

OPEN MUSIC THEORY

VERSION 2

*Mark Gotham | Kyle Gullings | Chelsey Hamm
Bryn Hughes | Brian Jarvis | Megan Lavengood | John Peterson*

OPEN MUSIC THEORY

Version 2

Authors

Mark Gotham; Kyle Gullings; Chelsey Hamm; Bryn Hughes; Brian Jarvis;
Megan Lavengood; and John Peterson

Contributors

John Kocur; Samuel Brady; Brian Moseley; Kris Shaffer; Levi Langolf; and
Scott Hanenberg



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NOTE ON PDF VERSION

This book is designed web-first. Much of the content (especially music examples) is accessible only on the web. While we provide a PDF for those who would like it, we do not prioritize optimization for PDF. We highly recommend viewing on the web whenever possible.

INTRODUCTION

Open Music Theory (OMT) is an open educational resource intended to serve as the **primary text and workbook** for undergraduate music theory courses.

Features

Instructor Resources	
I. Fundamentals	+
II. Counterpoint and Galant Schemata	+
III. Form	+
IV. Diatonic Harmony, Tonicization, and Modulation	+
V. Chromaticism	+
VI. Jazz	+
VII. Popular Music	+
VIII. 20th- and 21st-Century Techniques	+

Diverse topics



*Notated example with
embedded MuseScore
player*

NO COST

Unlike textbooks from big name publishers which cost hundreds of dollars, *OMT* is completely free to use.

MOBILE-FRIENDLY

The whole textbook is natively online and responsive to mobile devices, which means students can comfortably use the textbook on their smartphones.



Interactive content

DIVERSE TOPICS

OMT provides not only the material for a complete traditional core undergraduate music theory sequence (fundamentals, diatonic harmony, chromatic harmony, form, 20th-century techniques), but also several other units for instructors who have diversified their curriculum, such as jazz, popular music, counterpoint, and orchestration. This was made possible through collaboration between many different music theorists with expertise in these subfields.

Assignments from the internet

rs and Rhombus (Easy) (pdf)
for Lines, PEs in dyphus, Rhombus (pdf)
Signatures, Rhombus (pdf)
a Signatures, Counting (pdf)
rs, Rhombus (p. 4) (pdf)
+ (pdf)
+ (pdf, pdf)
+ (pdf, pdf)

Assignments

for Lines (pdf, docx)
for Lines (pdf)

Assignments for each chapter

FLEXIBLE CURRICULUM DESIGN

This book covers all the topics in a traditionally-conceived theory sequence, but the sections in *OMT* need not be taught in a specific order. Most sections are written so that a student only needs familiarity with music fundamentals before studying a given approach or repertoire, which makes this book an excellent choice for schools with modular curricula. Each section's introduction clearly states what prerequisite knowledge is assumed for that section.

INCLUSIVE

The authors of *OMT* carefully selected music examples to represent people of diverse races and genders.

MULTIMEDIA

OMT takes full advantage of the online and web-based format and includes audio and video examples throughout. Where traditional textbooks instead create a roadblock for students by requiring them to navigate to a separate website or perform the examples themselves, *OMT* has embedded these things directly alongside the text for easy access.

INTERACTIVE

Many chapters include interactive content that allow students to easily test their knowledge on a concept and immediately find the correct answer, facilitating self-teaching.

WORKBOOK

Each chapter (with a few exceptions) features at least one accompanying worksheet intended to serve as a homework assignment on the topic. Worksheets are always given as PDFs and as an editable format (MuseScore or Word document). This allows flexibility for students to complete the assignment on paper or on their devices, and for instructors to edit the assignments to better fit their own goals. Many chapters also collect links to other online resources for studying music theory.

INSTRUCTOR RESOURCES AND COMMUNITY

Answer keys, exams, sample course outlines, a discussion board, and more are available in our Humanities Commons group, so that any instructor using *OMT* can share material with others (more information [below](#)).

Version 2

Version 2 of this textbook is collaboratively authored by Mark Gotham, Kyle Gullings, Chelsey Hamm, Bryn Hughes, Brian Jarvis, Megan Lavengood, and John Peterson.

Each author led certain parts of the textbook. Dr. Hamm led fundamentals and co-led Post-tonal; Dr. Gotham led the Anthology, 12-tone Serialism, and Orchestration sections; Dr. Gullings led the assignments and workbook for all chapters; Dr. Hughes co-led Pop and Post-tonal; Drs. Jarvis and Peterson led Harmony and Form; Dr. Lavengood led Jazz and co-led Pop and edited many of the chapters of the book. Furthermore, each chapter individually lists the authors that wrote that chapter.

While the majority of our chapters are entirely new to *OMT* v. 2, we are indebted to the vision of [Version 1](#). Version 1 was built on resources authored by Kris Shaffer, Bryn Hughes, and Brian Moseley, edited by Kris Shaffer and Robin Wharton, and is published by [Hybrid Pedagogy Publishing](#). Version 1 will continue to live at <http://openmusictheory.github.io>.

Accessibility

We are committed to the principles of accessibility on the web.

- We use some less-standard terminology to help readers who use screen readers; in particular, we never use a capital/lowercase letter M to distinguish major and minor qualities, and instead use the abbreviations “ma” and “mi.” Hopefully this nomenclature will become more common over time.
- While capital and lowercase do reflect quality in Roman numerals, quality can also be inferred from context and is thus not essential information for screen readers.

- Alt text is provided for all images.
- Many examples and homework assignments use MuseScore, which is an [accessible score reader](#).

If you notice something that we can do better, please let us know through [Suggestions and Feedback](#).

Updates

We do not make major changes to the content or organization of the book during the school year (September–May) to avoid disrupting classroom instruction. We will, however, continue to fix small mistakes and improve aesthetics between versions, as this is one of the benefits of our open access format. Use [Suggestions and Feedback](#) to report any typos, broken links, or anything else you might come across that needs fixing, as well as ideas for new content. Any time we have a major update, we will list it in the [changelog](#).

Resources and Community for Instructors

Are you unsure how to use this book in your courses? Would you like access to answer keys for worksheets, or sample exams? We have set up a community for instructors on Humanities Commons so that anyone using *OMT* can share material with other instructors. The community also has a discussion board. [Fill out this form to request an invitation to the instructor community](#).

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ACKNOWLEDGMENTS

Authorship

The authorship of *OMT* is not quite like other textbooks. This was a collaborative venture that brought together many people. The authors listed on our front cover wrote the majority of the chapters, but we have additional contributors that wrote some chapters as well. For this reason, each chapter of the book is attributed to the specific people who primarily authored that chapter.

The primary authors of the book were each responsible for leading the writing and editing of certain sections, as follows:

- Workbook: Dr. Gullings
- [Fundamentals](#): Dr. Hamm
- [Counterpoint and Galant Schemas](#): Dr. Gotham
- [Form](#): Dr. Jarvis and Dr. Peterson
- [Diatonic Harmony, Tonicization, and Modulation](#): Dr. Peterson
- [Chromaticism](#): Dr. Jarvis and Dr. Hughes
- [Jazz](#): Dr. Lavengood
- [Popular Music](#): Dr. Hughes and Dr. Lavengood
- [20th- and 21st-c. Techniques](#): Dr. Gotham and Dr. Lavengood
- [Twelve-tone Music](#): Dr. Gotham
- [Orchestration](#): Dr. Gotham

Contributors

Many people contributed to this text beyond the authors. Their names and contributions are listed below.

- **Brian Moseley, *OMT* Version 1 author**

- **Kris Shaffer, *OMT Version 1* author**
- Brice Bach, MuseScore typesetting
- Samuel Brady, first author of the [Roman Numerals and SATB Chord Construction](#), and [Texture](#) chapters, and third author of the [The Basics of Sight-singing and Dictation](#) chapter
- Ben Corbin, video
- Paul Curran, editing
- Gabriel Gravini, worksheet editing
- Scott Hanenberg, author of the [Drumbeats](#) chapter
- Helen Hazard, worksheet editing
- Michael Kahle, examples for tonal analysis worksheets
- John Kocur, author of the [Chord-Scale Theory](#) chapter
- Levi Langolf, author of the [Examples for Sight-Counting and Sight-Singing: Level 1](#) and [Examples for Sight-Counting and Sight-Singing: Level 2](#) chapters
- John Lopez, video
- Sarah Loudon, graphics
- Aaron Loveless, editing
- Fe Miranda, MuseScore typesetting
- Nathaniel Mitchell, video editing and graphics
- Christina Ortiz, MuseScore typesetting
- Emma Pivetta, research assistant
- David Randolph, worksheet editing
- Lauren Reynolds, editing
- Brendan Schnabel, teaching and research assistant piloting [Jazz](#) chapters
- Garrett Schumann, music examples
- Matthew Shelley, editing
- Jacob Tews, video
- Silvana Uhorchuk, MuseScore typesetting
- [Evan Williams](#), Python scripts

Artwork

The cover, logo, and related imagery were designed by [Bethany Nistler](#). All rights reserved.

Financial Support

Version 2

Funding for Version 2 came primarily from a Course Redesign grant from [Virginia's Academic Library Consortium \(VIVA\)](#).

Version 1

Major funding and technological support (including the building of the technology behind the interactive music notation modules found in Version 1) came from the team at [Trinket](#).

The first major edition of OMT was made possible financially by [a crowdfunding campaign](#) in the summer of 2014. Many thanks to the donors who supported the project (listed on the [about page of Version 1](#)).

STATEMENT ON SPOTIFY USAGE



Zoë Keating
@zoecello

A deposit appeared in my account today and so I am sharing it as an artist data point...even though few people give a hoot about this anymore

Sept 2019
206,011 Spotify streams
\$753

\$0.003655144628199 per stream

2:55 PM · Nov 21, 2019

To keep this resource accessible and low-cost, we have opted to use Spotify links for audio examples for tracks which otherwise would cause OMT to incur considerable copyright costs. This book is best accessed if the user has a Spotify Premium account. Student accounts are half the cost of normal premium accounts, so we are hopeful that this does not dissuade many users. [Sign up for Spotify Premium for Students here.](#)

We also state that Spotify is well-known to be bad for artists because of its pay scheme. We encourage readers to support artists directly by purchasing music when they can.

Media Attributions

twitter-screenshot © Zoë Keating

INSTRUCTOR RESOURCES

We have set up a community for instructors on Humanities Commons so that anyone using *OMT* can share material with other instructors. The community also has a discussion board.

The instructor community provides many resources:

- Course calendars and syllabi for core theory classes and electives
- Answer keys for worksheets
- Additional assignments and projects
- Sample exams
- Discussion board

Fill out this form to request an invitation to the instructor community.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=6517>

CHANGELOG

Below is a list of major edits and improvements to *OMT*. Minor edits (fixing typos, adding worksheets, aesthetic changes, etc.) are not necessarily listed.

We will not make major changes to the textbook during the school year (September–May).

Summer 2022

- All chapters are line-edited for improved clarity, consistency, and accuracy. Thanks to Erin K. Maher for editing *OMT*!
- The chapter “Half- and Whole-Steps and Accidentals” is now titled [“Half Steps, Whole Steps, and Accidentals.”](#) The URL is unchanged.
- The chapter “Mi (scale degree 3) in the bass at beginnings” is now titled [“The mediant harmonizing mi \(scale-degree 3\) in the bass.”](#) The URL is now [`https://viva.pressbooks.pub/openmusictheory/chapter/the-mediator`](https://viva.pressbooks.pub/openmusictheory/chapter/the-mediator).
- Added [Chapters in Development](#) section, where authors will soft-launch new material to be added to *OMT* in future years.
- Replaced M/m abbreviations for quality (major/minor) with ma/mi, which are more accessible for people using screen readers.

FÜR DEUTSCHSPRACHIGE

[View in English](#)

Herzlich willkommen zu Open Music Theory!

Obwohl dieses Lehrwerk in englischer Sprache (American English) verfasst ist, wird es dennoch auf der ganzen Welt gelesen und verwendet. Und auch wenn wir leider nicht die Möglichkeiten haben, fachgenaue Übersetzungen des Lehrwerks in allen möglichen Sprachen zu erstellen, freuen wir uns sehr darüber, wenn internationale Leser von den Inhalten profitieren können.

Natürlich sind die Musikbeispiele für all diejenigen, die mit westlicher Musiknotation vertraut sind, gleichermaßen lesbar und zu verstehen; zudem sind Menschen auf der ganzen Welt zunehmend mit der englischen Sprache vertraut und automatische Übersetzungsprogramme gewinnen an Qualität und werden immer präziser.

... Doch leider stoßen automatische Übersetzungen immer wieder an ihre Grenzen und sollten daher mit Vorsicht genossen werden, insbesondere bei fachsprachlichen Texten mit entsprechenden musikspezifischen Termini. Und selbst bei Übersetzungen durch den Menschen zeigen sich weiterführende Probleme, die in unterschiedlichen pädagogischen Konventionen und Traditionen des Faches begründet sind.

In einer kurzen Einführung werden wir (als sowohl englische als auch deutsche Muttersprachler/-innen) drei besonders schwierige Aspekte beleuchten:

1. Es gibt englische sowie deutsche Fachbegriffe, für die es keine Entsprechung in der jeweils anderen Sprache gibt. Also kann in solchen Fällen keine korrekte Übersetzung erstellt werden und wir müssen darauf hoffen, dass das Englische ausreichende Klarheit bringt und die Bedeutung verstanden wird.
2. Selbst bei ganz grundlegenden Begriffen kann es sein, dass eine direkte Übersetzung womöglich nicht alle Bedeutungsebenen abbildet. Glücklicherweise sind sich das Deutsche und das

amerikanische Englisch in dieser Hinsicht relativ nahe. Man denke dabei an die direkte Entsprechung der Begriffe „quarter note“ und „Viertelnote“ – eine Entsprechung, die es im britischen Englisch oder aber im Französischen nicht gibt.

3. Hinzu kommen noch einige besondere Fälle, in denen Begriffe, die auf den ersten Blick scheinbar wie Entsprechungen aussehen, in Wahrheit unterschiedlich verwendet werden. Ein Begriff, der womöglich die größte Verwirrung mit sich bringt und zudem auch noch äußerst häufig verwendet wird, ist „parallel“. In der modernen deutschen Theoriesprache wird der Begriff verwendet, um die Beziehung von Dur- und Moll-Tonarten, die sich dieselben Vorzeichen teilen (z. B. C-Dur und a-Moll), sowie die Beziehung dieser Akkorde selbst zueinander zu beschreiben. Im (britischen wie auch amerikanischen) Englischen wird diese Beziehung als „relativ“ bezeichnet; der Begriff „parallel“ hingegen meint die Beziehung von Dur- und Moll-Akkorden auf demselben Grundton (z. B. die Varianttonarten C-Dur und c-Moll). Auch wenn es sich hierbei natürlich lediglich um ein einzelnes Beispiel handelt, so ist es doch neben weiteren vermutlich der verwirrendste Fall.

Wir hoffen, dass diese kurzen Hinweise hilfreich für Sie sind und Ihnen dabei helfen, von der OMT profitieren zu können.

—Mark Gotham und [Andreas Feilen](#)

Welcome to Open Music Theory!

This textbook is written in American English, but we have readers and users all over the world. While we don't have the resources to make thorough translation into multiple languages, we are very pleased if international users can benefit from what's here—the musical examples are equally legible to anyone familiar with Western music notation, ever more of world's inhabitants speak ever better English, and the quality of automatic translation is likewise improving all the time.

But beware automatic translation, especially for specialist language like the music-specific terminology used here. And with machine or human translation, there are confusing differences between different languages pedagogical conventions that go beyond simple translation. In this brief introduction, we shine a light on three particularly difficult aspects.

1. There are terms which exist in German for which there is no English equivalent and vice versa. In that case, there is no correct translation, and we have to hope that the meaning is clear enough from the English.
2. Even basic terminology can be structured in a different way that defies direct translation. Fortunately,

German and American English are relatively close to one another in this respect. Note, for example, the very direct translation between “quarter note” and “Viertelnote”. The same is not true of British English or French.

3. Finally, there are some special pitfalls where what looks like the same terms is actually used differently. Perhaps the most confusing and commonly used term here is “parallel.” Modern German music theory pedagogy uses “Parallel” to describe the relationship between two keys with the same key signature (e.g., C major and a minor) and for the same relationship between triads. English (British and American) music theory use “relative” for this and “parallel” for keys and triads on the same root (e.g., C major and c minor, “Varianttonarten” in German). This is just one term, but a particularly confusing one that percolates through wider differences.

We hope these brief caveats are useful and you will be able to benefit from OMT.

—Mark Gotham

POUR LES FRANCOPHONES

[*View in English*](#)

Bienvenue dans l'Open Music Theory!

Ce manuel est écrit en anglais américain, mais nous avons des lecteurs et des utilisateurs partout dans le monde. Bien que nous n'ayons pas les ressources nécessaires pour effectuer une traduction complète dans plusieurs langues, nous sommes très heureux si les utilisateurs internationaux peuvent bénéficier de ce qui se trouve ici. Il est clair que :

- les exemples musicaux sont compréhensibles pour quiconque est familier avec la notation musicale occidentale,
- de plus en plus d'habitants du monde parlent de mieux en mieux anglais, et
- la qualité de la traduction automatique s'améliore également tout le temps.

... Mais méfiez-vous de la traduction automatique, en particulier pour le vocabulaire spécialisé comme la terminologie musicale utilisée ici. Les cultures et langues ont des conventions pédagogiques différentes qui vont au-delà de difficultés de traduction, qu'elle soit automatique ou humaine. Cette brève introduction met en lumière trois aspects potentiellement difficiles.

Premièrement, il existe des termes qui existent en français mais pour lesquels il n'existe pas d'équivalent en anglais et vice versa. Dans ce cas, il n'y a pas de traduction correcte, et nous devons espérer que le sens soit suffisamment clair à partir de l'anglais.

Deuxièmement, même la terminologie de base peut être structurée d'une manière différente qui défie la traduction directe. Par exemple, la « ronde » est appelée « whole » en anglais américain, remplissant une mesure 4/4, et les « blanches » et « noires » sont nommées « half » et « quarter », représentant à chaque fois la moitié de la durée précédente. L'allemand aborde cela d'une manière très similaire, mais le français ne le fait pas. (Soit dit en passant, l'anglais britannique est encore plus compliqué!)

Enfin, la pédagogie française utilise généralement le système dit de « solfège fixe » (« fixed-do » en anglais). Un « ré » est toujours un « ré », ce qui se note « *pitch D* » pour les américains. Le Gloria de Vivaldi, en Ré majeur, est ainsi en « D major ». Lorsque l'anglais américain utilise les syllabes « Do » ou « Ré », c'est le plus souvent dans un système de « solfège mobile » (« moveable-do », utilisé aussi par la méthode Kodály) : « Do » fait référence à la tonique de la gamme, et « Ré » au degré au-dessus. La première note du Gloria de Vivaldi, un « Ré » en français, est ainsi solfiée... « Do » !

Nous espérons que ces brèves mises en garde vous seront utiles et que vous pourrez profiter de l'OMT. Merci de nous contacter si vous rencontrez d'autres difficultés qui, selon vous, devraient être énumérées ici.

— Mark Gotham, avec remerciements à [Zélie Jouenne](#) et [Mathieu Giraud](#).

Welcome to Open Music Theory!

This textbook is written in American English, but we have readers and users all over the world. While we don't have the resources to make thorough translation into multiple languages, we are very pleased if international users can benefit from what's here. Clearly the musical examples are equally legible to anyone familiar with Western music notation, even more if world's inhabitants speak ever better English, and the quality of automatic translation is likewise improving all the time.

... But beware automatic translation, especially for specialist language like the music-specific terminology used here. And even with machine or human translation, there are confusing differences between different languages pedagogical conventions that go beyond simply translation. This brief introduction shines a light on three potentially difficult aspects.

1. First, there are terms which exist in French for which there is no English equivalent and vice versa. In that case, there is no correct translation, and we must hope that the meaning is clear enough from the English.
2. Second, even basic terminology can be structured in a different way that defies direct translation. For example, American English uses a system for note names with “whole” for the note value that fills a 4/4 measure, “half” for half of that duration, and so on. The German language approaches this in a very similar way, but French does not. (Incidentally, neither does British English which is even more complicated!)
3. Finally, French pedagogy typically uses what's called the “fixed-do” system of solfège, with “Do” always referring to the pitch “C”, “Re” to the pitch “D”, and so on. American English, by contrast,

uses “moveable-do” (cf. the Kodály method), such that “Do” refers to the tonic scale degree of whatever key we’re in, and “Re” to the scale degree above that. You will never ever see American English describe a piece as being in “Re Major”.

We hope these brief caveats are useful and you will be able to benefit from OMT. Please let us know if you come across other big difficulties that you think should be listed here.

— Mark Gotham

HELPFUL DOCUMENTS

Below are links to several PDFs that students may find helpful in their study of music theory.

Staff paper

- [Blank staff paper](#)
- [Piano staff paper \(two staves bracketed together\)](#)
- [Half staff, half blank horizontal split](#)
- [Half staff, half blank vertical split](#)

Set Theory

- [Clock faces \(letter names\)](#)
- [Clock faces \(integers\)](#)

Technology

- [MuseScore keyboard shortcuts cheat sheet](#)

I. FUNDAMENTALS

FUNDAMENTALS CHAPTERS

- Introduction to Western Musical Notation
- Notation of Notes, Clefs, and Ledger Lines
- Reading Clefs
- The Keyboard and the Grand Staff
- Half Steps, Whole Steps, and Accidentals
- American Standard Pitch Notation (ASPN)
- Other Aspects of Notation
- Rhythmic and Rest Values
- Simple Meter and Time Signatures
- Compound Meter and Time Signatures
- Other Rhythmic Essentials
- Major Scales, Scale Degrees, and Key Signatures
- Minor Scales, Scale Degrees,

This section introduces students to the basics of music notation, including rhythm, pitch, and expressive markings. Students also learn to construct and identify rudimentary harmonies, including intervals (two-note chords), triads (three-note chords), and seventh chords (four-note chords).

Prerequisites

The Fundamentals section assumes no previous familiarity with Western musical notation. However, each chapter in this section assumes familiarity with all preceding chapters; for that reason, it is recommended that chapters are studied in order.

Organization

In the section's first chapter, [Introduction to Western Musical Notation](#), students are encouraged to think about the ways in which they might write down (or notate) their favorite song or composition. The next six chapters ([Notation of Notes, Clefs, and Ledger Lines](#) through [Other Aspects of Notation](#)) focus upon the notation of pitch and the expressive and stylistic conventions of Western musical notation.

Next, students are introduced to the conventions of Western rhythmic notation in the subsequent four chapters ([Rhythmic and Rest Values](#) through [Other Rhythmic Essentials](#)). Pitch is then revisited, beginning with the spelling and identification of scales, key signatures, the diatonic modes, and the chromatic collection (in [Major Scales, Scale Degrees, and Key Signatures](#) through [Introduction to Diatonic Modes and the Chromatic “Scale”](#)).

The following chapter, [The Basics of Sight-singing and Dictation](#), presumes knowledge of the concepts in all previous chapters. It can be used as a stand-alone chapter in an aural skills class or within the context of a music theory or fundamentals course. Finally, the construction of harmonies is explored, from two-note [Intervals](#) through four-note [Seventh Chords](#).

The [Triads](#) and [Seventh Chords](#) chapters deliberately do not include inversion or figured bass, as this is covered as a separate topic ([Inversion and Figured Bass](#)). This chapter, along with [Roman Numerals and SATB Chord Construction](#) and [Texture](#), can be used as introductions to part-writing, counterpoint, music appreciation, or music history courses.

and Key Signatures

- Introduction to Diatonic Modes and the Chromatic “Scale”
- The Basics of Sight-singing and Dictation
- Intervals
- Triads
- Seventh Chords
- Inversion and Figured Bass
- Roman Numerals and SATB Chord Construction
- Texture

Audience

The Fundamentals section is designed for a wide audience, including high school students (and those taking AP Music Theory), collegiate non-music majors (and musical theater majors), and collegiate music majors.

INTRODUCTION TO WESTERN MUSICAL NOTATION

Chelsey Hamm

KEY TAKEAWAYS

- The term “Western musical notation” refers to written symbols that are used to communicate musical sounds.
- Western musical notation is one of many different systems of musical notation that appear across time spans, places, and cultures.
- Someone who writes down music chooses a musical notation system based on these factors, also known as their social context or milieu.

Music is an auditory or aural art form that can be represented visually with notation.

Think about what it’s like to translate one language to another. It can be a challenging task—a direct word-for-word translation isn’t always possible or useful, so a translator needs to think about how best to communicate to the reader. Similarly, writing down sounds involves making decisions about what needs to be communicated and how. No system of notation could capture every aspect of sound in full detail and still be useful or readable, so only some musical elements can be depicted.

Despite this, there are several advantages to written musical notation: a written musical work does not need to be memorized, and details can be recorded that might otherwise be forgotten. Additionally, written notation makes musical works accessible to more people, since anyone who knows the notation system can learn a notated work on their own without the help of a teacher.

Imagine inventing a way to write down a favorite song or musical work so that a musician could perform

it without ever having heard it before. In the assignment below (“Inventing a Notation System”), you’ll have the opportunity to do this for a specific musical work or song of your choice. Here are some questions to consider as you think about creating your own musical notation system:

1. What are the most important musical features of the work? What are the less important musical features?
2. What are the musical features that you would write down? Are there any that you would leave out?
3. Would your answers to questions 1 and 2 change if you were writing down a different song or work?
4. How would you explain your notation system to someone else?

Online Resources

- [“How was Musical Notation Invented? A Brief History.” \(WQXR\)](#)
- [“How did Music Notation Actually Begin?” \(Classic FM\)](#)

Assignments

1. Inventing a Notation System ([.pdf](#), [.docx](#)); Rubric ([.pdf](#), [.docx](#))

NOTATION OF NOTES, CLEFS, AND LEDGER LINES

Chelsey Hamm

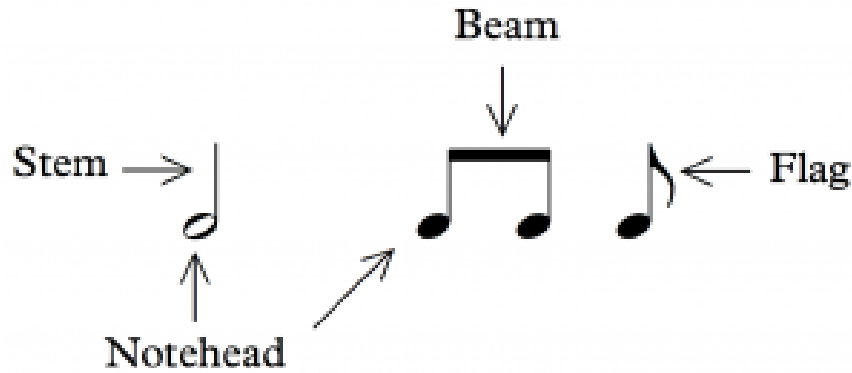
KEY TAKEAWAYS

- A note indicates both pitch and rhythm.
- Notes are written on a staff. Notes with a higher frequency (shorter wavelength) are written higher on the staff than notes with a lower frequency (longer wavelength). That is, higher notes are placed above lower ones.
- A notehead must be written carefully on a staff. A notehead is oval (not round); additionally, it should be neither too large nor too small, and it is tilted slightly upward toward the right.
- The stems of notes can point either upward (on the right side of a note) or downward (on the left side of a note). For notes above the middle line, the stem points downward, and for notes below the middle line, stems point upward. Notes on the middle line can point in either direction, depending on the surrounding notes.
- Writing seconds always involves displacing one note to the left or right of a stem. The lower note always goes on the left, regardless of whether the stem points up or down.
- A clef indicates which pitches are assigned to the lines and spaces on a staff.
- Extra lines called ledger lines extend a staff higher or lower.

Western musical notation privileges two musical features: pitch and rhythm. Pitches are notated vertically (on the y -axis), while rhythms are notated horizontally (on the x -axis). Western musical notation is read left-to-right and top-to-bottom, like the page of a book in written English.

Notation of Notes

A note indicates both pitch and rhythm. Each written note consists of a notehead (either empty or filled in) and may also have a stem and a beam or flag (see [Rhythmic and Rest Values](#)). **Example 1** shows an illustration of noteheads, stems, beams, and flags:

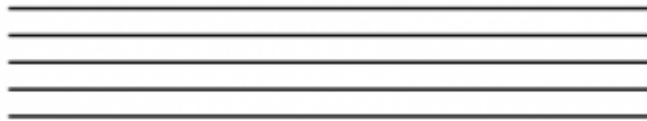


Example 1. Noteheads, stems, beams, and flags.

Staff Notation

A staff (plural “staves”) is essential for conveying pitch. A staff consists of five horizontal lines, evenly spaced, and each note is placed on the line or space that corresponds to its pitch (see [Clefs](#) below).

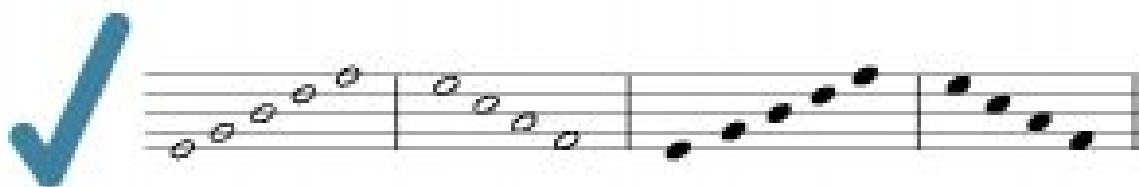
Example 2 depicts a staff:



Example 2. A staff.

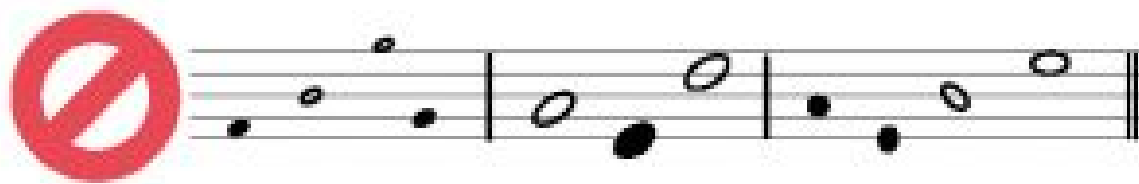
Placing Notes on a Staff

Noteheads on a line should fill in half of each space above and below. Noteheads in a space should just touch the lines above and below. **Example 3** shows examples of correct noteheads, both open and filled in, both on lines and in spaces:



Example 3. Correct noteheads, open (white) and filled in (black), both on lines and in spaces.

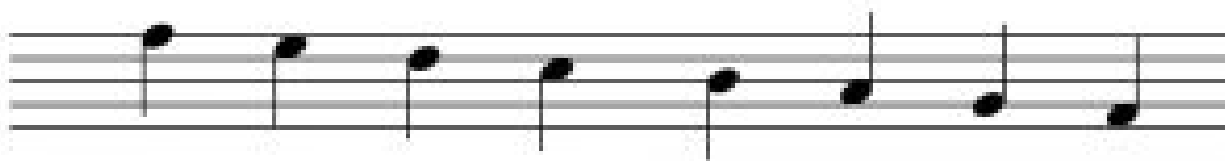
Noteheads should be oval (not round), and they are tilted slightly upward toward the right. **Example 4** shows incorrect noteheads. As you can see, noteheads can be drawn too small, too big, or the wrong shape.



Example 4. Incorrect examples of noteheads.

Stems and Beams

The stems of notes can point either upward (on the right side of a note) or downward (on the left side of a note). For notes above the middle line, the stem points downward, and for notes below the middle line, stems point upward. Notes on the middle line can point in either direction, depending on the surrounding notes. This is shown in **Example 5**:



Example 5. Correct stemming directions.

Stemming directions and beaming conventions are discussed more in [Simple Meter and Time Signatures](#) and [Compound Meter and Time Signatures](#). When hand-drawing stems, their length is equal to four lines of the staff. Beams are about four times thicker than stems.

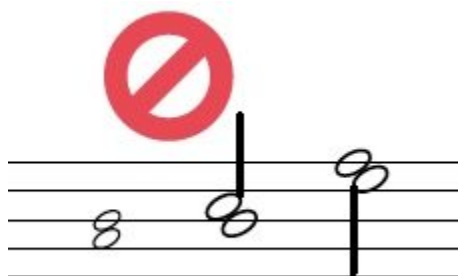
Drawing Seconds

When notes at the interval of a second (see the [Generic Intervals](#) section of [The Keyboard and the Grand Staff](#)) occur harmonically, they are on an adjacent line and space of the staff, so one note needs to be displaced to the left or right of the stem. The lower note always goes on the left, regardless of whether the stem points up or down. **Example 6** shows the correct way to draw seconds:



Example 6. Three correct seconds.

Seconds should not be stacked on top of one another, nor should the lower note be on the right, as seen in **Example 7:**



Example 7. Three incorrect seconds.

Drawing seconds in seventh chords is discussed in [Seventh Chords](#).

Clefs

The notes drawn on the lines and spaces of a staff represent pitches. Musicians use spatial metaphors to describe notes placed on a staff: notes appearing toward the top of the staff are said to be “higher” than those toward the bottom, which are said to be “lower.” Higher pitches are produced by sound waves with a shorter wavelength (and consequently a higher frequency); sound waves with a longer wavelength (lower

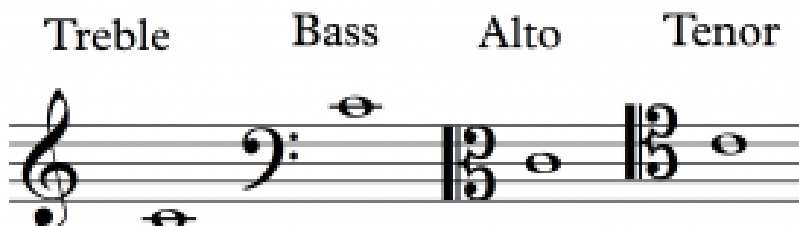
frequency) produce lower pitches. Such spatial metaphors vary with milieu—i.e. across cultures and time periods. For example, for some music theorists in ancient Greece, higher-sounding notes were visually placed below lower-sounding notes.¹ As **Example 8** demonstrates, this is because these theorists were likely most familiar with string instruments that functioned similarly to the violins, guitars, and harps we know today.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=29#oembed-1>

Example 8. *Dr. Jacob Tews (Christopher Newport University) explains more about ancient Greek musical notation.*

For notes to convey pitch information beyond “higher” and “lower,” the staff on which they appear must include a clef. A clef indicates which pitches are assigned to the lines and spaces on a staff (see also [Reading Clefs](#)). The two most commonly used clefs today are the treble clef and bass clef. Two other clefs that you may encounter are the alto clef and the tenor clef. **Example 9** shows the same pitch placed after the treble, bass, alto, and tenor clefs:



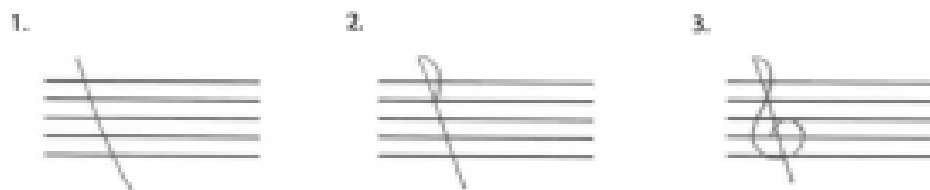
Example 9. *The same pitch placed after a treble, bass, alto, and tenor clef.*

Higher notes, such as those played by a flute or sung by a soprano, are usually written in treble clef, and lower notes, such as those played by a trombone or sung by a bass, are usually written in bass clef. Alto and tenor clefs are relatively rare compared to treble and bass. But in some cases, alto clef is used for medium-high notes, and tenor clef is used for medium-low notes.

1. For one example, see André Barbera, *The Euclidean Division of the Canon: Greek and Latin Sources. New Critical Texts and Translations on Facing Pages, with an Introduction, Annotations, and Indices Verborum and Nominum et Rerum* (Lincoln: University of Nebraska Press, 1991), 276–9.

Drawing Clefs

One can draw a treble clef in three simple steps, as demonstrated in **Example 10**:



Example 10. Drawing a treble clef in three steps.

1. Draw a slanted vertical line that extends slightly above and below the staff.
2. Draw a half circle that intersects with your slanted line at the second staff line from the top.
3. Circle around the second staff line from the bottom.

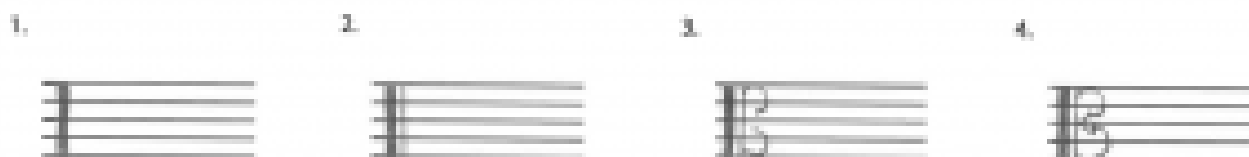
Likewise, one can also draw a bass clef in three steps, as shown in **Example 11**:



Example 11. Drawing a bass clef in three steps.

1. Draw a dot on the second staff line from the top.
2. Draw a backward C that ends in the bottom space of the staff, making sure that the top part of the C does not extend above the staff.
3. Place two dots to the right of the backward C, in the top two spaces of the staff.

One can draw an alto clef in four steps, as **Example 12** shows:



Example 12. Drawing an alto clef in four steps.

1. Draw a thick vertical line that spans the staff.
2. Draw a thinner vertical line next to it.
3. Draw two backward Cs, the first taking up slightly less than the top half of the staff and the second taking up slightly less than the bottom half of the staff.
4. Connect these backward Cs with a point that rests on the middle line of the staff.

As seen in **Example 13**, the tenor clef is drawn the same way as the alto clef, just shifted up one line of the staff higher. The vertical lines in steps 1 and 2 begin on the second staff line from the bottom and extend slightly above the staff. The first backward C extends slightly above the top half of the staff, and the second takes up slightly less than the middle two spaces of the staff. The point connecting them rests on the second staff line from the top.



Example 13. Drawing a tenor clef in four steps.

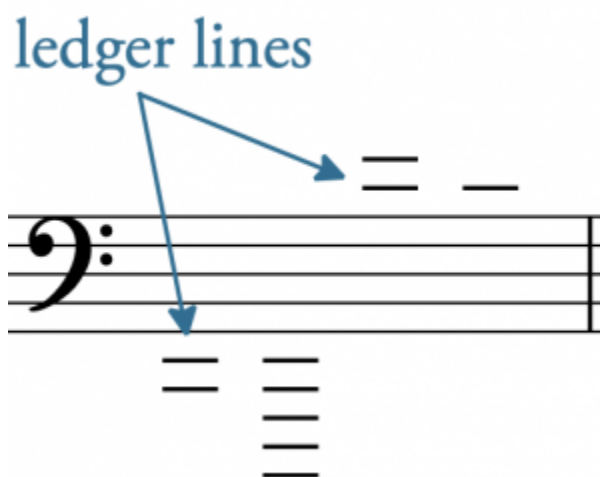
Sometimes when musicians draw the alto or tenor clef, they do so by writing the letter “K” as a form of shorthand. **Example 14** shows this:



Example 14. Using the letter “K” to draw the alto and tenor clefs.

Writing Ledger Lines

When notes are too high or low to be written on a staff, small lines called ledger lines are drawn to extend the staff. **Example 15** shows ledger lines written above and below a staff:



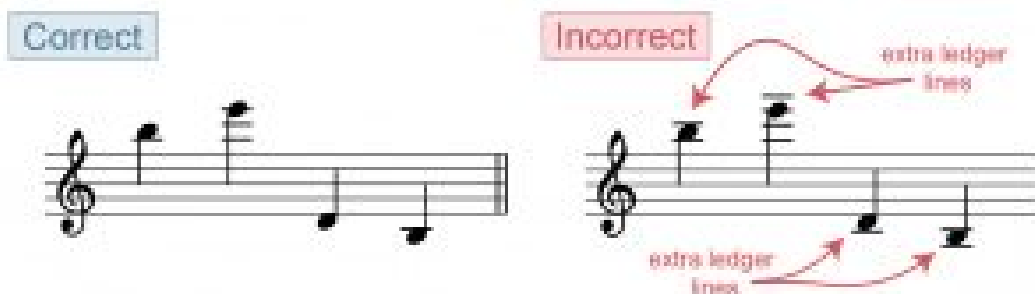
Example 15. Ledger lines, both above and below a staff with a bass clef.

Example 16 shows notes (with stems and beams) drawn on ledger lines, above and below a staff.



Example 16. Notes (with stems and beams) on ledger lines, above and below a staff with a treble clef.

When writing ledger lines, be sure not to put in an extra ledger line above or below the note you are writing. **Example 17** first shows the correct way of writing notes on ledger lines, followed by the incorrect way, with extra ledger lines above and below the notes:



Example 17. Correct and incorrect notation of ledger lines.

Online Resources

- [Pitch and Frequency \(the Physics of Sound\) \(physicsclassroom.com\)](https://www.physicsclassroom.com)
- [The Music Staff \(essential-music-theory.com\)](https://essential-music-theory.com)
- [Drawing Notes \(YouTube\)](#)
- [Clefs \(Music Notes Now\)](#)
- [Drawing Treble and Bass Clefs \(YouTube\)](#)
- [Drawing C Clefs \(Ultimate Music Theory\)](#)
- [The Staff, Clefs, and Ledger Lines \(musictheory.net\)](https://musictheory.net)
- [Music Notation Style Guide \(Indiana University\)](#)

Assignments from the Internet

- A. The Staff ([.pdf](#))
- B. Drawing Notes on Lines and Spaces, High and Low ([.pdf](#))

Assignments

1. Writing Noteheads, Clefs, and Ledger Lines ([.pdf](#), [.docx](#))

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Footnotes

READING CLEFS

Chelsey Hamm

KEY TAKEAWAYS

- Pitch in Western musical notation is designated by the letters A, B, C, D, E, F, and G, which repeat in a loop.
- Different clefs make reading different ranges easier.
- Each clef indicates how the lines and spaces of the staff correspond to pitch.

In Western musical notation, pitches are designated by the first seven letters of the Latin alphabet: A, B, C, D, E, F, and G. After G these letter names repeat in a loop: A, B, C, D, E, F, G, A, B, C, D, E, F, G, A, B, C, etc. This loop of letter names exists because musicians and music theorists today accept what is called octave equivalence, or the assumption that pitches separated by an octave should have the same letter name. More information about this concept can be found in the next chapter, [The Keyboard and the Grand Staff](#).

This assumption varies with milieu. For example, some ancient Greek music theorists did not accept octave equivalence. These theorists used more than seven letters of the Greek alphabet to name pitches.

Clefs and Ranges

The [Notation of Notes, Clefs, and Ledger Lines](#) chapter introduced four clefs: treble, bass, alto, and tenor. A clef indicates which pitches are assigned to the lines and spaces on a staff. In the next chapter, [The Keyboard and the Grand Staff](#), we will see that having multiple clefs makes reading different ranges easier. The treble clef is typically used for higher voices and instruments, such as a flute, violin, trumpet, or soprano voice. The bass clef is usually utilized for lower voices and instruments, such as a

bassoon, cello, trombone, or bass voice. The alto clef is primarily used for the viola, a mid-ranged instrument, while the tenor clef is sometimes employed in cello, bassoon, and trombone music (although the principal clef used for these instruments is the bass clef).

Each clef indicates how the lines and spaces of the staff correspond to pitch. Memorizing the patterns for each clef will help you read music written for different voices and instruments.

Reading Treble Clef

The treble clef is one of the most commonly used clefs today. **Example 1** shows the letter names used for the lines of a staff when a treble clef is employed. One mnemonic device that may help you remember this order of letter names is “Every Good Bird Does Fly” (E, G, B, D, F). As seen in **Example 1**, the treble clef wraps around the G line (the second line from the bottom). For this reason, it is sometimes called the “G clef.”



Example 1. The letter names for the lines with a treble clef.

Example 2 shows the letter names used for the spaces of a staff with a treble clef. Remembering that these letter names spell the word “face” may make identifying these spaces easier.



Example 2. The letter names for the spaces with a treble clef.

Reading Bass Clef

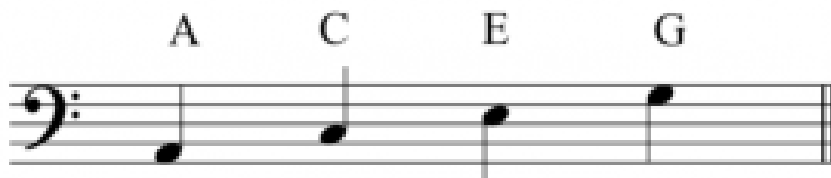
The other most commonly used clef today is the bass clef. **Example 3** shows the letter names used for the lines of a staff when a bass clef is employed. A mnemonic device for this order of letter names is

“Good Bikes Don’t Fall Apart” (G, B, D, F, A). The bass clef is sometimes called the “F clef”; as seen in **Example 3**, the dot of the bass clef begins on the F line (the second line from the top).



Example 3. The letter names for the lines with a bass clef.

Example 4 shows the letter names used for the spaces of a staff with a bass clef. The mnemonic device “All Cows Eat Grass” (A, C, E, G) may make identifying these spaces easier.



Example 4. The letter names for the spaces with a bass clef.

Reading Alto Clef

Example 5 shows the letter names used for the lines of the staff with the alto clef, which is less commonly used today. The mnemonic device “Fat Alley Cats Eat Garbage” (F, A, C, E, G) may help you remember this order of letter names. As seen in **Example 5**, the center of the alto clef is indented around the C line (the middle line). For this reason it is sometimes called a “C clef.”



Example 5. The letter names for the lines with an alto clef.

Example 6 shows the letter names used for the spaces of a staff with an alto clef, which can be remembered with the mnemonic device “Grand Boats Drift Flamboyantly” (G, B, D, F).



Example 6. The letter names for the spaces with an alto clef.

Reading Tenor Clef

The tenor clef, another less commonly used clef, is also sometimes called a “C clef,” but the center of the clef is indented around the second line from the top. **Example 7** shows the letter names used for the lines of a staff when a tenor clef is employed, which can be remembered with the mnemonic device “Dodges, Fords, and Chevrolets Everywhere” (D, F, A, C, E):



Example 7. The letter names for the lines with a tenor clef.

Example 8 shows the letter names used for the spaces of a staff with a tenor clef. The mnemonic device “Elvis’s Guitar Broke Down” (E, G, B, D) may make identifying these spaces easier.



Example 8. The letter names for the spaces with a tenor clef.

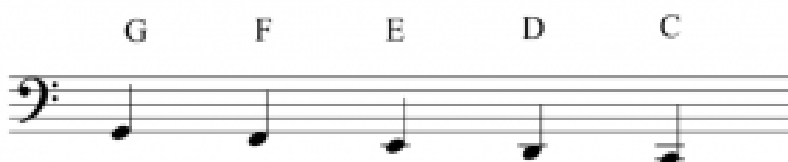
Ledger Lines

When notes are too high or low to be written on a staff, small lines are drawn to extend the staff. You may recall from the previous chapter that these extra lines are called ledger lines. Ledger lines can be used to extend a staff with any clef. **Example 9** shows ledger lines above a staff with a treble clef:



Example 9. Ledger lines extend a staff upwards with a treble clef.

Notice that each space and line above the staff gets a letter name with ledger lines, as if the staff were simply continuing upwards. The same is true for ledger lines below a staff, as shown in **Example 10**:



Example 10. Ledger lines extend a staff downwards with a bass clef.

Notice that each space and line below the staff gets a letter name with ledger lines, as if the staff were simply continuing downwards.

Online Resources

- [The Staff, Clefs, and Ledger Lines \(musictheory.net\)](https://musictheory.net)
- [Flashcards for Treble, Bass, Alto, and Tenor Clefs \(Richman Music School\)](#)
- [Printable Treble Clef Flash Cards \(Samuel Stokes Music\)](#) (pages 3 to 5)
- [Printable Bass Clef Flash Cards \(Samuel Stokes Music\)](#) (pages 1 to 3)
- [Printable Alto Clef Flash Cards \(Samuel Stokes Music\)](#)
- [Printable Tenor Clef Flash Cards \(Samuel Stokes Music\)](#)
- [Paced Game: Treble Clef \(Tone Savvy\)](#)
- [Paced Game: Bass Clef \(Tone Savvy\)](#)
- [Paced Game: Alto Clef \(Tone Savvy\)](#)
- [Paced Game: Tenor Clef \(Tone Savvy\)](#)

Assignments on the Internet

Easy

- A. Treble and Bass Clefs ([.pdf](#))
- B. Treble Clef ([.pdf](#))
- C. Bass Clef ([.pdf](#))
- D. Alto Clef ([.pdf](#))
- E. Tenor Clef ([.pdf](#))

Medium

- A. Worksheets in Treble Clef ([.pdf](#))
- B. Treble Clef with Ledger Lines ([.pdf](#))
- C. Worksheets in Bass Clef ([.pdf](#), [.pdf](#))
- D. Bass Clef with Ledger Lines ([.pdf](#))
- E. Worksheets in Alto Clef ([.pdf](#), [.pdf](#))
- F. Worksheets in Tenor Clef ([.pdf](#))

Advanced

- A. All Clefs ([.pdf](#))

Assignments

1. Writing and Identifying Notes Assignment #1 ([.pdf](#), [.mscx](#))
2. Writing and Identifying Notes Assignment #2 ([.pdf](#), [.mscx](#))

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THE KEYBOARD AND THE GRAND STAFF

Chelsey Hamm

KEY TAKEAWAYS

- Playing the piano will help you in your music theoretical studies by allowing you to engage kinesthetically with music.
- A pattern of black keys grouped into twos and threes repeats on the piano keyboard for seven octaves.
- The white note C is to the immediate left of the two-note black key pattern, while the white note F is to the immediate left of the three-note black key pattern.
- Piano players, also called pianists, read music on the grand staff.
- Middle C is the note that appears on the line between the two staves in a grand staff.
- When counting intervals on a piano keyboard, always count the first note as “one.”

Many students find studying music theory easier when they engage with music kinesthetically. In other words, physically creating sounds by playing a musical instrument (such as the piano) helps you to better visualize and audiate the music you are writing down or studying. This allows students to understand the relationship between different pitches more quickly.

The Piano Keyboard

Learning to play notes on the piano is one easy way to engage with music kinesthetically. You may find access to a piano keyboard (acoustic or electronic) at your school. You may also purchase an inexpensive electronic keyboard if you like. Another option is to download a free piano app that you can play on your phone, such as [Tiny Piano](#).

In **Example 1**, notice that the keyboard has both white keys and black keys. The black keys are grouped

into sets of either three or two. In **Example 2**, notice that the sets of three and two black keys alternate throughout the entire length of a piano keyboard, repeating the pattern for each octave.



Example 1. *A small portion of a piano keyboard.*



Example 2. *A larger portion of a piano keyboard.*

Playing the Piano

When you sit at the piano, it is important to sit up straight, keeping your head over your shoulders, which should be kept down. Your elbows should be a comfortable distance from your body, and your fingers should remain arched (as if you were pulling a library book off of a shelf). Keep your knees and wrists flexible (not stiff), and keep your feet flat on the ground unless you are using the pedals.

Example 3 explains how to achieve proper posture at the piano.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=1285#oembed-1>

Example 3. Dr. Benjamin Corbin (Christopher Newport University) demonstrates proper piano posture.

Octave Equivalence and White-Key Letter Names on the Piano Keyboard

Example 4 shows a piano keyboard with the letter names of the white key pitches labeled. The same letter names appear on different keys of the keyboard. As discussed in [the previous chapter](#), pitches in Western musical notation are designated by the letters A, B, C, D, E, F, and G, repeating in a loop. Because of the principle of octave equivalence in the Western system, pitches separated by an octave have the same letter name.



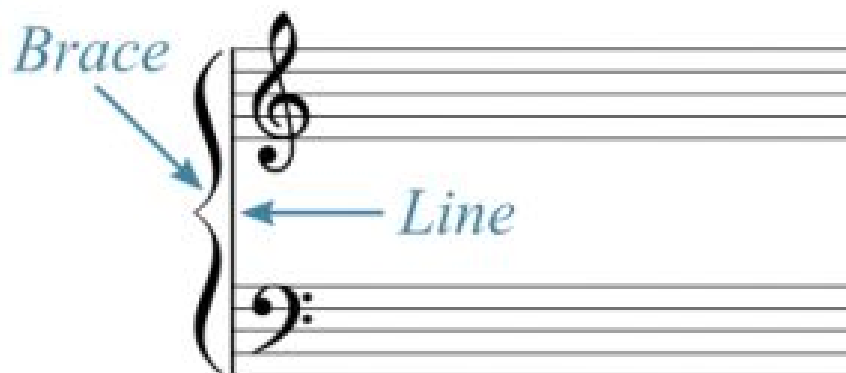
Example 4. The letter names of the white key pitches are labeled.

On the piano keyboard, when the black keys appear as a set of two, the note to their immediate left is C. With a set of three black keys, the note to their immediate left is F.

The Grand Staff

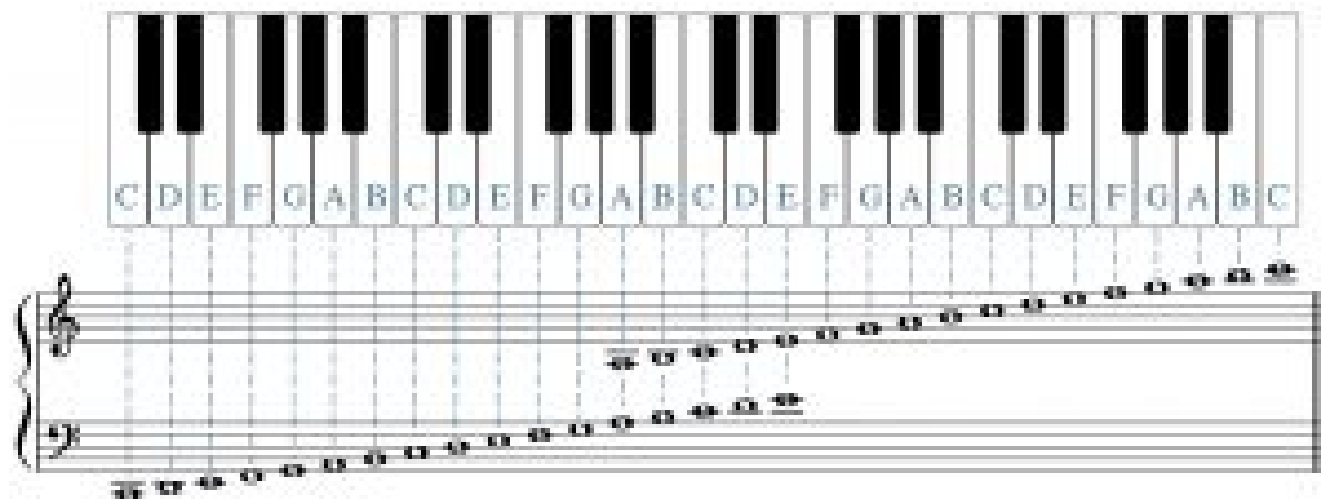
Music for the piano is typically written in both the treble and bass clefs on a grand staff, as shown in **Example 5**. To make a grand staff, a staff with a treble clef is placed above a staff with a bass clef. The

two staves are connected on the left side with a line and a brace. Typically, the pianist plays the lower notes (in the bass clef) with their left hand and the higher notes (in the treble clef) with their right hand.



Example 5. A grand staff is connected with a line and a brace.

Example 6 shows the lines and spaces on the grand staff labeled with letter names. As you can see, the letter names of the lines and spaces of the treble and bass clefs match what was discussed in the prior chapter ([Reading Clefs](#)).



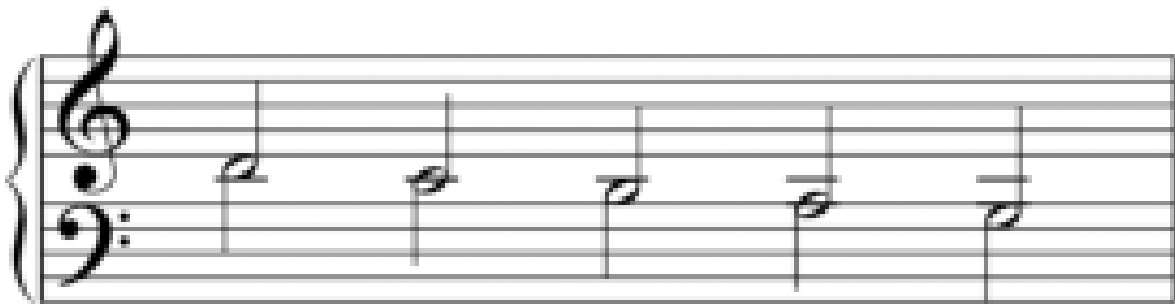
Example 6. A grand staff with the lines and spaces labeled with pitch names.

Let's take a closer look at the ledger-line notes that might appear below the treble staff and above the bass clef staff. **Example 7** shows some of these notes, labeled with letter names. Each vertical pair of notes is the same pitch, even though the notes are notated in two different clefs. (The notes with upward-pointing stems belong to the treble clef staff, while the notes with downward-pointing stems belong to the bass clef staff.)



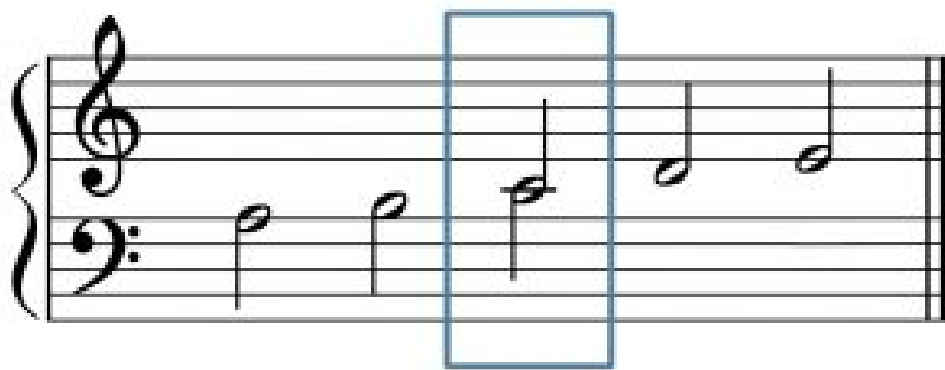
Example 7. *Pitches below the treble clef staff and above the bass clef staff, labeled with letter names.*

Example 8 shows the staves of **Example 7** vertically condensed—how these notes would appear if there were not so much space in between the treble clef and bass clef staves of a grand staff. The letter names are the same in **Example 8** as they were in **Example 7**.



Example 8. *The staves of **Example 7** have been vertically condensed and the two notes combined into one (with two stems).*

Example 9 shows a vertically condensed grand staff with the note C boxed. This boxed C is called middle C, so named because in the vertically condensed grand staff shown in **Example 9**, it appears in the middle of the treble and bass clef staves. Additionally, middle C is the note that appears to be around the middle of a piano keyboard, usually underneath the brand name.



Example 9. The note C is boxed in a vertically condensed grand staff.

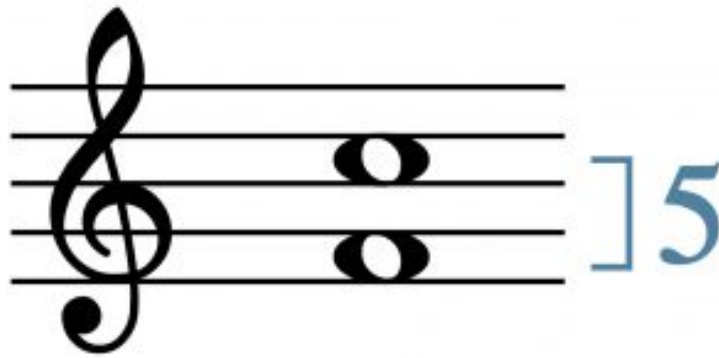
Example 10 shows **Example 9** vertically expanded to its regular spacing, with middle C still boxed. Though it now appears in both the treble and bass clef staves, this note would still sound as the same pitch.



Example 10. A vertically expanded **Example 9**.

Generic Intervals (Interval Size)

Often in music theory, you will want to measure or describe the distance between notes—either on a piano keyboard or on a staff. This “count” of notes on a piano keyboard or staff is called a generic interval. When counting generic intervals, it is important to know that when you count the first note, it should be counted as one and not zero. **Example 11** shows two notes, an F and a C, on a staff with a treble clef. If you count the notes F to C in **Example 11** (by counting each line and space between the two notes), you may be tempted to do this: F to G is one, G to A is two, A to B is three, and B to C is four. However, this would be incorrect. Instead, you need to count F as one, F to G as two, G to A as three, A to B as four, and B to C as five. Therefore, we would say that F and C are five notes apart, not four. Music theorists and musicians would call the distance between these two notes a “generic fifth.”



Example 11. An example of a generic fifth.

Online Resources

- [Piano Posture Tips \(Liberty Park Music\)](#)
- [Naming White Keys Practice \(musictheory.net\)](#)
- [The Grand Staff \(musictheory.net\)](#)
- [Grand Staff Note Reading Game \(readmusicfree.com\)](#)
- [Generic Intervals \(musictheory.net\)](#)
- [Blank Keyboards for Students or Teachers](#)

Assignments on the Internet

- A. Drawing the Grand Staff, Identifying Notes ([.pdf](#))
- B. Identifying Notes on the Grand Staff without Accidentals ([.pdf](#), [.pdf](#), [.pdf](#), [.pdf](#), [.pdf](#))
- C. Identifying White Keys on the Piano ([.pdf](#), [.pdf](#))

Assignments

1. White Keys on the Piano and the Grand Staff ([.pdf](#), [.docx](#))
2. The Piano Keyboard and the Grand Staff with Ledger Lines ([.pdf](#), [.docx](#))
3. Generic Intervals ([.pdf](#), [.docx](#))
4. Grand Staff Note Names with Ledger Lines ([.pdf](#), [.docx](#))

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HALF STEPS, WHOLE STEPS, AND ACCIDENTALS

Chelsey Hamm

KEY TAKEAWAYS

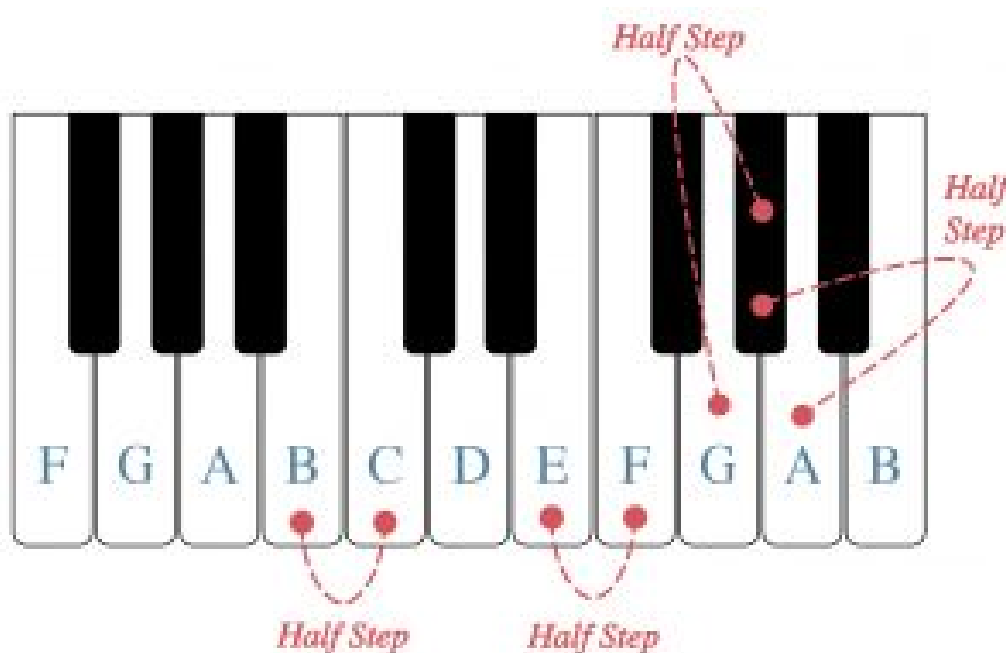
- A half step above a key on the piano is the key to its immediate right, while a half step below a key on the piano is the key to its immediate left.
- A whole step is two half steps. A whole step above is two keys to its right, while a whole step below is two keys to its left.
- An accidental changes the pitch of a note. A sharp raises a note by a half step, while a flat lowers a note by a half step. A natural cancels a previous accidental.
- A double sharp raises a note by a whole step, while a double flat lowers a note by a whole step.
- Be sure to write accidentals to the left of a note, directly across the line or space on which a note appears.
- Notes have enharmonic equivalence when they are spelled differently but sound the same.

In the last chapter, [The Keyboard and the Grand Staff](#), we discussed the letter names of the white keys on the piano keyboard and noted that the black keys are grouped into alternating sets of two or three. Before we discuss the names of the black keys, however, we must first learn about half steps and whole steps.

Half Steps and Whole Steps

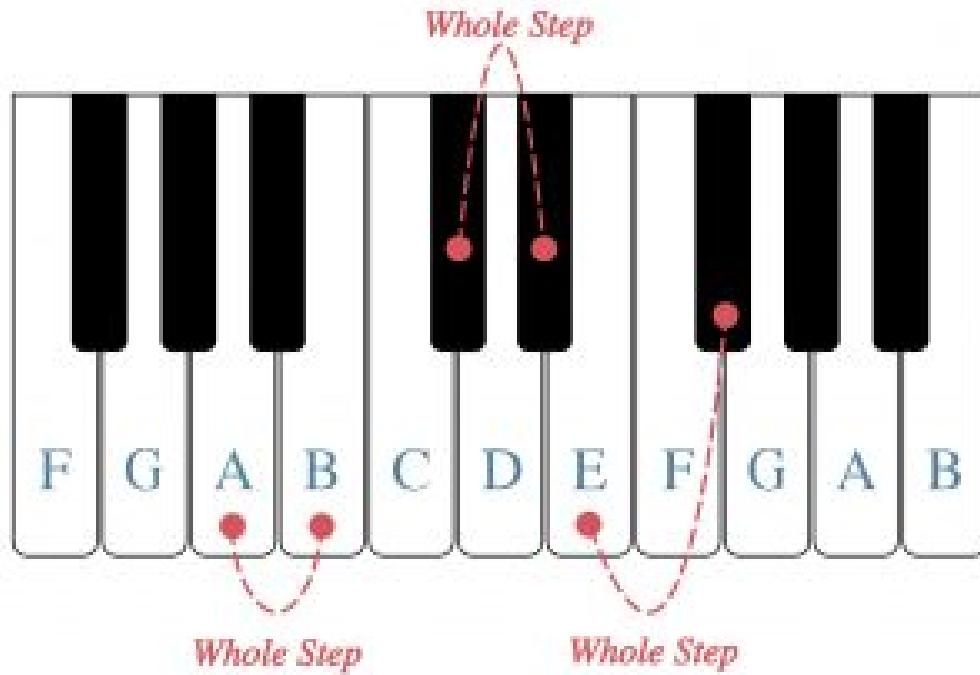
A half step is considered to be the smallest interval, or distance between two notes, in Western musical notation. **Example 1** shows a piano keyboard with the letter names of the white-key pitches and some half steps labeled. On the piano keyboard (see **Example 1**), for most of the white-key notes, a half step above that note will be the black key to its upper right, while a half step below it will be the black key to its upper left. For example, the black key to the upper right of G is “in between” the notes G and A; one

would say that this black key is a half step above G and a half step below A. Two pairs of white keys—E/F and B/C—do not have black keys in between them (see **Example 1**). This is because E–F and B–C are both half steps. Having the black keys grouped into sets of either two or three makes it easier for a keyboardist to see and feel them more quickly.



Example 1. A piano keyboard with letter names on the white keys; some half steps are labeled.

A whole step is the equivalent of two half steps. **Example 2** shows a piano keyboard with the letter names of the white key pitches labeled, and some whole steps bracketed. Pairs of white keys with a black key in between them (A and B, C and D, D and E, F and G, and G and A) are a whole step apart. To find a whole step above the notes E or B, simply count two keys to the right: a whole step above E is the black key to the right of the note F, while a whole step above B is the black key to the right of the note C. Likewise, count two keys to the left to find a whole step below the notes C or F: the black keys to the left of the notes B and E, respectively. To find a whole step from a black key you will want to count two keys to the right or left. For example, a whole step above the black key to the right of C is the black key to the right of the note D. A whole step below the black key to the left of B is the black key to the left of the note A.



Example 2. A piano keyboard with letter names on the white keys; some whole steps are labeled.

What do half steps and whole steps sound like? The short video shown in **Example 3** demonstrates:



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=1384#oembed-1>

Example 3. Dr. Chelsey Hamm (Christopher Newport University) demonstrates the sound of a half step and a whole step.

Sharps, Flats, and Naturals

An accidental changes the pitch of a note. A sharp ($\sharp$) looks like a tilted hashtag, and it raises a note by a half step. A flat ($\flat$) looks like a slanted lowercase “b,” and it lowers a note by a half step. A natural ($\natural$) looks like a tilted box with a line sticking out of the top left and bottom right corners, and it cancels a previous accidental such as a sharp or flat. Sharps, flats, and naturals are the three most common accidentals.

A double sharp (or $\times$) raises a note by two half steps (i.e., a whole step). A double flat ($\flat\flat$) lowers a note by two half steps (i.e., a whole step). Accidentals are always written to the left of a note, regardless of stem direction. An accidental should be written directly across the line or space on which a note appears.

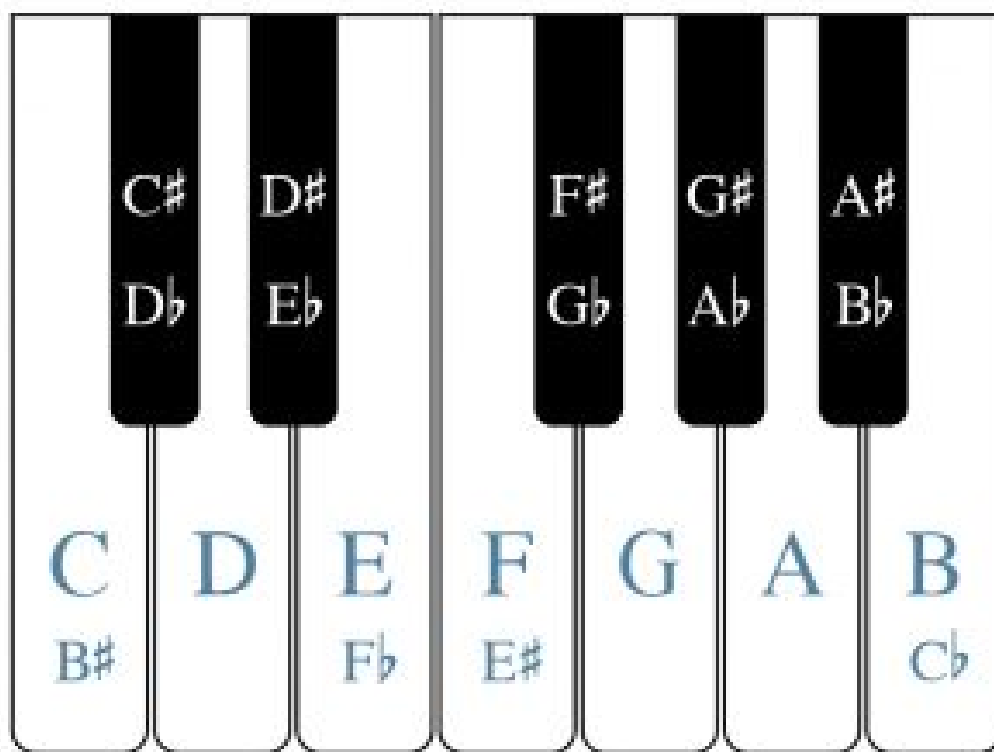
Example 4 shows both correct and incorrect ways to notate sharps, flats, and naturals:



Example 4. Correct and incorrect ways to draw accidentals.

The Black Keys on the Piano Keyboard

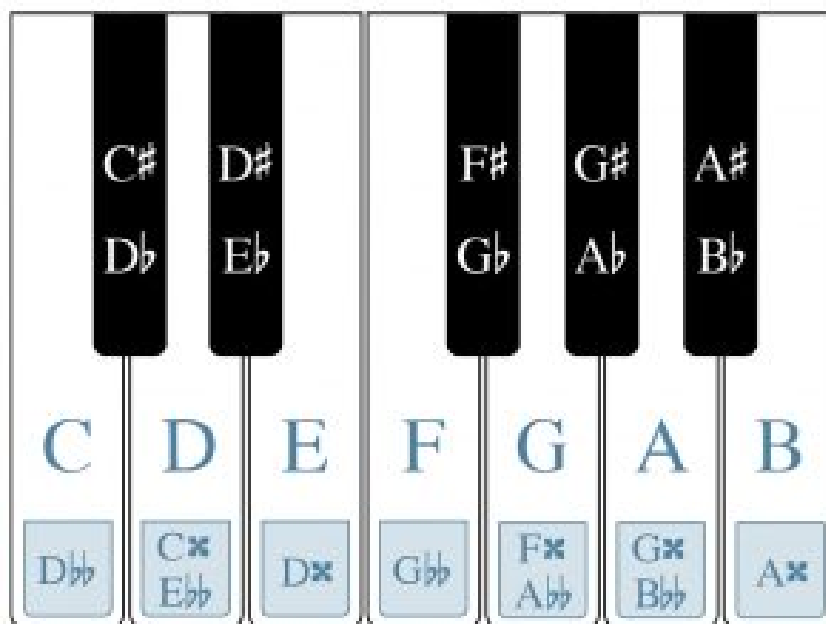
Example 5 shows a piano keyboard with the letter names of the black keys labeled. Black keys that are a half step above a white key take the name of the white key and add the word “sharp.” For example, the black key to the right of the note C is called “C-sharp” and is written as $C\sharp$. Black keys that are a half step below a white key take the name of the white key and add the word “flat.” For example, the black key to the left of the note D is called “D-flat” and is written as $D\flat$.



Example 5. A piano keyboard with the letter names of the black keys labeled.

F is also known as E#, and E is also known as Fb. C is also known as B#, and B is also known as Cb.

Example 6 also shows some of the double-sharp and double-flat accidentals. A double sharp is two half steps above a note. For example, Dx is also E; Ex is also F# (or Gb). A double flat is two half steps below a note. For example, Abb is also G; Cbb is also Bb or A#.



Example 6. Double accidentals on the piano keyboard.

Enharmonic equivalence

You will have noticed by now that each key on the piano keyboard has more than one name. Notes have enharmonic equivalence when they are spelled differently but sound the same. For example, you can see that $C\sharp$ and $D\flat$ are enharmonically equivalent, as seen in **Examples 5** and **6**. **Example 6** also shows that the note D is enharmonically equivalent with the notes $C\sharp$ and $E\flat$. In other words, playing a D, $C\sharp$, or $E\flat$ will result in the same pitch.

Online Resources

- [Tutorial on Half and Whole Steps \(Music Theory Fundamentals\)](#)
- [Tutorial on Half Steps, Whole Steps, and Accidentals \(musictheory.net\)](#)
- [Game to Practice Half Steps, Whole Steps, and Accidentals \(drawmusic.com\)](#)
- [Tutorial on Accidentals \(mymusictheory.com\)](#)
- [Tutorial on the Black Keys on the Piano \(musicradar.com\)](#)
- [Practicing the Piano Keyboard \(musictheory.net\)](#)
- [Matching Game for Piano Key Notes \(quizlet.com\)](#)
- [Labeling Game for Piano Key Notes \(quizlet.com\)](#)
- [Tutorial on Enharmonic Equivalence \(The Music Notation Project\)](#)

Assignments on the Internet

- A. Half and Whole Steps on the Piano Keyboard and in Staff Notation ([.pdf](#))
- B. Half and Whole Steps in Staff Notation ([.pdf](#))
- C. Writing and Identifying Notes with Accidentals, p. 1 ([.pdf](#)), pp. 9–11 ([.pdf](#))
- D. Keyboard to Staff Notation Matching ([.pdf](#))
- E. Enharmonic Equivalence, p. 3 ([.pdf](#)), ([.pdf](#))

Assignments

- 1. Black Keys on the Piano ([.pdf](#), [.docx](#))
- 2. Half and Whole Steps on the Piano Keyboard ([.pdf](#), [.docx](#))
- 3. Writing Accidentals ([.pdf](#), [.docx](#))
- 4. Writing and Identifying Accidentals ([.pdf](#), [.docx](#))
- 5. Half and Whole Steps in Staff Notation ([.pdf](#), [.docx](#))
- 6. Enharmonic Equivalence ([.pdf](#), [.docx](#))

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AMERICAN STANDARD PITCH NOTATION (ASPN)

Chelsey Hamm and Bryn Hughes

KEY TAKEAWAYS

- American Standard Pitch Notation (ASPN) provides labels for specific musical frequencies by combining a note name (such as C) with a subscript octave designation (such as 4).
- A pitch is a discrete tone with an individual frequency (e.g. C₄), while a pitch class is less specific (e.g., C in general).
- ASPN differentiates between octaves, from C to B. The octaves are labeled from lowest to highest, beginning with 0 and continuing in ascending numerical order (1, 2, etc.).
- A piano keyboard primarily uses the ASPN octave designations 1 through 7, although small portions of octaves 0 and 8 are included.
- Middle C is C₄ in ASPN. It is helpful to memorize the ASPN label of this note as a starting point.

American Standard Pitch Notation and Pitch versus Pitch Class

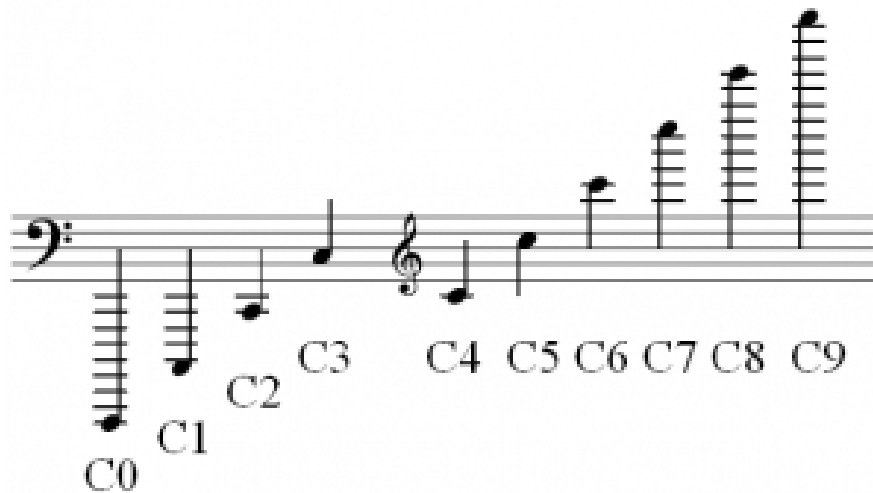
In order to discuss specific notes, or pitches, we will use American Standard Pitch Notation, abbreviated ASPN. ASPN designates specific musical pitches by combining a note name (such as C) with a subscript octave designation (such as 4), creating a bipartite label (for example, C₄). ASPN labels are very useful, since they can identify every possible musical note within human hearing range, from the lowest pitches to the highest.

The [Reading Clefs](#) chapter introduced octave equivalence, the concept that explains why notes one or

more octaves apart have the same letter name. Music theorists distinguish between a pitch, a discrete tone with an individual frequency (e.g. C₄ using ASPN), versus a pitch class, which is less specific (e.g., C in general). A pitch class includes all the pitches with the same letter name, in any octave, along with their enharmonic equivalents. For example, all Cs are the same pitch class, and the enharmonically equivalent notes D $\flat$ and B $\sharp$ are also part of the C pitch class. In this chapter we are naming specific pitches with ASPN.

ASPN and Octave Designations

ASPN differentiates between octaves, beginning with the pitch C and ending with the pitch B. This means that each new octave designation begins on the note C, as seen in [Example 1](#). The octaves are labeled from lowest to highest, beginning with 0 and continuing in numerical order (1, 2, 3, etc.). The pitch middle C is C₄, which is useful to memorize.



Example 1. ASPN octave designations; each octave begins with the pitch C.

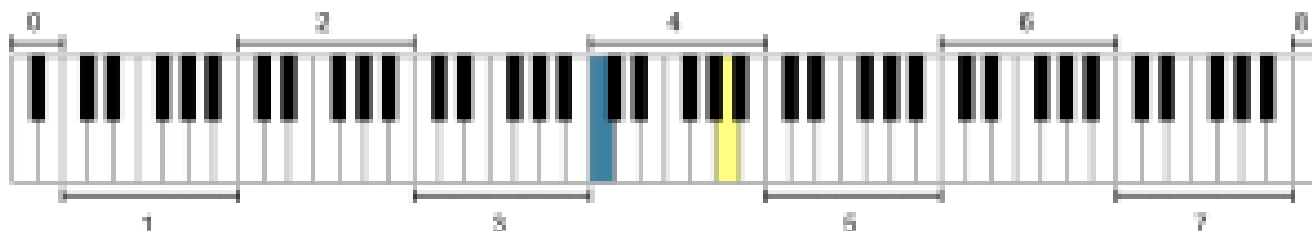
All letter names within an octave (below the C of the next octave) receive the same octave designation. For example, all of the notes in [Example 2](#) would be designated in the 4 octave, because they are above C₄ but below C₅. Accidentals applied to a note do not have an effect on its ASPN number. For example, B $\sharp$ ₃ and C₄ have different octave numbers despite being enharmonically equivalent, because the B $\sharp$ is still considered part of the lower octave.



Example 2. The notes C₄, D₄, E₄, F₄, G₄, A₄, and B₄.

ASPN and the Keyboard

ASPN labels are very helpful for finding specific notes on the piano keyboard. **Example 3** depicts a piano keyboard with each octave labeled using ASPN notation. As you can see, the piano keyboard spans the full octaves 1 to 7. It also contains a small part of both octaves 0 and 8. ASPN labels are the same regardless of instrument or voice type. In other words, a C₄ will always be labeled as such regardless of whether it is produced with a flute, trombone, violin, or voice.



Example 3. A piano keyboard with ASPN octave designations labeled; both colored notes (blue and yellow) fall into the octave 4 designation.

ASPN and Staff Notation

Example 4 shows ASPN labels for common notes in the treble, bass, alto, and tenor clefs. Memorizing the location of C₄ in each clef can make finding ASPN labels quicker and easier.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=34>

Example 4. ASPN labels for notes in four clefs.

Online Resources

- [“Pitches, Pitch Classes, Octave Designation, Enharmonic Equivalence” \(YouTube\)](#)
- [Tutorial on ASPN Octave Labels \(liveabout.com\)](#)
- [Tutorial on ASPN Octave Labels \(flutopedia.com\)](#)
- [Helpful Graphic with ASPN Labels on the Grand Staff and Piano \(Music Theory Tips\)](#)
- [Flash Cards with ASPN Labels in Treble and Bass Clefs \(quizlet.com\)](#)

Assignments on the Internet

- A. ASPN Labels and Staff Notation ([.pdf](#))
- B. ASPN Labels, pp. 23, 27, and 28 ([.pdf](#))

Assignments

1. Writing and Identifying ASPN Labels ([.pdf](#), [.docx](#))

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OTHER ASPECTS OF NOTATION

Chelsey Hamm and Mark Gotham

KEY TAKEAWAYS

- Dynamics indicate the loudness of music. Musicians use a variety of Italian words to specify dynamics in Western musical notation.
- A crescendo indicates an increase in loudness, while a decrescendo or diminuendo indicates a decrease in loudness.
- The term articulation refers to the connection or separation between notes, as well as the accent level at the beginning of a note (its attack).
- A tempo indication tells a musician how fast or slow to play or sing a composition.
- Musicians periodize music into historical eras, which are useful to memorize. Works within these historical periods tend to share similar style characteristics.
- Structural features divide up a work or movement into smaller sections.

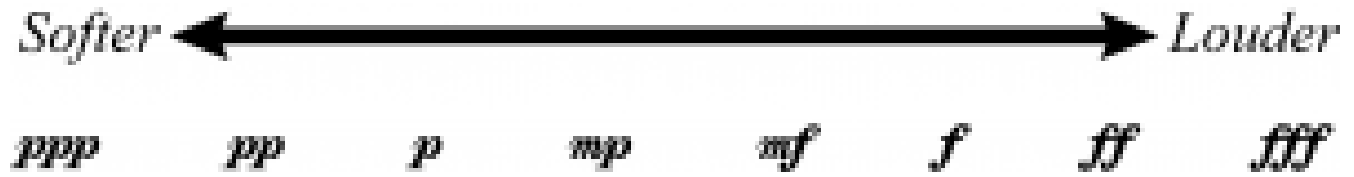
In this chapter we will explore other elements of music besides pitch (discussed in previous chapters) and duration (discussed in following chapters). These elements include dynamics, articulations, tempi, stylistic periods, and structural markers.

Dynamics

Dynamics indicate the loudness of music. In Western musical notation, we often use italicized Italian words, which can be abbreviated, to describe dynamics. The dynamic marking *forte* means loud, while *piano* means quiet. In sheet music, these words are written either above or below the staff.

Several Italian words and suffixes can modify *piano* and *forte* to create a range of dynamics from very quiet to very loud ([Example 1](#)). The Italian word *mezzo* means “moderately.” Musicians say *mezzo forte*

to mean moderately loud and *mezzo piano* to mean moderately quiet. The Italian suffix *-issimo* means “very” or “extremely.” Musicians say *pianissimo* to mean “very quiet” and *fortissimo* to mean “very loud.” This suffix can be stacked; for example, one can say *pianississimo* to mean “very, very quietly,” or *fortississimo* to mean “very, very loudly.”



Example 1. Dynamics are arranged from quietest to loudest.

Dynamics are often abbreviated in Western musical notation, as shown below.

- *fff* = *fortississimo*
- *ff* = *fortissimo*
- *f* = *forte*
- *mf* = *mezzo forte*
- *mp* = *mezzo piano*
- *p* = *piano*
- *pp* = *pianissimo*
- *ppp* = *pianississimo*

Some composers add even more “*-issimo*”s, but this is rare. However, you might one day spot a *pppppp* or an *ffffff* in music that you play or sing!

There are three other Italian words that are commonly used to indicate a change in dynamic level. Crescendo (*cresc.*) means to get louder, while decrescendo (*decresc.*) and diminuendo (*dim.*) both mean to get quieter. Crescendos and decrescendos are indicated two different ways: either by writing out the abbreviation *cresc.* or *decresc.*, possibly followed by dots, or by drawing hairpins. The term “hairpin” refers to the following symbols, which roughly approximate the shape of a bobby pin (or “hairpin”), as seen in **Example 2.**



Example 2. A crescendo and decrescendo (“hairpins”).

Articulations

The term articulation refers to the connection or separation between notes and to the accent level at the beginning of a note (its attack). Several articulations are demonstrated in **Examples 3–7**. Percussion instruments, plucked strings, bowed strings, winds, brass, and voices all have different methods of carrying out particular attacks and articulations. You will want to consult with a private teacher or ensemble director for help with applying different articulations to your instrument or voice.

Example 3: Legato means to play or sing smoothly or connected. This articulation is indicated by a curved slur marking.

Example 4: Another way to indicate smooth, connected playing is with tenuto markings, which look like a small line above or below notes.

Example 5: Staccato means to play or sing notes more separated, leaving space between notes. This articulation is usually indicated by a dot placed above or below notes.

Example 6: An accent (a sideways V) means to play or sing a note with extra stress or emphasis.

Example 7: A marcato marking (an upside-down V) means to play or sing a note with a more forceful accent.





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Example 3. Slurred notes.



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Example 4. Tenuto notes.



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Example 5. Staccato notes.



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<https://viva.pressbooks.pub/openmusictheory/?p=4083#audio-4083-4>

Example 6. Accented notes.



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Example 7. Marcato notes.

Accented notes can also be indicated by the italicized abbreviations *sfz*, *sf*, or *fz* (*sforzando*, *forzando*, or *forzato*). These accents are usually interpreted to be slightly more forceful (i.e., louder) than regular accents. These symbols work like dynamics and are placed directly above or below the note to which they apply.

Tempo

Tempo (plural tempi) is the term for how fast or slow a composition is performed. Tempi are usually indicated either specifically, by a metronome marking, or less specifically, by a textual indication. A metronome marking is usually indicated in beats per minute (bpm). A work that is marked $\text{♩} = 60$ would contain 60 quarter notes in one minute (one quarter note per second). With a free metronome application (such as [Pro Metronome](#)) on your phone, you can easily check the tempo of a work you're playing or singing.

Like dynamics, most tempo markings are written in Italian. They often appear at the beginning of a work, movement, or section, at the top left of the first staff or system. The most common tempi are as follows:

- Fast tempi: *vivace*, *presto*, *allegro*, *allegretto* (-etto is an Italian suffix meaning “little”)
- Medium tempi: *moderato*, *andante*
- Slow tempi: *adagio*, *largo*, *lento*, *grave*

Example 8 depicts tempi from the slowest to the fastest:



Composers sometimes use additional Italian words, especially emotive expressions, to modify a tempo marking. Words like *assai* (“very” or “rather”), *espressivo* (“expressively”), or *cantabile* (“singly”) frequently appear after tempo markings, especially in works written after the year 1800. For example, one might come across tempo markings like “*allegro assai*” (“very fast”), “*andante cantabile*” (“a moderate tempo, singingly”), or “*adagio espressivo*” (“slow and expressive”). Always be sure to look up the definition of any words that you do not know in your music.

Two other Italian words are commonly used to indicate changes in tempo: *ritardando* (*rit.*) for a gradual decrease and *accelerando* (*accel.*) for a gradual increase. Both words are generally italicized, and they are often abbreviated (*rit.* and *accel.* respectively). When these directions are meant to apply to several measures, they are often followed by dots. The dots continue as long as the direction is meant to be followed.

Structural Features

The following words and symbols indicate structural features in compositions. Structural features divide up a work or movement into smaller sections.

- **Example 9:** A fermata indicates that a note should be held longer than its regular duration. Fermatas often appear at the start or end of a musical section.
- **Example 10:** A caesura indicates a break or a musical cutoff.
- **Example 11:** A breath mark indicates a breath for a wind instrumentalist or a vocalist. For percussionists, keyboardists, or string players, it indicates a pause similar in length to a breath.



Example 9. A note in treble clef with a fermata.



Example 10. A note in bass clef with a caesura after it.



Example 11. A note in alto clef with a breath mark after it.

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<https://viva.pressbooks.pub/openmusictheory/?p=4083>



One or more
interactive
elements

Example 12. Four notes in bass clef surrounded by repeat signs.



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Example 13. A repeat sign with a first and second ending in treble clef.

Occasionally you may come across music that has more than two endings. Repeated sections with a third or even a fourth ending are common in some styles of music, such as Broadway musicals. These work like a first and second ending: the third ending is performed after the third time the section is repeated, the fourth ending is performed after the fourth time, and so on.

Stylistic Periods

As you begin to study music theory, it will be helpful to have a basic familiarity with the ways in which music theorists and musicologists historically periodize Western classical music. Time periods in the history of this music are flexible, but having a general framework to group musical compositions with certain stylistic similarities can be useful for musicians.

The following time periods, depicted in **Example 14**, are generally agreed upon by most musicologists:

- Medieval: c. 600–1400
- Renaissance: c. 1400–1600
- Baroque: c. 1600–1750
- Classical: c. 1750–1820
- Romantic: c. 1800–1910
- Post-tonal: c. 1900–present



Example 14. A timeline depicting commonly accepted years for musical stylistic periods.

Online Resources

- [Tutorial on Dynamics \(Music Theory Academy\)](#)
- [Tutorial on Dynamics \(Lumen's Music Appreciation\)](#)
- [Dynamics Quiz \(quizizz.com\)](#)
- [Articulations \(BBC\)](#)
- [Articulations \(librettexts.org\)](#)
- [Tempo \(BBC\)](#)
- [Tempo \(Music Theory Academy\)](#)
- [Notes on Periodization in Musicology \(Oxford History of Western Music\)](#)
- [Historical Eras in Musicology \(Naxos\)](#)
- [Music Notation Style Guide \(Indiana University\)](#)

Assignments on the Internet

- A. Dynamics, pp. 13–17 ([.pdf](#)), and pp. 2–4, 18 and 22 ([.pdf](#))
- B. Articulations, p. 1 ([.pdf](#))
- C. Tempo, pp. 12, 21 ([.pdf](#)), and p. 13 ([.pdf](#))
- D. Structural Markers, p. 9 ([.pdf](#))
- E. Mixed Terminology, pp. 13–17, 23 ([.pdf](#))

Assignments

1. Dynamics, Articulations, Tempi, Stylistic Periods, Structural Features ([.pdf](#), [.docx](#))

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tempi © Nathaniel Mitchell is licensed under a CC BY-SA (Attribution ShareAlike) license

Stylistic Periods Timeline © Nathaniel Mitchell is licensed under a CC BY-SA (Attribution ShareAlike) license

RHYTHMIC AND REST VALUES

Chelsey Hamm; Mark Gotham; and Bryn Hughes

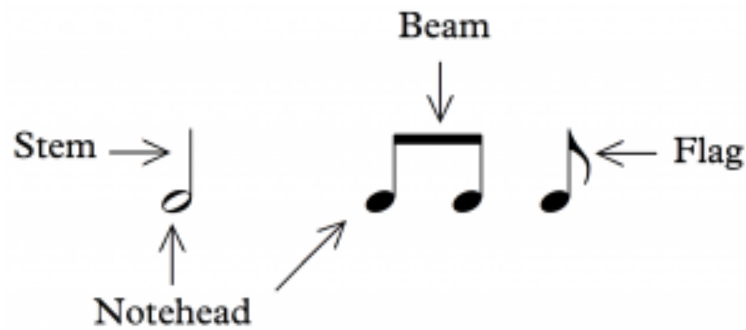
KEY TAKEAWAYS

- Notes consist of several different components, including a notehead, stem, beam, and flag.
- Common note values include the whole note, half note, quarter note, eighth note, and sixteenth note.
- Common rest values include the whole rest, half rest, quarter rest, eighth rest, and sixteenth rest.
- British terms for note and rest values are different from American terms.
- A dot increases the duration of a note by half. Subsequent dots add half the duration of the previous dot.
- A tie connects two or more notes of the same pitch. Do not rearticulate any “tied to” notes.

Music is a temporal art—in other words, time is one of its components—so organizing time is essential for Western musical notation. The next several chapters will focus on the temporal facets of rhythm and meter, starting in this chapter with the basic note and rest values in this notation system.

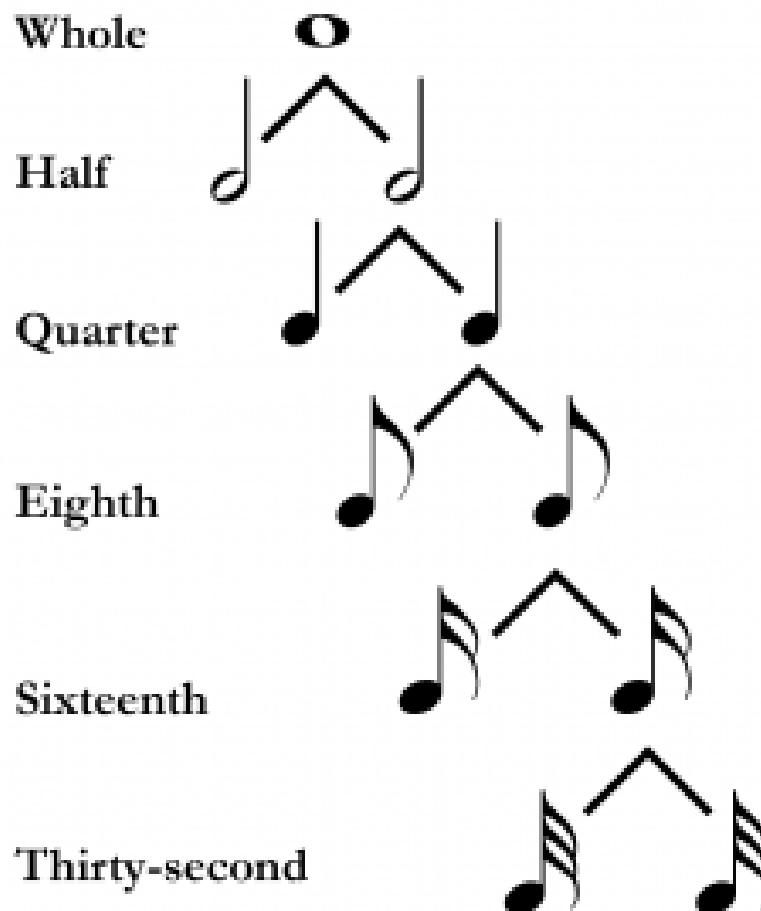
Note Values

Broadly speaking, rhythm refers to the duration of musical sounds and rests in time. As you’ll recall in the chapter titled [Notation of Notes, Clefs, and Ledger Lines](#), notes may contain several different components, as seen in **Example 1**:



Example 1. Noteheads with stems, beams and flags labeled.

There are many common note values in Western musical notation. Note values are hierarchical; in other words, their lengths are defined relative to one another. Each note value can be divided into two smaller values, as seen in **Example 2**. Just as a whole pizza divides into two halves, four quarters, eight eighths, etc., a whole note divides into two half notes, four quarter notes, eight eighth notes, and so on.



Example 2. The relative relationships between common note values.

Several additional aspects of **Example 2** should be noted:

- Noteheads can be filled in (black) or unfilled (white); quarter notes and shorter durations are filled in.
- Unfilled noteheads may or may not have a stem, but filled noteheads always have stems.
- Flags are only added to the stems of filled noteheads.

Additionally, there are three ways to decrease a note's value by half:

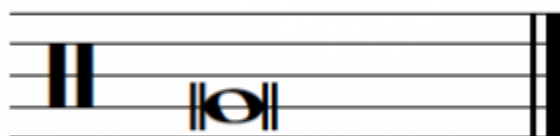
- Adding a stem to a note (i.e., whole to half)
- Filling in a notehead (i.e., half to quarter)
- Adding a flag (i.e., quarter to eighth or eighth to sixteenth)

Open Music Theory privileges the North American names for note values, but it's worth being familiar with the British names as well (indicated in parentheses below). See **Example 2** for a visual of each note value.

- **Whole note (semibreve in British English):** this thick, unfilled oval shape has no stem. In many compositions today, this is the longest note value used.
- **Half note (minim in British English):** also an oval, drawn with a slightly thinner line, and has a stem. This note is half as long as the whole note (i.e., two half notes make up one whole note).
- **Quarter note (crotchet in British English):** looks like the half note, except that the notehead has been filled in. This note is half as long as a half note (i.e., two quarter notes make up one half note) and a quarter as long as a whole note (i.e., four quarter notes make up one whole note).
- **Eighth note (quaver in British English):** looks like the quarter note, except that a flag has been added to its stem. This note is half as long as a quarter note (i.e., two eighth notes make up one quarter note) and an eighth as long as a whole note (i.e., eight eighth notes make up one whole note).
- **Sixteenth note (semiquaver in British English):** looks like an eighth note, except that it has an extra flag. This note is half as long as an eighth note (i.e., two sixteenth notes make up one eighth note) and one sixteenth as long as a whole note (i.e., sixteen sixteenth notes make up one whole note).

Symbol	American name	British name
◦	Whole note	Semibreve
♪	Half note	Minim
♪	Quarter note	Crotchet
♪	Eighth note	Quaver
♪	Sixteenth note	Semiquaver

Note values shorter than the sixteenth note (thirty-second note, sixty-fourth note, etc.) are created by adding extra flags. You may run into one additional, less common note value called the double whole note (breve in British English; **Example 3**). Double whole notes are sometimes notated with only one line on either side of the notehead. In older musical notation styles, the notehead appears more square than oval. Double whole notes divide into whole notes (i.e., two whole notes make up one double whole note).

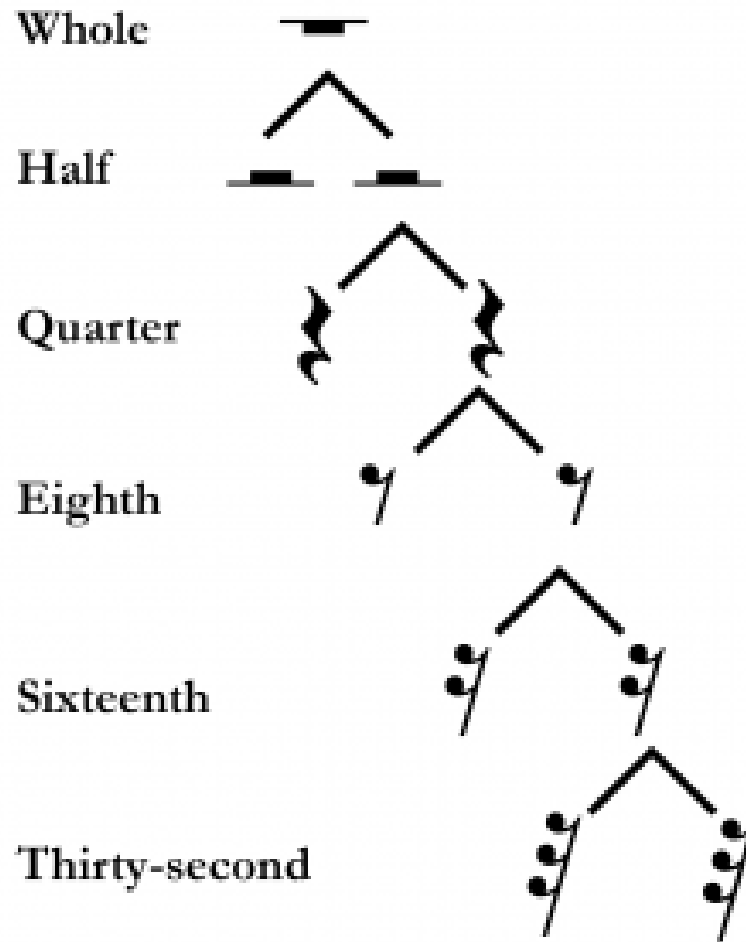


Example 3. A double whole note on a line.

Rest Values

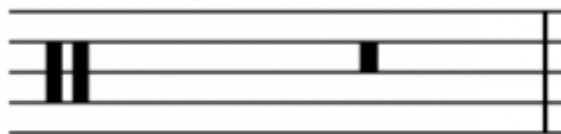
Broadly speaking, rests refer to the duration of silences in music. Each hierarchical note value has a corresponding rest value, as seen in **Example 4**. Like note values, each rest value can be divided into two smaller values. Several additional aspects of **Example 4** should be noted:

- Notice that a whole rest hangs down from a line while a half rest sits on top of a line. It may be helpful to think of a whole rest as “heavier” than a half rest to remember that it hangs down; likewise, a half rest resembles a top hat, so you can think of it as sitting on top of a line as if on a person’s head.
- Practice drawing quarter rests carefully; many students find them difficult to draw.
- Adding a flag to a rest (i.e., eighth to sixteenth) decreases a rest’s duration by half.



Example 4. *The relative relationships between common rest values.*

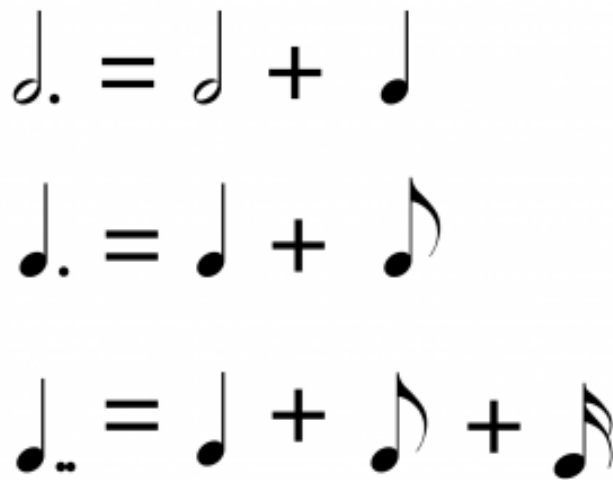
Although rare, you may run across a breve rest (**Example 5**). A breve rest is equivalent in length to two whole rests. It looks like a filled-in box and appears on the second space from the top.



Example 5. *A breve rest.*

Dots and ties

Dots and ties allow rhythmic and rest durations to be lengthened. A dot is written immediately after a note or rest, and it increases its duration by half (**Example 6**). For example, a quarter note is equivalent in duration to two eighth notes; therefore, a dotted quarter note would be equivalent to *three* eighth notes. Similarly, a whole note is equivalent to two half notes, so a dotted whole note would be equivalent to *three* half notes. Multiple dots can be added to a duration, with each subsequent dot adding half the duration of the previous one. For example, a double-dotted quarter note (i.e., a quarter note with two dots) is equivalent in duration to a quarter note, eighth note, and sixteenth note added together. In other words, a double-dotted note is $1\frac{3}{4}$ the duration of the original note.



Example 6. The rhythmic breakdown of two dotted notes and one double-dotted note.

A tie is a curved line that connects two or more notes with the same pitch. Tied-to notes are not rearticulated. In other words, ties are used to combine the durations of multiple notes. The tie connecting the first two notes in **Example 7** indicates that, when these half and quarter notes are played or sung, the quarter note should not be articulated; in other words, the first note should be held for the duration of three quarter notes instead of two. Another way to write this duration is as a dotted half note.



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Example 7. A tie connects the first two notes.

You would be correct to think that a tie looks like a slur (see [Other Aspects of Notation](#)). The difference between the two is that slurs connect notes of different pitches and indicate to play or sing the notes tenuto, while ties connect notes of the same pitch to create a note with a longer duration.

Online Resources

- [Note Durations \(musictheory.net\)](#)
- [Rhythmic Values \(learnmusictheory.net\)](#)
- [Note Values \(Essentials of Harmony\)](#)
- [Dots and Ties \(YouTube\)](#)
- [Dots and Ties \(musictheory.net\)](#)

Assignments on the Internet

- A. Rhythmic Equations with Whole and Half Notes ([.pdf](#))
- B. Rhythmic Equations with Half, Quarter, and Eighth Notes ([.pdf](#))
- C. Rhythmic Equations with Quarter and Eighth Notes ([.pdf](#))
- D. Rhythmic Equations with Quarter, Eighth, and Sixteenth Notes ([.pdf](#))
- E. Writing Notes and Rests, Rhythmic Equations, pp. 3–7 ([.pdf](#))
- F. Advanced Rhythmic Equations, p. 3 ([.pdf](#))
- G. Slurs and Ties ([.pdf](#))

Assignments

1. Note and Rest Values ([.pdf](#), [.docx](#))
2. Dots and Ties ([.pdf](#), [.docx](#))

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SIMPLE METER AND TIME SIGNATURES

Chelsey Hamm; Kris Shaffer; and Mark Gotham

KEY TAKEAWAYS

- A beat is a pulse in music that regularly recurs.
- Simple meters are meters in which the beat divides into two, and then further subdivides into four.
- Duple meters have groupings of two beats, triple meters have groupings of three beats, and quadruple meters have groupings of four beats.
- There are different conducting patterns for duple, triple, and quadruple meters.
- A measure is equivalent to one group of beats (duple, triple, or quadruple). Measures are separated by bar lines.
- Time signatures in simple meters express two things: how many beats are contained in each measure (the top number), and the beat unit (the bottom number), which refers to the note value that is the beat.
- A beam visually connects notes together, grouping them by beat. Beaming changes in different time signatures.
- Notes below the middle line on a staff are up-stemmed, while notes above the middle line on a staff are down-stemmed. Flag direction works similarly.

CHAPTER PLAYLIST

In [Rhythmic and Rest Values](#), we discussed the different rhythmic values of notes and rests. Musicians organize rhythmic values into various meters, which are—broadly speaking—formed as the result of recurrent patterns of accents in musical performances.

Terminology

Listen to the following performance by the contemporary musical group Postmodern Jukebox (**Example 1**). They are performing a cover of the song “Wannabe” by the Spice Girls (originally released in 1996). Beginning at 0:11, it is easy to tap or clap along to this recording. What you are tapping along to is called a beat—a pulse in music that regularly recurs.



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Example 1. A cover of “Wannabe” performed by Postmodern Jukebox; listen starting at 0:11.

Example 1 is in a simple meter: a meter in which the beat divides into two, and then further subdivides into four. You can feel this yourself by tapping your beat twice as fast; you might also think of this as dividing your beat into two smaller beats.

Different numbers of beats group into different meters. Duple meters contain beats that are grouped into twos, while Triple meters contain beats that are grouped into threes, and Quadruple meters contain beats that are grouped into fours.

Listening to Simple Meters

Let’s listen to examples of simple duple, simple triple, and simple quadruple meters. A simple duple meter contains two beats, each of which divides into two (and further subdivides into four). “The Stars and Stripes Forever” (1896), written by John Philip Sousa, is in a simple duple meter.

Listen to **Example 2**, and tap along, feeling how the beats group into sets of two:



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Example 2. “The Stars and Stripes Forever” played by the Dallas Winds.

A simple triple meter contains three beats, each of which divides into two (and further subdivides into four). Wolfgang Amadeus Mozart’s “Minuet in F major,” K.2 (1774) is in a simple triple meter. Listen to **Example 3**, and tap along, feeling how the beats group into sets of three:



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Example 3. Mozart’s “Minuet in F major,” played by Alan Huckleberry.

Finally, a simple quadruple meter contains four beats, each of which divides into two (and further subdivides into four). The song “Cake” (2017) by Flo Rida is in a simple quadruple meter. Listen to **Example 4** starting at 0:45 and tap along, feeling how the beats group into sets of four:



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Example 4. “Cake” by Flo Rida; listen starting at 0:45.

As you can hear and feel (by tapping along), musical compositions in a wide variety of styles are governed by meter. You might practice identifying the meters of some of your favorite songs or musical compositions as simple duple, simple triple, or simple quadruple; listening carefully and tapping along is the best way to do this. Note that simple quadruple meters feel similar to simple duple meters, since four beats can be divided into two groups of two beats. It may not always be immediately apparent if a work is in a simple duple or simple quadruple meter by listening alone.

Conducting Patterns

If you have ever sung in a choir or played an instrument in a band or orchestra, then you have likely had experience with a conductor. Conductors have many jobs. One of these jobs is to provide conducting patterns for the musicians in their choir, band, or orchestra. Conducting patterns serve two main purposes: first, they establish a tempo, and second, they establish a meter.

The three most common conducting patterns outline duple, triple, and quadruple meters. Duple meters

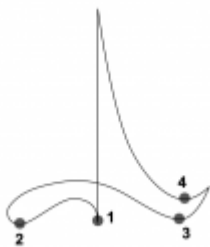
are conducted with a downward/outward motion (step 1), followed by an upward motion (step 2), as seen in **Example 5**. Triple meters are conducted with a downward motion (step 1), an outward motion (step 2), and an upward motion (step 3), as seen in **Example 6**. Quadruple meters are conducted with a downward motion (step 1), an inward motion (step 2), an outward motion (step 3), and an upward motion (step 4), as seen in **Example 7**:



Example 5. A duple conducting pattern.



Example 6. A triple conducting pattern.



Example 7. A quadruple conducting pattern.

Beat 1 of each of these measures is considered a downbeat. A downbeat is conducted with a downward motion, and you may hear and feel that it has more “weight”

or “heaviness” than the other beats. An upbeat is the last beat of any measure. Upbeats are conducted with an upward motion, and you may feel and hear that they are anticipatory in nature.

Time Signatures

In Western musical notation, beat groupings (duple, triple, quadruple, etc.) are shown using bar lines, which separate music into measures (also called bars), as shown in **Example 8**. Each measure is equivalent to one beat grouping.



Example 8. Bar lines and measures.

In simple meters, time signatures (also called meter signatures) express two things: 1) how many beats are contained in each measure, and 2) the beat unit (which note value gets the beat). Time signatures are expressed by two numbers, one above the other, placed after the clef (**Example 9**).

A time signature is not a fraction, though it may look like one; note that there is no line between the two numbers. In simple meters, the top number of a time signature represents the number of beats in each measure, while the bottom number represents the beat unit.



Example 9. The two numbers (4 and 4) form a time signature.

In simple meters, the top number is always 2, 3, or 4, corresponding to duple, triple, or quadruple beat patterns. The bottom number is usually one of the following:

- 2, which means the half note gets the beat.
- 4, which means the quarter note gets the beat.
- 8, which means the eighth note gets the beat.

You may also see the bottom number 16 (the sixteenth note gets the beat) or 1 (the whole note gets the beat) in simple meter time signatures.

There are two additional simple meter time signatures, which are **C** (common time) and **C** (cut time). Common time is the equivalent of $\frac{4}{4}$ (simple quadruple—four beats per measure), while cut time is the equivalent of $\frac{2}{2}$ (simple duple—two beats per measure).

Counting in Simple Meter

Counting rhythms aloud is important for musical performance; as a singer or instrumentalist, you must be able to perform rhythms that are written in Western musical notation. Conducting while counting rhythms is highly recommended and will help you to keep a steady tempo. Please note that your instructor may employ a different counting system. *Open Music Theory* privileges American traditional counting, but this is not the only method.

Example 10 shows a rhythm in a $\frac{4}{4}$ time signature, which is a simple quadruple meter. This time signature means that there are four beats per measure (the top 4) and that the quarter note gets the beat (the bottom 4).

- In each measure, each quarter note gets a count, expressed with Arabic numerals—"1, 2, 3, 4."
- When notes last longer than one beat (such as a half or whole note in this example), the count is held over multiple beats. Beats that are not counted out loud are written in parentheses.

- When the beat in a simple meter is divided into two, the divisions are counted aloud with the syllable “and,” which is usually notated with the plus sign (+). So, if the quarter note gets the beat, the second eighth note in each beat would be counted as “and.”
- Further subdivisions at the sixteenth-note level are counted as “e” (pronounced as a long vowel, as in the word “see”) and “a” (pronounced “uh”). At the thirty-second-note level, further subdivisions add the syllable “ta” in between each of the previous syllables.



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Example 10. Rhythm in 4/4 time.

Simple duple meters have only two beats and simple triple meters have only three, but the subdivisions are counted the same way (**Example 11**).



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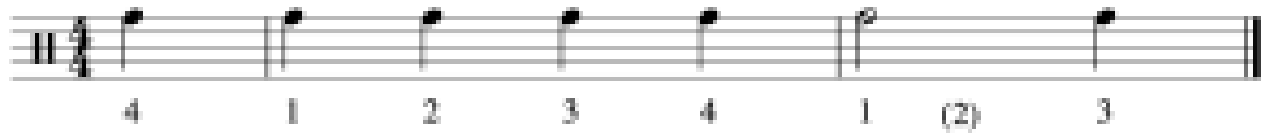
Example 11. Simple duple meters have two beats per measure; simple triple meters have three.

Like with notes that last for two or more beats, beats that are not articulated because of rests, ties, and dots are also not counted out loud. These beats are usually written in parentheses, as shown in **Example 12**:



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Example 12. Beats that are not counted out loud are put in parentheses.



Example 13. *An anacrusis.*

When an example begins with a pickup note (anacrusis), your count will not begin on “1,” as shown in **Example 13**. An anacrusis is counted as the last note(s) of an imaginary measure. When a work begins with an anacrusis, the last measure is usually shortened by the length of the anacrusis. This is demonstrated in **Example 13**: the anacrusis is one quarter note in length, so the last measure is only three beats long (i.e., it is missing one quarter note).

Counting with Beat Units of 2, 8, and 16

In simple meters with other beat units (shown in the bottom number of the time signature), the same counting patterns are used for the beats and subdivisions, but they correspond to different note values.

Example 14 shows a rhythm with a $\frac{4}{4}$ time signature, followed by the same rhythms with different beat units. Each of these rhythms sounds the same and is counted the same. They are also all considered simple quadruple meters. The difference in each example is the bottom number of the time signature—which note gets the beat unit (quarter, half, eighth, or sixteenth).



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Example 14. *The same counted rhythm, as written in a meter with (a) a quarter-note beat, (b) a half-note beat, (c) an eighth-note beat, and (d) a sixteenth-note beat.*

Beaming, Stems, Flags, and Multi-Measure Rests

Beams connect notes together by beat. As **Example 15** shows, this means that beaming changes depending on the time signature. In the first measure, sixteenth notes are grouped into sets of four, because four sixteenth notes in a $\frac{4}{4}$ time signature are equivalent to one beat. In the second measure,

however, sixteenth notes are grouped into sets of two, because one beat in a $\frac{4}{8}$ time signature is only equivalent to two sixteenth notes.



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Example 15. *Beaming in two different meters.*

unbeamed

beamed

Example 16. *Beaming makes rhythms easier to read by showing the beat unit.*

Note that in vocal music, beaming is sometimes only used to connect notes sung on the same syllable. If you are accustomed to music without beaming, you may need to pay special attention to beaming conventions until you have mastered them. In the top staff of **Example 16**, the eighth notes are not grouped with beams, making it difficult to see where beats 2 and 3 in the triple meter begin. The bottom staff shows that if we re-notate the rhythm so that the notes that fall within the same beat are grouped together with a beam, it makes the music much easier to read. Note that these two rhythms sound the same, even though they are beamed differently. The ability to group events according to a hierarchy is an important part of human perception, which is why beaming helps us visually parse notated musical rhythms—the metrical structure provides a hierarchy that we show using notational tools like beaming.

Example 17 shows several different note values beamed together to show the beat unit. The first line does not require beams because quarter notes are never beamed, but all subsequent lines do need beams to clarify beats.

Quarter notes are never beamed



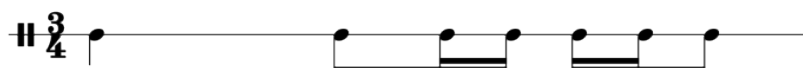
Eighth notes beamed together to show quarter-note beat



Sixteenth notes beamed together to show quarter-note beat



Mixed values beamed together to show quarter-note beat



Example 17. Note values can be beamed together to show the beat unit. In $\mathbf{3_4}$, eighth and sixteenth notes can be beamed together to show a quarter-note beat.



Example 18. Beaming with different stem directions.

The second measure of **Example 18** shows that when notes are grouped together with beams, the stem direction is determined by the note farthest from the middle line. On beat 1 of measure 2, this note is E₅, which is above the middle line, so down-stems are used. Beat 2 uses up-stems because the note farthest from the middle line is the E₄ below it.

Flagging is determined by stem direction (**Example 19**). Notes above the middle line receive a down-stem (on the left) and an inward-facing flag (facing right). Notes below the middle line receive an up-stem (on the right) and an outward-facing flag (facing left). Notes on the middle line can be flagged in either direction, usually depending on the contour of the musical line.



Example 19. Flagging is determined by stem direction.

Partial beams can be used for mixed rhythmic groupings, as shown in **Example 20**. Sometimes these beaming conventions look strange to students who have had less experience with reading beamed music. If this is the case, you will want to pay special attention to how the notes in **Example 20** are beamed.



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Example 20. Partial beams are used for some mixed rhythmic groupings.

Rests that last for multiple full measures are sometimes notated as seen in **Example 21**. This example indicates that the musician is to rest for a duration of four full measures.



Example 21. A multi-measure rest lasting four measures.

A Note on Ties

We have already encountered ties that can be used to extend a note over a measure line. But ties can also be used like beams to clarify the metrical structure within a measure. In the first measure of **Example 22**, beat 2 begins in the middle of the eighth note, making it difficult to see the metrical structure. Breaking the eighth note into two sixteenth notes connected by a tie, as shown in the second measure, clearly shows the beginning of beat 2.

Hard to read:
Beat units unclear



Easier to read:
Ties clarify the beat



Example 22. Ties and proper beaming help to clarify beats.

Online Resources

- [Simple Meter Tutorial \(musictheory.net\)](http://musictheory.net)
- [Video Tutorial on Simple Meter, Beats, and Beaming \(YouTube\)](#)
- [Conducting Patterns \(YouTube\)](#)
- [Simple Meter Time Signatures \(liveabout.com\)](http://liveabout.com)
- [Video Tutorial on Counting Simple Meters \(One Minute Music Lessons\)](#)
- [Simple Meter Counting \(YouTube\)](#)
- [Beaming Rules \(Music Notes Now\)](#)
- [Beaming Examples \(Dr. Sebastian Anthony Birch\)](#)

Assignments from the Internet

- A. Time Signatures and Rhythms ([.pdf](#))
- B. Terminology, Bar Lines, Fill-in-rhythms, Re-beaming ([.pdf](#))
- C. Meters, Time Signatures, Re-beaming ([website](#))
- D. Bar Lines, Time Signatures, Counting ([.pdf](#))
- E. Time Signatures, Re-beaming, p. 4 ([.pdf](#))
- F. Fill-in-rhythms ([.pdf](#))
- G. Time Signatures ([.pdf](#), [.pdf](#))
- H. Bar Lines ([.pdf](#), [.pdf](#), [.pdf](#))

Assignments

1. Notes, Rests, Bar Lines ([.pdf](#), [.docx](#))

2. Re-beaming ([.pdf](#), [.musx](#))

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ties-clarify-beat © Mark Gotham is licensed under a [CC BY-SA \(Attribution ShareAlike\)](#) license

COMPOUND METER AND TIME SIGNATURES

Chelsey Hamm and Mark Gotham

KEY TAKEAWAYS

- Compound meters are meters in which the beat divides into three and then further subdivides into six.
- Duple meters have groupings of two beats, triple meters have groupings of three beats, and quadruple meters have groupings of four beats. You can determine these groupings aurally by listening carefully and tapping along to the beat.
- There are different conducting patterns for duple, triple, and quadruple meters; these are the same in both compound and simple meters.
- Time signatures in compound meters express two things: how many divisions are contained in each measure (the top number), and the division unit—which note gets the division (the bottom number).
- Rhythms in compound meters get different counts based upon their division unit. Beats that are not articulated (because they contain more than one beat or because of ties, rests, or dots) receive parentheses around their counts.

CHAPTER PLAYLIST

In the previous chapter, [Simple Meter and Time Signatures](#), we explored rhythm and time signatures in simple meters—meters in which the beat divides into two and further subdivides into four. In this chapter, we will learn about compound meters—meters in which the beat divides into three and further subdivides into six.

Listening to and Conducting Compound Meters

Compound meters can be duple, triple, or quadruple, just like simple meters. In other words, the beats of compound meters group into sets of either two, three, or four. The difference is that each beat divides into three divisions instead of two, as you can hear by listening carefully to the following examples:



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- “End of the Road” (1992) by Boyz II Men is in a duple meter—the beats group into a two pattern. Tap along to the beat and notice how it divides into three parts instead of two. If you further divide the beat (by tapping twice as fast), you will feel that the beat subdivides into six parts.
- The second movement (Minuet) of Franz Joseph Haydn’s Sonata no. 42 in G Major (1784) is in a compound triple meter. Listen for the groupings of three beats, each of which divides into three.
- Finally, a compound quadruple meter contains four beats, each of which divides into three. Listen to “Exogenesis Symphony Part III” (2010) by the alternative rock band Muse. This is in a compound quadruple meter; in other words, the beats are grouped into a four pattern.

In general, it is less common for music to be written in compound meters. Nonetheless, you must learn how to read music and perform in these meters in order to master Western musical notation.

Review the conducting patterns for simple meters [in the previous chapter](#), as they are the same for compound meters.

Time Signatures

Measures in compound meters are equivalent to one beat grouping (duple, triple, or quadruple), just as they are in simple meters. However, the two numbers in the time signature express different information for compound meters. The top number of a time signature in compound meter expresses the number of divisions in a measure, while the bottom number expresses the division unit—which note value is the division. **Example 1** shows a common compound-meter time signature.

Just like in simple meter, compound-meter time signatures are not fractions (and there is no line between the two numbers), and they are placed after the clef on the staff. In **Example 1**, the top number (6) means that each measure will contain six divisions; the bottom number (8) means that the eighth note is the division. This means that each measure in this time signature will contain six eighth notes, as you can verify by examining **Example 1**.



Example 1. Two numbers (6 and 8) form a common compound meter time signature.

In compound meters, the top number is always a multiple of three. Divide this number by three to find the corresponding number of beats in simple meter: top numbers of 6, 9, and 12 correspond to duple, triple, and quadruple meters respectively. In compound meters, the bottom number is usually one of the following:

- 8, which means the eighth note receives the division.
- 4, which means the quarter note receives the division.
- 16, which means the sixteenth note receives the division.

The following table summarizes the six categories of meters that we have covered so far:

Simple or Compound?	Duple, Triple, Quadruple?	Beat Grouping	Beat Division	Example Time Signatures
Simple	Duple	2	2	$\mathbf{\frac{2}{4}}$ $\mathbf{\frac{2}{8}}$ $\mathbf{\frac{2}{2}}$ $\mathbf{\frac{2}{16}}$
Simple	Triple	3	2	$\mathbf{\frac{3}{4}}$ $\mathbf{\frac{3}{8}}$ $\mathbf{\frac{3}{2}}$ $\mathbf{\frac{3}{16}}$
Simple	Quadruple	4	2	$\mathbf{\frac{4}{4}}$ $\mathbf{\frac{4}{8}}$ $\mathbf{\frac{4}{2}}$ $\mathbf{\frac{4}{16}}$
Compound	Duple	2	3	$\mathbf{\frac{6}{8}}$ $\mathbf{\frac{6}{4}}$ $\mathbf{\frac{6}{16}}$
Compound	Triple	3	3	$\mathbf{\frac{9}{8}}$ $\mathbf{\frac{9}{4}}$ $\mathbf{\frac{9}{16}}$
Compound	Quadruple	4	3	$\mathbf{\frac{12}{8}}$ $\mathbf{\frac{12}{4}}$ $\mathbf{\frac{12}{16}}$

Example 2. Categories of meters.

Counting in Compound Meter

While counting compound meter rhythms, it is recommended that you conduct in order to keep a steady tempo. Because beats in compound meter divide into three, they are always dotted. Beats in compound meter are as follows:

- If 8 is the bottom number, the beat is a dotted quarter note (equivalent to three eighth notes).
- If 4 is the bottom number, the beat is a dotted half note (equivalent to three quarter notes).
- If 16 is the bottom number, the beat is a dotted eighth note (equivalent to three sixteenth notes).

In simple meters, the beat divides into two parts, the first accented and the second non-accented. In compound meters, the beat divides into three parts, the first accented and the second and third non-accented. The counts for compound meter are different from simple meter, as demonstrated in **Example 3**, which is in $\frac{6}{8}$.



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Example 3. Counting in a compound duple meter.

In this time signature, each measure has two beats ($6 \div 3 = 2$), indicating duple meter. Each dotted quarter note (the beat) gets a count, which is expressed in Arabic numerals, like in simple meter. For notes that are longer than one beat (such as the dotted half note in the fourth measure of **Example 3**), the beats that are not counted out loud are still written in parentheses. Divisions are counted using the syllables “la” (first division) and “li” (second division). As the final measure of **Example 3** shows, further subdivisions at the sixteenth-note level are counted as “ta,” with the “la” and “li” syllables on the eighth-note subdivisions remaining consistent.

The third measure of **Example 3** presents two of the most common compound-meter rhythms with divisions, so make sure to review this measure carefully if you are not familiar with compound meter.

Please note that your instructor may employ a different counting system. *Open Music Theory* privileges American traditional counting, but this is not the only method.

Example 4 gives examples of rhythms in (a) duple, (b) triple, and (c) quadruple meter. Just as with

simple meters, compound duple meters have only two beats, compound triple meters have three beats, and compound quadruple meters have four beats.



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Example 4. (a) Compound duple has two beats, (b) compound triple has three beats, and (c) compound quadruple has four beats.

Like in simple meters, beats that are not articulated because of rests and ties are written in parentheses and not counted out loud, as shown in **Example 5**. However, because dotted notes receive the beat in compound meters, dotted rhythms do not cause beats to be written in parentheses the way they do in simple meters.



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Example 5. Beats that are not counted out loud are put in parentheses.

Counting with Division Units of 4 and 16

So far, we have focused on meters with a dotted-quarter beat. In compound meters with other beat units (shown in the bottom number of the time signature), the same counting patterns are used for the beats and subdivisions, but they correspond to different note values (**Example 6**).



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Example 6. The same rhythm written with three different beat units: (a) dotted quarter, (b) dotted half, and (c) dotted eighth.

Each of these rhythms sounds the same and is counted the same. They are also all considered compound triple meters. The difference in each example is the bottom number—which note gets the division unit (eighth, quarter, or sixteenth), which then determines the beat unit.

Beaming, Stems, and Flags

In compound meters, beams still connect notes together by beat; beaming therefore changes in different time signatures. In the first measure of **Example 7**, sixteenth notes are grouped into sets of six, because six sixteenth notes in a $\frac{6}{8}$ time signature are equivalent to one beat. In the second measure of **Example 7**, sixteenth notes are grouped into sets of three, because three sixteenth notes in a $\frac{6}{16}$ time signature are equivalent to one beat.



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Example 7. *Beaming in two different meters.*

When the music involves note values smaller than a quarter note, you should always clarify the meter with beams, regardless of whether the time signature is simple or compound. **Example 8** shows twelve sixteenth notes beamed properly in two different meters. The first measure is in simple meter, so the notes are grouped by beat into sets of four; in the second measure, the compound meter requires the notes to be grouped by beat into sets of six.



Example 8. *Proper beaming is essential in both simple and compound meters.*

The same rules of stemming and flagging that applied in simple meter still apply in compound meter. For notes above the middle line, stems and flags point downward on the left side of the note, and for notes below the middle line, stems and flags point upward on the right side of the note. Stems and flags on notes on the middle line can point in either direction, depending on the surrounding notes.

Like in simple meters, partial beams can be used for mixed rhythmic groupings. If you aren't yet familiar with these conventions, pay special attention to how the notes in **Example 9** are beamed.



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Example 9. The most common partially beamed variations with a division unit of the eighth note.

Online Resources

- [Compound Meter Tutorial \(musictheory.net\)](#) (compound meter starts about halfway through)
- [Video Tutorial on Compound Meters and Beats \(YouTube\)](#) (start at 1:49 for compound meter)
- [Compound Meter Counting and Time Signatures \(John Ellinger\)](#)
- [Compound Meter Counting \(YouTube\)](#)
- [Compound Meter Rhythmic Practice \(YouTube\)](#)
- [Compound Meter Beaming \(Michael Sult\)](#)

Assignments from the Internet

- A. Meter Identification (Simple and Compound) ([.pdf](#)), and with Bar Lines ([.pdf](#))
- B. Meter Beaming (Simple and Compound) ([.pdf](#)), and pp. 4 and 5 ([.pdf](#))
- C. Time Signatures (Simple and Compound) ([.pdf](#))
- D. Counting in 6/8 ([.pdf](#), [.pdf](#), [.pdf](#))
- E. Time Signatures ([.pdf](#), [.pdf](#), [.pdf](#))
- F. Bar Lines ([.pdf](#)), and p. 2 ([.pdf](#))

Assignments

1. Notes, Rests, Bar Lines ([.pdf](#), [.docx](#))
2. Re-beaming ([.pdf](#), [.musx](#))

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OTHER RHYTHMIC ESSENTIALS

Bryn Hughes; Mark Gotham; and Chelsey Hamm

KEY TAKEAWAYS

- A triplet is a type of tuplet in which a beat (or subdivision, or multiple beats) in simple meter is divided into three parts. Notate a triplet by writing a 3 above the triplet rhythm.
- A duplet is a tuplet in which a beat (or subdivision) in compound meter is divided into two parts. Notate a duplet by writing a 2 above the duplet rhythm.
- Hypermeter refers to the patterns of accentuation at the metrical level.
- Syncopation happens when there are off-beat rhythmic accents, which can be created by ties, dots, rests, and/or dynamics.

Borrowed Divisions

Typically, a meter is defined by the presence of a consistent beat division: division by two in simple meter, and by three in compound meter. Sometimes composers will use a triple division of the beat in a simple meter, or a duple division of the beat in a compound meter; these rhythms are called tuplets. Triplets are a type of tuplet in which a beat (or subdivision, or multiple beats) in simple meter is divided into three parts. Triplets are sometimes thought of as “borrowed” from compound meter, because the beat in compound meter is usually divided into three parts. A triplet is notated by writing the number 3 on top of the triplet rhythm.

Triplets may occur at both any metric level, as seen in [Example 1](#). In [Example 1a](#), the triplet is at the beat level—this is the most common use of a triplet. [Example 1b](#) shows a sixteenth-note triplet, which is equivalent to one eighth note (the division in this time signature). Triplets also may occur across

multiple beats, as seen in **Example 1c**. This triplet (notated with three quarter notes) takes up the space of one half note.



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Example 1. Triplets at (a) the beat level, (b) the subdivision level, and (c) the multi-beat level.

A duplet is a tuplet in which a beat (or subdivision) in compound meter is divided into two parts. Duplets are notated by writing the number 2 on top of the duplet rhythm, as seen in **Example 2**.



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Example 2. Notate a duplet by writing a 2 on top of the duplet rhythm.

Counting for tuplet rhythms is usually “borrowed” as well. For example, triplets are usually counted 1-la-li, while duplets are usually counted 1-and, 2-and, etc.

Meter Beyond Measure (Hypermeter)

We have seen that beats are either accented or non-accented which was observed in the discussion of conducting patterns in the previous two chapters (see [Simple Meter and Time Signatures](#) and [Compound Meter and Time Signatures](#)). Hypermeter refers to groups of measures that form patterns of accentuation, especially at faster tempos. In order to label patterns of accentuation across multiple measures, it can be helpful to annotate the score with hypermetrical counts as in **Example 3**, which shows a reduced excerpt from the “Scherzo” of Ludwig van Beethoven’s Symphony no. 9 (1824). While listening to **Example 3**, try conducting along to the hypermetrical numbers in a quadruple pattern. By doing this, you will be able to feel (and hear) which measures are more accented (1 and 3) and which are less accented (2 and 4).



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Example 3. Eight measures of the “Scherzo” of Ludwig van Beethoven’s Symphony no. 9 (1824) with hypermetric counts.

Syncopation

Syncopation happens when there are off-beat rhythmic accents (see [Rhythm and Meter in Pop Music](#) for more information), and as **Example 4** shows, it can be created by ties, dots, rests, and/or dynamics. In measure 1, the ties create the syncopation, while in measure 2, the rhythm is syncopated because of both a dot and a tie. The sense of syncopation in measure 3 is created by the rests at the beginning of each beat. In measure 4, while there is an eighth note on each division, the off-beat accents (dynamics) produce syncopation.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=63>

Example 4. Different examples of syncopated rhythms.

Online Resources

- [Triplets and Duplets \(YouTube\)](#)
- [Triplets \(Hello Music Theory\)](#)
- [Duplets \(Hello Music Theory\)](#)
- [Syncopation \(Music Theory Academy\)](#)
- [Syncopated Rhythm Practice \(YouTube\)](#)

Assignments from the Internet

- A. Counting Triplets, pp. 32–33 ([.pdf](#))
- B. Counting Duplets, p. 13 ([.pdf](#))
- C. Hypermetrical Numbers ([.pdf](#))
- D. Counting Syncopation ([.pdf](#), [website](#), [.pdf](#))

Assignments

1. Triplets and Duplets, Hypermeter, Syncopation ([.pdf](#), [.docx](#))

Worksheet playlist

MAJOR SCALES, SCALE DEGREES, AND KEY SIGNATURES

Chelsey Hamm and Bryn Hughes

KEY TAKEAWAYS

- A major scale is an ordered collection of half and whole steps with the ascending succession W-W-H-W-W-W-H.
- Major scales are named for their first note (which is also their last note), including any accidental that applies to the note.
- Scale degrees are solmization syllables notated by Arabic numerals with carets above them. The scale degrees are $\hat{1} - \hat{2} - \hat{3} - \hat{4} - \hat{5} - \hat{6} - \hat{7}$.
- Solfège solmization syllables are another method of naming notes in a major scale. The syllables are *do*, *re*, *mi*, *fa*, *sol*, *la*, and *ti*.
- Each note of a major scale is also named with scale-degree names: tonic, supertonic, mediant, subdominant, dominant, submediant, and leading tone.
- A key signature, consisting of either sharps or flats, appears at the beginning of a composition, after a clef but before a time signature.
- The order of sharps in key signatures is F, C, G, D, A, E, B, while the order of flats is the opposite: B, E, A, D, G, C, F. In sharp key signatures, the last sharp is a half step below the tonic (the first note of a scale). In flat key signatures, the second-to-last flat is the tonic.
- The circle of fifths is a convenient visual for remembering major key signatures. All of the major key signatures are placed on a circle in order of number of accidentals.

A scale is an ordered collection of half and whole steps (see [Half and Whole Steps and Accidentals](#) to review).

Major Scales

A major scale is an ordered collection of half- (abbreviated H) and whole steps (abbreviated W) in the following ascending succession: W-W-H-W-W-W-H. Listen to **Example 1** to hear an ascending major scale. Each whole step is labeled with a square bracket and “W,” and each half step is labeled with an angled bracket and “H.”



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Example 1. An ascending major scale.

A major scale always starts and ends on notes of the same letter name, one octave apart, and this starting and ending note determines the name of the scale. Therefore, **Example 1** depicts a C major scale because its first and last note is a C.

The name of a scale includes any accidental that applies to the first and last note. **Example 2** shows a B $\flat$ (B-flat) major scale—not a B major scale, which would use a different collection of pitches. Note that the pattern of half and whole steps is the same in every major scale, as shown in **Example 1** and **Example 2**.



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Example 2. A B-flat major scale.

Scale Degrees, Solfège, and Scale-Degree Names

Musicians name the notes of major scales in several different ways. Scale degrees are solmization syllables notated by Arabic numerals with carets above them. The first note of a scale is $\hat{1}$ and the numbers ascend until the last note of a scale, which is also $\hat{1}$ (although some instructors prefer $\hat{8}$). **Example 3** shows a D major scale with each scale degree labeled with an Arabic numeral and a caret.



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Example 3. A D major scale.

Below the scale degrees, Example 3 also shows another method of naming notes in a major scale: solfège solmization syllables. Solfège (a system of solmization syllables) are another method of naming notes in a major scale. The syllables *do*, *re*, *mi*, *fa*, *sol*, *la*, and *ti* can be applied to the first seven notes of any major scale; these are analogous to the scale degrees $\hat{1}$, $\hat{2}$, $\hat{3}$, $\hat{4}$, $\hat{5}$, $\hat{6}$, and $\hat{7}$. The last note is *do* ($\hat{1}$) because it is a repetition of the first note. Because *do* ($\hat{1}$) changes depending on what the first note of a major scale is, this method of solfège is called movable *do*. This is in contrast to a fixed *do* solmization system, in which *do* ($\hat{1}$) is always the pitch class C.

Each note of a major scale is also named with scale-degree names: tonic, supertonic, mediant, subdominant, dominant, submediant, leading tone, and then tonic again. **Example 4** shows how these names align with the scale-degree number and solfège systems described above.

Scale Degree Number	Solfège	Scale Degree Name
$\hat{1}$	<i>do</i>	Tonic
$\hat{2}$	<i>re</i>	Supertonic
$\hat{3}$	<i>mi</i>	Mediant
$\hat{4}$	<i>fa</i>	Subdominant
$\hat{5}$	<i>sol</i>	Dominant
$\hat{6}$	<i>la</i>	Submediant
$\hat{7}$	<i>ti</i>	Leading Tone
$\hat{8}$ / $\hat{1}$	<i>do</i>	Tonic

Example 4. Scale-degree numbers, solfège syllables, and scale-degree names.

Example 5 shows these scale-degree names applied to an A $\flat$ major scale:



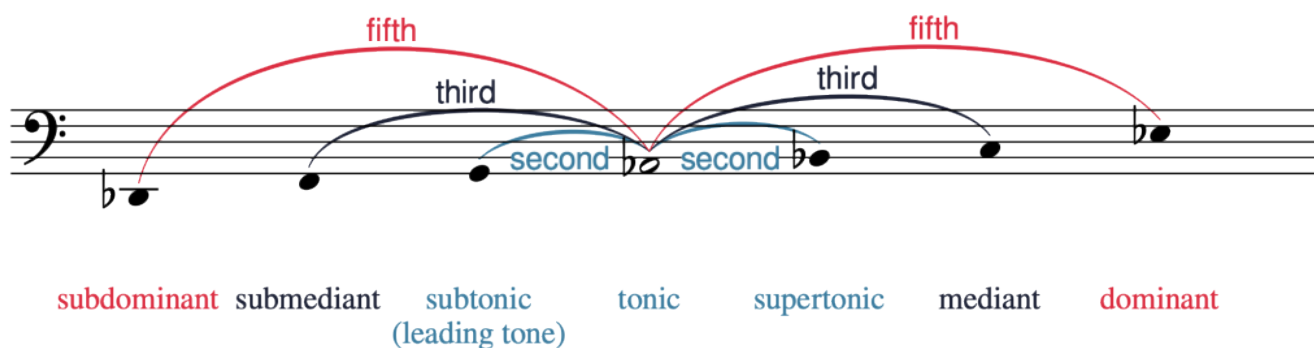


One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=82>

Example 5. An $A\flat$ major scale with scale-degree names.

Example 6 shows the notes and scale-degree names of the $A\flat$ major scale in an order that shows how the names of the scale degrees were derived. The curved lines above the staff show the intervallic distance between each scale degree and the tonic.

- The word *dominant* is inherited from medieval music theory, and refers to the importance of the fifth above the tonic in diatonic music.
- The word *mediant* means “middle,” and refers to the fact that the mediant is in the middle of the tonic and dominant pitches.
- The Latin prefix *super* means “above,” so the supertonic is a second above the tonic. This is the only “super-” interval.
- The Latin prefix *sub* means “below”; the subtonic, submediant, and subdominant are the inverted versions (i.e., below the tonic) of the supertonic, mediant, and dominant respectively. (Note that in this text, we prefer the term leading tone instead of “subtonic” when referring to the scale-degree that is a half step below tonic, so named because it is often thought of as “leading” toward the tonic.)



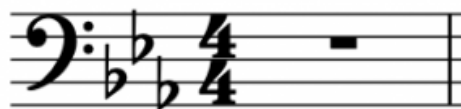
Example 6. The notes of the $A\flat$ major scale arranged to show the derivation of scale-degree names.

Key Signatures

A key signature, consisting of either sharps or flats, appears at the beginning of a composition, after a clef

but before a time signature. You can remember this order because it is alphabetical: clef, key, time.

Example 7 shows a key signature in between a bass clef and a time signature.



Example 7. A key signature goes after a clef, but before a time signature.



Example 8. Both Bs are flat, regardless of octave.

Key signatures collect the accidentals in a scale and place them at the beginning of a composition so that it is easier to keep track of which notes have accidentals applied to them. In **Example 7**, there are flats on the lines and spaces that indicate the notes B, E, and A (reading left to right). Therefore, every B, E, and A in a composition with this key signature will be flat, regardless of octave. In **Example 8** both of these Bs will be flat because B $\flat$ is in the key signature.

Flat key signatures have a specific order in which flats are added, and the same is true of the sharps in sharp key signatures. These orders apply regardless of clef. **Example 9** shows the order of sharps and flats in all four clefs that we have learned:



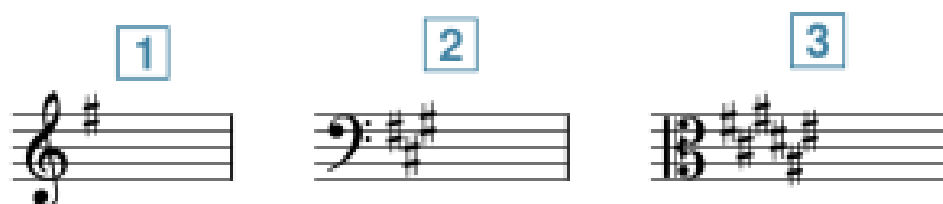
Example 9. The order of sharps and flats in treble, bass, alto, and tenor clefs.

The order of sharps is always F, C, G, D, A, E, B. This can be remembered with the mnemonic “Fat Cats

Go Down Alleys (to) Eat Birds.” The sharps form a zig-zag pattern, alternating going down and up. In the treble, bass, and alto clefs, this pattern “breaks” after D $\sharp$ and then resumes. In the tenor clef, there is no break, but F $\sharp$ and G $\sharp$ appear in the lower octave instead of the upper octave.

The order of the flats is the opposite of the order of the sharps: B, E, A, D, G, C, F. This makes the order of flats and sharps palindromes. The order of flats can be remembered with this mnemonic: “Birds Eat And Dive Going Copiously Far.” The flats always make a perfect zig-zag pattern, alternating going up and down, regardless of clef, as seen in **Example 9**.

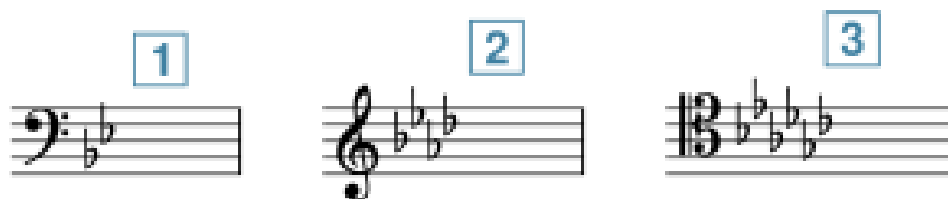
There are easy ways to remember which key signature belongs to which major scale. In sharp key signatures, the last sharp is a half step below the tonic (the first note of a scale). **Example 10** shows three sharp key signatures in different clefs. Here’s how to identify each with this method:



Example 10. Three different sharp key signatures in treble, bass, and alto clefs.

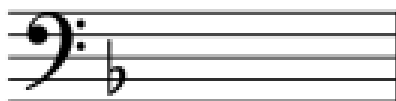
1. The last sharp (in this case the only sharp), F $\sharp$, is a half step below the note G. Therefore, this is the key signature of G major.
2. The last sharp, C $\sharp$, is a half step below the note D. Therefore, this is the key signature of D major.
3. The last sharp, G $\sharp$, is a half step below the note A. Therefore, this is the key signature of A major.

In flat key signatures, the second-to-last flat is the tonic (the first note of a scale). **Example 11** shows three flat key signatures in different clefs. Here’s how to identify each with this method:



Example 11. Three different flat key signatures in bass, treble, and tenor clefs.

1. The second-to-last flat in this key signature is B $\flat$. Therefore, this is the key signature of B $\flat$ major.
2. The second-to-last flat is A $\flat$. Therefore, this is the key signature of A $\flat$ major.
3. The second-to-last flat is G $\flat$. Therefore, this is the key signature of G $\flat$ major.



Example 12. The key signatures of C major (top) and F major (bottom).

There are two key signatures that have no “tricks” that you will simply have to memorize. These are C major, which has nothing in its key signature (no sharps or flats), and F major, which has one flat: B $\flat$ (**Example 12**).

Example 13 shows the key signature for C major (no sharps or flats) followed by all of the sharp key signatures in order in all four clefs: G, D, A, E, B, F $\sharp$, and C $\sharp$ major.



Example 13. The key signatures of C, G, D, A, E, B, F $\sharp$, and C $\sharp$ in all four clefs.

Example 14 first shows the key signature for C major (no sharps or flats), then all of the flat key signatures in order in all four clefs: F, B $\flat$, E $\flat$, A $\flat$, D $\flat$, G $\flat$, and C $\flat$ major.



Example 14. The key signatures of C, F, B $\flat$, E $\flat$, A $\flat$, D $\flat$, G $\flat$, and C $\flat$ in all four clefs.

Example 14 first shows the key signature of C major (with no sharps or flats), and then the key signatures of F, B $\flat$, E $\flat$, A $\flat$, D $\flat$, G $\flat$, and C $\flat$ in all four clefs.

There is one other “trick” that might make memorization of the key signatures easier: C major is the key signature with no sharps or flats, C $\flat$ major is the key signature with every note flat (7 flats total), and C $\sharp$ major is the key signature with every note sharp (7 sharps total).

Major keys are said to be “real” if they correspond to one of the key signatures in **Examples 13** or **14**. If a double sharp or double flat would be needed for a key signature, then that key signature would be “imaginary.” Occasionally, you may encounter music in an imaginary key. **Example 15** shows an F $\flat$ major scale; an F $\flat$ major key signature is imaginary because it would need a B $\flat\flat$.

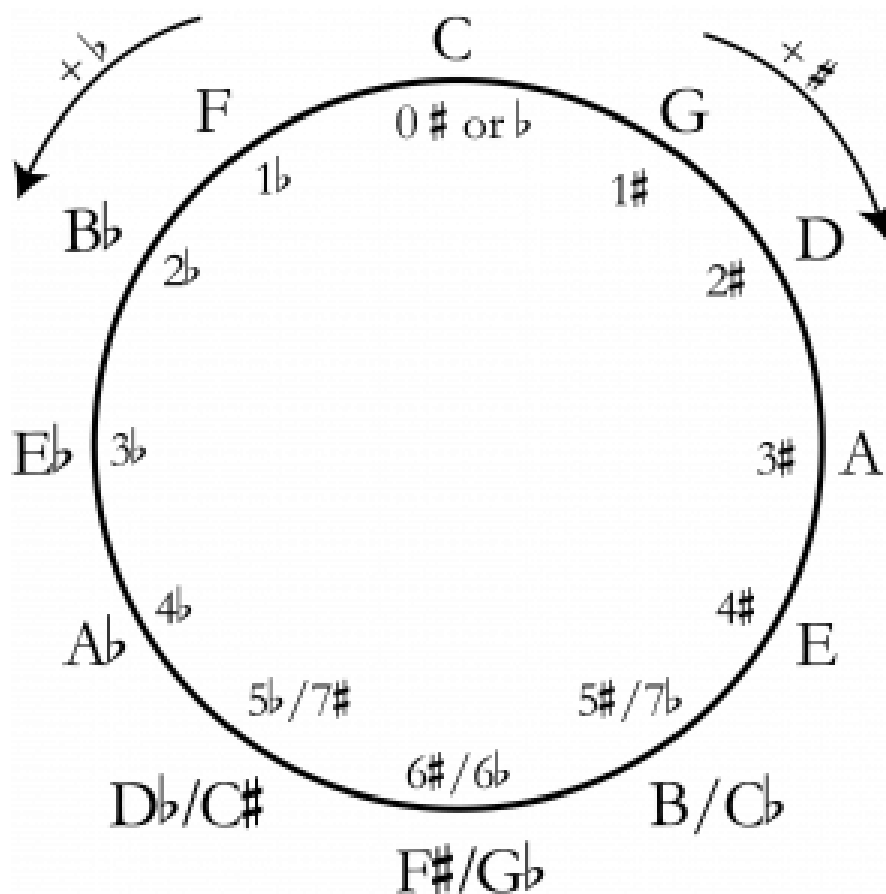


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Example 15. An $F\flat$ major scale in treble clef.

The Circle of Fifths

The circle of fifths is a convenient visual. In the circle of fifths, all of the major key signatures are placed on a circle in order of number of accidentals. The circle of fifths is so named because each key signature is a fifth away from the ones on either side of it. **Example 16** shows the circle of fifths for major key signatures:



Example 16. The circle of fifths for major keys.

If you start at the top of the circle (12 o'clock), the key signature of C major appears, which has no sharps or flats. If you continue clockwise, sharp key signatures appear, each subsequent key signature adding one more sharp. If you continue counter-clockwise from C major, flat key signatures appear, each subsequent key signature adding one more flat. The bottom three key signatures (at 7, 6, and 5 o'clock) in **Example 16** are enharmonically equivalent. For example, the B major and C $\flat$ major scales have different key signatures—five sharps and seven flats, respectively—but they sound the same because the notes B and C $\flat$ are enharmonically equivalent.

Online Resources

- [Major Scales Tutorial \(musictheory.net\)](https://musictheory.net/major-scales-tutorial)
- [Major Scales \(Practical Chords and Harmonies\)](#)
- [Major Scales \(YouTube\)](#)
- [Scale Degree Names \(musictheoryfundamentals.com\)](https://musictheoryfundamentals.com/scale-degree-names)
- [Scale Degree Names \(musictheory.net\)](https://musictheory.net/scale-degree-names)
- [Solfège History and Tutorial \(Earlham College\)](#)
- [Scale Degrees, Solfège, and Scale-degree Names \(YouTube\)](#)
- [Major Key Signatures \(musictheory.net\)](https://musictheory.net/major-key-signatures)
- [Sharp Key Signatures \(YouTube\)](#)
- [Flat Key Signatures \(YouTube\)](#)
- [Major Key Signature Flashcards \(music-theory-practice.com\)](https://music-theory-practice.com/major-key-signature-flashcards)
- [The Circle of Fifths \(YouTube\)](#)
- [The Circle of Fifths \(Classic FM\)](#)

Assignments from the Internet

- A. Writing Major Scales ([.pdf](#)), from Tonic and Other Scale Degrees ([.pdf](#))
- B. Writing Major Key Signatures ([.pdf](#))
- C. Identifying Major Key Signatures ([.pdf](#))
- D. Major Keys Worksheets for Children ([.pdf](#))
- E. Scale Degrees or Solfège ([.pdf](#), [.pdf](#))

Assignments

1. Writing Major Scales ([.pdf](#), [.mscx](#))
2. Key Signatures: Major ([.pdf](#), [.mscx](#))

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Order of Sharps and Flats © Chelsey Hamm is licensed under a CC BY-SA (Attribution ShareAlike) license

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cmajfmaj © Megan Lavengood is licensed under a CC BY-SA (Attribution ShareAlike) license

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MINOR SCALES, SCALE DEGREES, AND KEY SIGNATURES

Chelsey Hamm and Bryn Hughes

KEY TAKEAWAYS

- A minor scale's third note is always a half step lower than the third note of the major scale with the same name.
- There are three variations on the minor scale: natural minor, harmonic minor, and melodic minor.
- Each minor scale is an ordered collection of half and whole steps, as follows:
 - Natural minor: W-H-W-W-H-W-W (ascending)
 - Harmonic minor: W-H-W-W-H-3Hs-H (ascending)
 - Melodic minor: W-H-W-W-W-H-H (ascending) and W-W-H-W-W-H-W (descending).
- While there are three minor scales, minor keys and minor key signatures are always identified as simply “minor” (“A minor,” “D minor,” etc.) and are based on the natural minor scale.
- Scale degrees in minor are the same as those in major. There are a few new solfège syllables in minor including *me* ($\downarrow \hat{3}$), *le* ($\downarrow \hat{6}$), and *te* ($\downarrow \hat{7}$).
- Each note of a minor scale is also named with scale-degree names. These are largely the same in minor as they are in major, except for the subtonic (*te* or $\downarrow \hat{7}$).
- Major and minor keys share two different relationships. The parallel relationship is when a major and minor key share a tonic note, while the relative relationship is when a major and minor key share a key signature.
- Each major key signature has a corresponding relative minor key signature whose tonic is three half steps below the relative major's tonic. The orders of sharps and flats in major and minor key signatures are the same.

CHAPTER PLAYLIST

The Minor Scale

A minor scale's third note is always a half step lower than the third note of the major scale with the same name (e.g., B major and B minor). There are three different types of minor scales: natural minor, harmonic minor, and melodic minor. These three types of minor scales should be thought of like flavors of ice cream; ice cream is still ice cream regardless of whether it is chocolate, vanilla, strawberry, etc. Likewise, a work is simply “minor” or “in minor”; musicians do not consider music to be “in” a specific type of minor scale (i.e., natural, harmonic, or melodic). In other words, while there are three minor scales, minor keys and minor key signatures are always identified as simply “minor” (“A minor,” “D minor,” etc.) and are based on the natural minor scale.

The three different types of minor scales are useful categories primarily for instrumental performers. Learning to play the different types of minor scales on instruments allows performers to become familiar with the minor patterns most commonly used in Western classical music. Just like major scales, minor scales are named for their first note (including the accidental, if any), which is also their last note.

Natural Minor

The natural minor form of the minor scale consists of an ordered collection of half and whole steps with the ascending succession W-H-W-W-H-W-W, as shown in **Example 1**. Each whole step is labeled with a square bracket and “W,” and each half step is labeled with an angled bracket and “H.” Listen carefully to **Example 1** and notice that the half and whole step pattern of the natural minor form of the minor scale is the same ascending and descending.



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Example 1. A G natural minor scale. (Sounding scale is F natural minor.)

Harmonic Minor

The harmonic minor form of the minor scale consists of an ordered collection of half and whole steps in the ascending succession W-H-W-W-H-3Hs-H (“3Hs” = 3 half steps), as shown in **Example 2**. The curved bracket represents a distance of three half steps (or a whole step plus a half step). Listen carefully to **Example 2** and notice that the half and whole step pattern of the harmonic minor form of the minor scale is the same ascending and descending.



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Example 2. A G harmonic minor scale. (Sounding scale is F harmonic minor.)

Melodic Minor

The melodic minor form of the minor scale consists of an ordered collection of half and whole steps in the ascending succession W-H-W-W-W-W-H and the descending succession W-W-H-W-W-H-W, as shown in **Example 3**. When you listen to **Example 3**, notice that the melodic minor form has different ascending and descending patterns: the ascending pattern is unique to the melodic minor form, while the descending pattern is the same as the natural form.



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Example 3. A G melodic minor scale. (Sounding scale is F melodic minor.)

Example 4 shows four versions of a C scale—major, natural minor, harmonic minor, and melodic minor—with the scale degrees indicated ([see below](#)). Listen to this example carefully, noting the aural differences between the scales.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=4921>

Example 4. Major, natural minor, harmonic minor, and melodic minor scales, all starting on C.

Minor Scale Degrees, Solfège, and Scale-Degree Names

Minor scale degrees, solfège, and scale-degree names are similar to, but not exactly the same as, their major-scale counterparts. **Example 5** summarizes the three types of minor scale, and shows the scale degrees and solfège for each. Note that the scale degrees are the same as in a major scale. The bottom line shows the solfège syllables, which differ from the major-scale syllables in several places to reflect the minor scale's pattern of whole and half steps.



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Example 5. Scale degrees and solfege for all three types of minor scales: a) natural minor; b) harmonic minor, and c) melodic minor.

In natural minor (**Example 5a**), *mi* ($\hat{3}$) becomes *me* ($\downarrow \hat{3}$) (pronounced “may”), *la* ($\hat{6}$) becomes *le* ($\downarrow \hat{6}$) (pronounced “lay”), and *ti* ($\hat{7}$) becomes *te* ($\downarrow \hat{7}$) (pronounced “tay”). If you sing or play through the above example, you’ll notice that the ending lacks the same sense of closure you heard in the major scale. In the major scale, this closure is created in part by the ascending semitone between *ti* ($\hat{7}$) and *do* ($\hat{1}$).

In harmonic minor (**Example 5b**), *mi* ($\hat{3}$) becomes *me* ($\downarrow \hat{3}$) and *la* ($\hat{6}$) becomes *le* ($\downarrow \hat{6}$). Having *ti* ($\hat{7}$) creates the sense of closure that is absent in the natural minor scale.

As noted above, the melodic minor scale has different ascending and descending patterns (**Example 5c**). In the ascending form of melodic minor, *mi* ($\hat{3}$) becomes *me* ($\downarrow \hat{3}$), but the rest of the solfège syllables are the same as in major. In the descending form of melodic minor, *mi* ($\hat{3}$) becomes *me* ($\downarrow \hat{3}$), *la* ($\hat{6}$) becomes *le* ($\downarrow \hat{6}$), and *ti* ($\hat{7}$) becomes *te* ($\downarrow \hat{7}$), like natural minor. Therefore, the ascending version of

melodic minor has the sense of closure associated with the major scale, while the descending version follows the pattern of the natural minor scale.

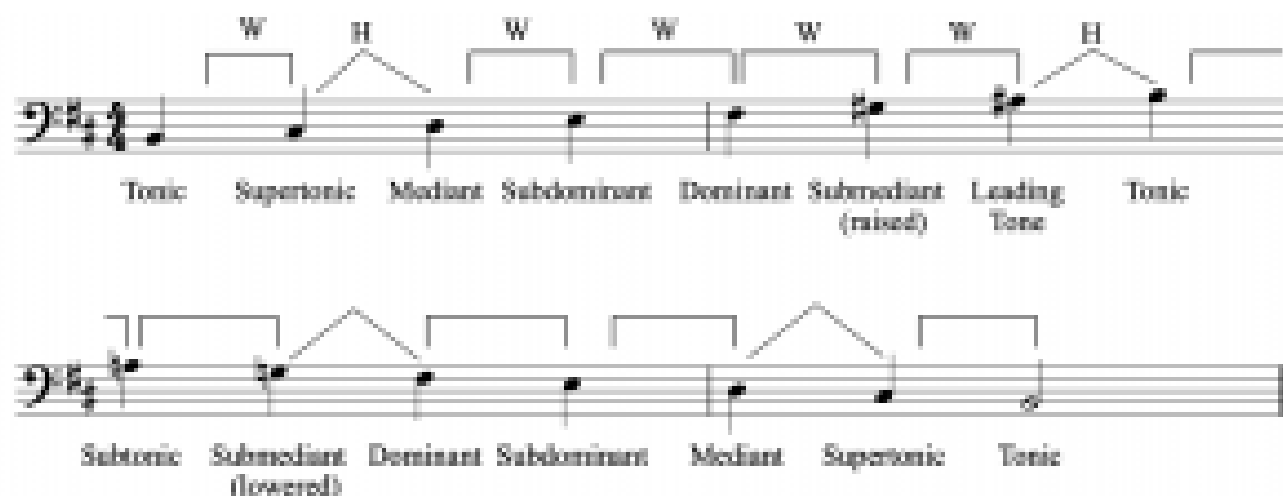
As in major scales, each note of a minor scale is also named with scale-degree names. **Example 6** shows the scale-degree names used in minor scales alongside the corresponding scale-degree numbers and solfège syllables.

Scale Degree Number	Solfège	Scale Degree Names
$\hat{1}$	<i>do</i>	Tonic
$\hat{2}$	<i>re</i>	Supertonic
$\hat{3}$	<i>me</i>	Mediant
$\hat{4}$	<i>fa</i>	Subdominant
$\hat{5}$	<i>sol</i>	Dominant
$\hat{6}$	<i>le</i>	Submediant
$\hat{7}$	<i>te</i>	Subtonic
$\hat{7}$	<i>ti</i>	Leading Tone

Example 6. Scale-degree names in minor scales.

As the chapter on major scales discussed, the Latin prefix *sub* means “under”—the submediant is a third below the tonic, and the subdominant is a fifth below. To this, we can now add one new scale degree name: the subtonic, for lowered $\downarrow \hat{7}$. The supertonic is one whole step above the tonic, while the subtonic is one whole step below the tonic.

Example 7 shows a B melodic minor scale, ascending and descending, with scale-degree names labeled. As you can see, the melodic minor scale utilizes the leading tone in its ascending form, and the subtonic in its descending form.



Example 7. A B melodic minor scale.

Example 8 is a helpful visual for learning about the three forms of the minor scale. The order reflects the number of lowered scale degrees (compared to a major scale starting on the same note).

Form of Minor Scale	Lowered Scale Degrees
Natural	$\hat{3}, \hat{6}, \hat{7}$
Harmonic	$\hat{3}, \hat{6}$
Melodic (ascending)	$\hat{3}$

Example 8. Lowered scale degrees of minor.

As you can see, natural minor scales have three lowered scale degrees, harmonic minor scales have two, and melodic minor scales have one in the ascending version. Remember, the descending version of melodic minor is the same as natural minor, with three lowered scale degrees.

The Parallel and Relative Relationships

When comparing major and minor keys, there are two relationships that are important. The parallel relationship is when a major key shares a tonic (*do*, $\hat{1}$) with a minor key. For example, C major and C minor (or A $\flat$ major and A $\flat$ minor, or F $\sharp$ major and F $\sharp$ minor) are parallel keys. We use the terms “parallel minor” and “parallel major” to describe this relationship: C major is the parallel major of C minor, and C minor is the parallel minor of C major.

The relative relationship is when a major key shares a key signature with a minor key. For example, C

major does not have any sharps or flats in its key signature, and neither does A minor. We use the terms “relative minor” and “relative major” to describe this relationship: C major is the relative major of A minor, and A minor is the relative minor of C major. The tonic of a minor key is always three half steps below the tonic of its relative major: if you count three half steps below C, you will get A (C–B, B–B $\flat$, B $\flat$ –A). Likewise, to find the relative major key of a given minor key, count three half steps up.

When counting half steps to determine the relative major or minor of a given key, keep in mind that relative keys have the same key signature. A sharp key cannot share a relative relationship with a flat key (and vice versa), which means you need to select the correct enharmonic key. For example, although the pitch three half steps down from D $\flat$ could be written as either B $\flat$ or A $\sharp$, only B $\flat$ minor (five flats) is the relative minor of D $\flat$ major (also five flats), because A $\sharp$ minor has a different key signature (seven sharps).

Minor Key Signatures

Minor key signatures, like major key signatures, go after a clef but before a time signature. Each major key has a corresponding relative minor key signature; therefore, the orders of the sharps and flats are the same in minor key signatures as they are in major key signatures, placed on the same lines and spaces.

Example 9, reproduced from the previous chapter, shows the order of sharps and flats in all four clefs:



Example 9. The order of sharps and flats in all four clefs.

As previously mentioned, if you know the major key associated with a given key signature, you can go down three half steps from the tonic to find the minor key for that key signature. **Example 10** shows all of the sharp minor key signatures in order, and **Example 11** depicts all of the flat minor key signatures in order.



Example 10. The key signatures of A, E, B, F#, C#, G#, D#, and A# minor.

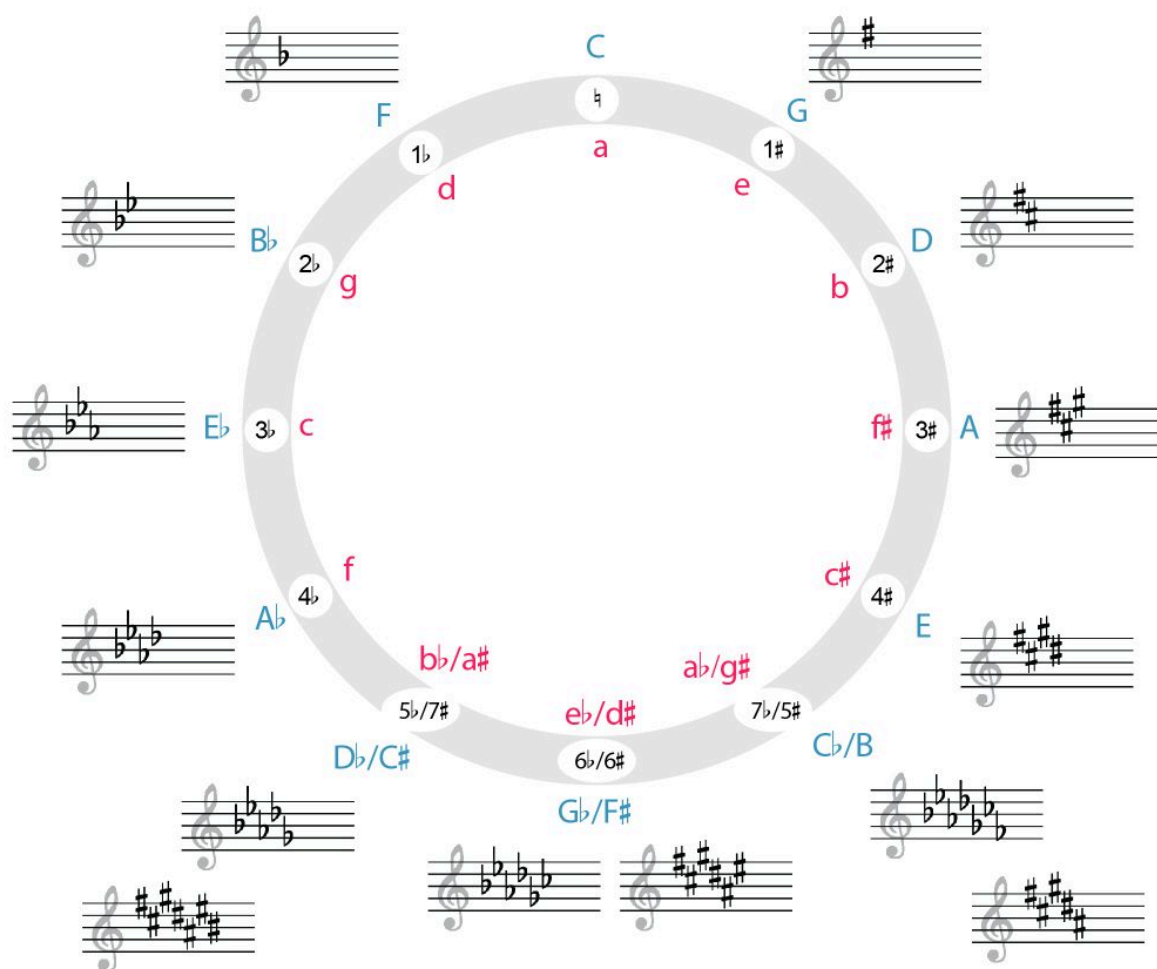


Example 11. The minor key signatures of A, D, G, C, F, Bb, Eb, and Ab minor.

Minor keys can also be imaginary (like imaginary major keys) if they contain double accidentals.

Minor Keys and the Circle of Fifths

The circle of fifths can be used as a visual for minor key signatures as well as major key signatures. Each key signature is placed alongside the corresponding major and minor keys. **Example 12** shows the circle of fifths for minor and major keys:



Example 12. The circle of fifths for major and minor keys.

In **Example 12**, major keys are in blue uppercase letters around the outside of the circle, while minor keys are in red lowercase letters around the inside of the circle. Once again, key signatures appear in order of their number of accidentals. If you start at the top of the circle (12 o'clock) and continue clockwise, key signatures add sharps, while if you start at the top of the circle and continue counterclockwise, they add flats. The bottom three key signatures can be written in sharps or flats, and so are enharmonic.

Major or Minor?

When you are given a piece of music to play or sing, the notation will often include a key signature, which will help you to narrow down the key of the work to two options: a major key and its relative minor.¹ But

1. The vast majority of Western classical works from 1700–1900 are in either major or minor. But outside of this time period and cultural

how can you tell which one the work is in? One thing that can help is to listen to and look at the first and last notes of the work—pieces often start and end on the tonic, so this can help you determine whether a work is major or minor.

Example 13 shows the first three measures of a song by Louise Reichardt (1779–1826) titled “Durch die bunten Rosenhecken” (“Through the colorful rose hedges”):

Example 13. The first three measures of “*Durch die bunten Rosenhecken.*”

This example shows a vocal line (the top staff) and a piano part (the grand staff underneath the vocal part). The key signature contains four flats, which means we can narrow down the key of this work to A $\flat$ major or F minor. In **Example 13**, the first note that is circled in the highest part (the vocalist) is F, as is the first note that is circled in the lowest part (the lowest note played by the piano). Therefore, it is likely that the key of this work is F minor instead of A $\flat$ major.

Online Resources

- [Minor Scales Tutorial \(musictheory.net\)](https://www.musictheory.net)
- [Minor Scales \(Practical Chords and Harmonies\)](#)
- [Minor Scales \(YouTube\)](#)
- [Scale Degree Names in Major and Minor \(musictheory.net\)](https://www.musictheory.net)
- [Solfège History and Tutorial \(Earlham College\)](#)
- [Minor and Major Key Signatures \(musictheory.net\)](https://www.musictheory.net)

context, you should also consider if the piece may be in a [diatonic mode](#). This would expand the number of possible tonics indicated by a key signature.

- [Minor Key Signatures \(YouTube\)](#)
- [Minor Key Signature Flashcards \(music-theory-practice.com\)](#) (be sure to click “minor” in the menu)
- [The Circle of Fifths for Minor and Major \(YouTube\)](#)
- [The Circle of Fifths \(Classic FM\)](#)

Assignments from the Internet

- A. Natural Minor Scales ([.pdf](#))
- B. Harmonic Minor Scales ([.pdf](#))
- C. Melodic Minor Scales ([.pdf](#))
- D. Writing Minor Scales ([.pdf](#), [.pdf](#))
- E. Writing Minor Key Signatures ([.pdf](#))
- F. Writing and Identifying Minor Key Signatures ([.pdf](#))
- G. Parallel and Relative Minor Questions ([.pdf](#))
- H. Scale Degree Names and Scale Degrees ([.pdf](#))

Assignments

1. Writing Minor Scales ([.pdf](#), [.mscx](#))
2. Key Signatures: Minor ([.pdf](#), [.mscx](#))

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Durch die bunten Rosenhecken © Louise Reichardt is licensed under a [CC BY-NC-SA \(Attribution NonCommercial ShareAlike\)](#) license

Footnotes

INTRODUCTION TO DIATONIC MODES AND THE CHROMATIC "SCALE"

Chelsey Hamm

KEY TAKEAWAYS

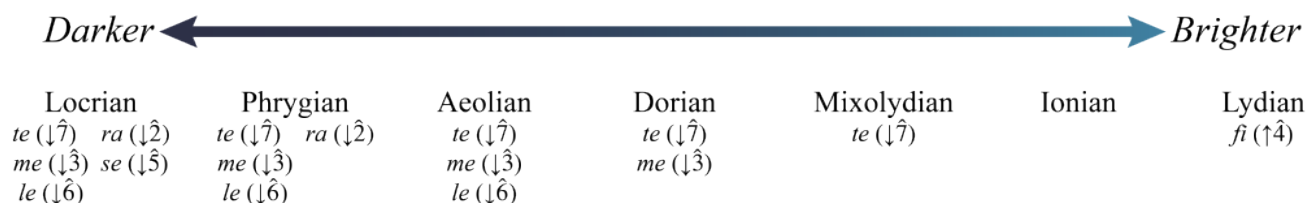
- The diatonic modes are scale-like collections of notes with patterns of half and whole steps.
- Modes can be described within a continuum of modal brightness: brighter modes sound more like a major scale, while darker modes sound more like a minor scale.
- The three bright modes, which contain *mi* ($\hat{3}$) instead of *me* ($\downarrow \hat{3}$), are lydian, ionian, and mixolydian.
- The four dark modes, which contain *me* ($\downarrow \hat{3}$) instead of *mi* ($\hat{3}$) are dorian, aeolian, phrygian, and locrian.
- A chromatic "scale", also known as the chromatic collection, consists of twelve adjacent half steps. Chromatic scales are often (but not always) written with sharps while ascending and with flats while descending.

This book covers modes from many different angles. For more information on modes, check [Chord-Scale Theory \(jazz\)](#), [Modal Schemas \(pop\)](#), [Diatonic Modes \(20th/21st-c.\)](#), and [Analyzing with Modes, Scales, and Collections \(20th-/21st-c.\)](#).

Modes and the Parallel Relationship

The diatonic modes are scale-like collections of notes with different patterns of half and whole steps. As we have learned previously, scales that share a tonic have a parallel relationship. In this chapter, modes are going to be described using the parallel relationship. Modes will also be described within a continuum of modal brightness; modal brightness: brighter modes sound more like a major scale, while darker modes sound more like a minor scale.

Example 1 ranks the seven diatonic modes in terms of relative brightness and darkness. It also summarizes which scale degrees are altered in relation to the ionian (major) mode, which will be explained in more detail below.



Example 1. Relative darkness and brightness of modes.

The brightest mode is the lydian mode. The ascending pattern of half and whole steps in this mode is W-W-W-H-W-W-H. Another way to think of this mode is as a major scale but with raised $\hat{4}$, whose solfège is *fi* ($\uparrow \hat{4}$). **Example 2** shows C lydian with solfège.



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Example 2. C lydian with solfège.

The next brightest mode is the ionian mode. This mode consists of an ascending pattern of half and whole steps that is the same as a major scale: W-W-H-W-W-W-H. **Example 3** shows C ionian with solfège.



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Example 3. C ionian with solfège.

The next brightest mode is the mixolydian mode, with W-W-H-W-W-H-W as the ascending pattern of half and whole steps. Another way to think of this mode is as a major scale but with lowered $\hat{7}$.

Example 4 shows C mixolydian with solfège.



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Example 4. C mixolydian with solfège.

The lydian, ionian, and mixolydian modes are usually considered the brighter (or more major) modes because they contain *mi* instead of *me* (unaltered $\hat{3}$ instead of lowered $\hat{3}$). The dorian, aeolian, phrygian, and locrian modes are usually considered darker (or more minor) modes because they contain *me* instead of *mi* ($\downarrow \hat{3}$ instead of unaltered $\hat{3}$).

The dorian mode is the first darker (or more minor) mode. This mode's ascending pattern of half and whole steps is W-H-W-W-W-H-W. Another way to think of this mode is as a minor scale but with raised $\hat{6}$ (*la*). **Example 5** shows C dorian with solfège:



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Example 5. C dorian with solfège.

The next darkest mode is the aeolian mode. The aeolian mode's ascending pattern of half and whole steps is the same as a natural minor scale: W-H-W-W-H-W-W. **Example 6** shows C aeolian with solfège.



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Example 6. C aeolian with solfège.

The next darkest mode is the phrygian mode. The ascending pattern of half and whole steps in the phrygian mode is H-W-W-W-H-W-W. This is the same pattern as a natural minor scale, but with lowered $\hat{2}$, whose solfège is *ra*. **Example 7** shows C phrygian with solfège:



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Example 7. *C phrygian with solfège.*

The darkest mode is the locrian mode. The locrian mode's ascending pattern of half and whole steps is H-W-W-H-W-W-W. This is the same pattern as a natural minor scale, but with lowered $\hat{2}$ (*ra*) and lowered $\hat{5}$, whose solfège is *se*. **Example 8** shows C locrian with solfège:



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Example 8. *C locrian with solfège.*

Each mode can start on any note. For example, one could build a mixolydian collection starting on $D\flat$, an aeolian collection starting on $G\flat$, or a lydian collection starting on $F\sharp$. When writing modal collections, be sure to think about your accidentals carefully.

Example 9 shows all of the different modes with scale degrees and solfège, ordered from brightest to darkest (lydian to locrian):



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Example 9. *The modes from brightest to darkest, starting on C, with scale degrees.*

Listen to **Example 9** carefully, observing the difference between the modes.

Chromatic “Scales”

A chromatic "scale" consists of twelve adjacent half steps. Because it lacks a pattern of half and whole steps, music theorists generally refer to it as a chromatic collection, which is why “scale” is in scare quotes here. **Example 10** shows two chromatic collections, the first starting on A and the second starting on E $\flat$:



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Example 10. Two chromatic collections starting on A and E $\flat$.

As you can see in **Example 10**, chromatic collections are often (but not always) written with sharps while ascending and with flats while descending; the first line of this example demonstrates this. A chromatic collection that begins with a flat note (such as the second line in **Example 10**) is usually written with naturals while ascending and with flats while descending. When you write chromatic collections, don't forget that two pairs of white keys on [the keyboard](#) are half steps: B/C and E/F.

Online Resources

- [Overview of the Modes and History \(Classic FM\)](#)
- [Modes from a Relative Conception \(Learning Music\)](#)
- [Modes Tutorial and Quiz \(musictheoryfundamentals.com\)](#)
- [Modes with Examples \(fretello.com\)](#)
- [Modes Identification Quiz \(music-theory-practice.com\)](#)
- [Chromatic Scales \(Hello Music Theory\)](#)

Assignments from the Internet

- A. Writing Modes ([.pdf](#), [.pdf](#)), from a Relative Conception ([.pdf](#))
- B. Mode Identification and Accidental Error Detection ([.pdf](#))
- C. Dorian p. 1, and lydian p. 3 ([.pdf](#))

- D. Mode Writing and Questions ([.docx](#), [.docx](#))
- E. Mode Identification ([.pdf](#))
- F. Chromatic Scales and Modes, p. 1 ([.pdf](#))
- G. Writing Chromatic Scales ([.pdf](#))

Assignments

1. Writing Modes Assignment #1 ([.pdf](#), [.mscx](#))
2. Writing Modes Assignment #2 ([.pdf](#), [.mscx](#))
3. Writing Chromatic "Scales" Assignment #1 ([.pdf](#), [.mscx](#))
4. Writing Chromatic "Scales" Assignment #2 ([.pdf](#), [.mscx](#))

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THE BASICS OF SIGHT-SINGING AND DICTATION

Kris Shaffer; Chelsey Hamm; and Samuel Brady

KEY TAKEAWAYS

- Sight-singing means to sing at sight, having never before heard or seen what you are singing. Sight-counting is counting a rhythm you have never before heard or seen.
- Always practice sight-singing with the rhythmic and melodic solmization systems your instructor taught you. The more you practice, the easier solmization will be!
- Practice sight-singing and sight-counting while conducting when possible. If you're having trouble, practice at a slower tempo.
- Dictation involves translating rhythms, melodies, chord progressions, or other aural sounds that you've never before seen, played, or sung into staff notation.
- Strategies for rhythmic dictation include dot grids, slash notation, and protonotation. Conducting and/or tapping while taking dictation can also help.
- Strategies for melodic dictation include contour lines, writing down solmization syllables, and protonotation. Conducting and/or tapping while taking dictation can also help.

Regardless of whether you are a vocalist or instrumentalist (or both!), you will likely study sight-singing. Sight-singing means to sing at sight, having never before heard or seen what you are singing. A related skill is sight-counting, which is counting a rhythm you have never before heard or seen. There are many strategies that will help you learn how to sight-sing and sight-count.

Strategies for Sight-Singing and Sight-Counting

If you are learning to sight-sing and sight-count in a classroom, then you are likely going to practice these

skills sitting down. When you sight-sing or sight-count, it is important to make sure you have good posture. You will want to sit up straight, at the edge of your chair, with your thighs parallel to the ground. Breathe from your diaphragm (not your chest!) and articulate your singing and counting syllables as clearly as possible.

Example 1 demonstrates proper singing posture while sitting down:



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Example 1. *Proper singing posture sitting down.*

When sight-counting, it is helpful to use a rhythmic solmization system. *Open Music Theory* prioritizes American standard counting, but there are many other great counting systems available. Here are some other strategies for sight-counting:

- Do not write your counts on your music. This will save you time and will help you to learn to count at sight.
- When you first look at a rhythm to sight-count, note the time signature. How many beats are in each measure, and what note value gets the beat?
- Conduct while you sight-count. This will help you to keep a steady tempo and to remember which beat you are counting.
- If you are not conducting, try tapping a steady beat while sight-counting. This will help you to keep a steady tempo.
- If you are still having trouble keeping a steady tempo, practice with a metronome app.
- If you're having trouble with a rhythm or with solmization syllables, practice at a slower tempo or break the rhythm down into smaller chunks.

When sight-singing, it is extremely helpful to use a melodic solmization system, such as scale degrees or solfège (see both [Major Scales, Scale Degrees, and Key Signatures](#) and [Minor Scales, Scale Degrees, and Key Signatures.](#)) Both systems are valid; what is important is that you practice consistently, as solmization will become easier the more you practice it. Here are some other strategies for sight-singing:

- Do not write your solfège or scale degrees on your music. This will save you time and will help you to learn to sing at sight.
- When you first look at a melody to sight-sing, note the clef, time signature, and key signature. What

is the clef? How many beats are in each measure, and what note value gets the beat? What key is the work in?

- Notice the contour of the melody you are about to sight-sing. Singing the correct direction (up, down, or the same note) is half the battle!
- Conduct while you sight-sing. This will help you to keep a steady tempo and to remember which beat your singing.
- If you are not conducting, try tapping a steady beat while sight-singing. This will help you to keep a steady tempo.
- If you are having trouble sight-singing with a steady tempo, practice with a metronome app.
- If you're having trouble with a melody, practice at a slower tempo or break the melody down into smaller chunks.
- If you're having trouble with rhythm, take the pitches out and just practice the rhythm.
- If you're having trouble with pitches, take the rhythm out and sing the pitches on a singular rhythm.

Learning to sight-sing and to sight-count is rewarding, but it takes many years to master these skills. This is why many undergraduate music curricula have four full classes dedicated to these skills (often called “Aural Skills”). Remember to be patient with yourself and to meet with your instructor for help early on if you are struggling.

Strategies for Dictation

Dictation is another important topic that musicians study. Your instructor will likely play rhythms, melodies, chord progressions, or other aural sounds that you've never before seen, played, or sung. You will then translate those aural sounds into staff notation. There are many strategies that will help you with dictation.

Rhythmic Dictation



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Example 2. A rhythm for dictation.

Listen to **Example 2**, which is a recording of a rhythm for dictation. One strategy for taking rhythmic

dictation is to construct a dot grid. A dot grid is a series of dots that represent beats and measures.

Example 3 shows a dot grid for four measures in common time:

• • • • • • • • • • • • • • • •

Example 3. A dot grid for four measures in common time.

Once a dot grid is constructed, you can place slashes to indicate where you hear articulations, dashes (horizontal lines) to indicate sustained notes, and circles to indicate rests. This is called slash notation. Next, you will want to translate your slash notation to staff notation. **Example 4** shows slash notation, followed by staff notation.



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Example 4. Slash notation and staff notation of **Example 2**.

It is also helpful to conduct or tap while taking rhythmic dictation. Tapping allows you to hear if a note happens on a beat or not—or if there is a rest on a beat. Conducting can help you to identify which beats have articulations, sustains, and rests.

Melodic Dictation

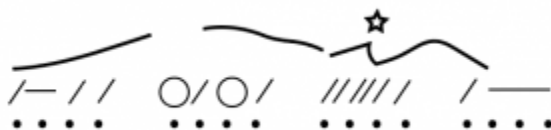


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Example 4. A melody with the same rhythm as **Example 2**.

Listen to **Example 4**, which adds pitches to the rhythmic dictation from **Example 2** above. The first step for taking melodic dictation is to write down the melody's rhythm (see the previous section on rhythmic dictation), then add pitch to your rhythm. There are several strategies for this. The first strategy is to use contour lines, which indicate whether a note moves up, down, or stays the same (**Example 5**).

You can also use stars (or another symbol) to indicate where you hear a leap. Another strategy is to write down the syllables you hear using your melodic solmization system (**Example 6**).



Example 5. Contour lines have been added to the slash notation.



Example 6. Solfège has been added to the slash notation.

The next step is to translate your contour lines and solmization syllables into staff notation (**Example 7**).



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Example 7. Examples 5–6 in staff notation.

It is also helpful to conduct or tap while taking melodic dictation, for the same reasons that it is helpful for rhythmic dictation.

Protonotation

Protonotation is a basic system of musical notation that is drawn from the book *Manual for Ear Training and Sight Singing* by Gary Karpinski (2007, 1–28). This system can also be used to take rhythmic and melodic dictation, and many find it very helpful. **Example 8** shows a melody in protonotation and in staff notation:



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=3680>

Example 8. A melody in protonotation and staff notation.

Protonotation does not contain information about beat duration or key. It only represents basic pitch and rhythmic elements ([discussed further below](#)).

Elements of Protonotation

Examples 9–11 shows blank protonotation grids for duple, triple, and quadruple meters:



Example 9. Grid for duple meter.



Example 10. Grid for triple meter.



Example 11. Grid for quadruple meter.

In duple and triple meter, downbeats are represented by longer vertical lines, and non-accented beats are represented by shorter vertical lines. In quadruple meter, the third beat of each bar is of medium accent, so it is represented by a medium-length line.

In protonotation, notes are notated by using horizontal lines for rhythmic duration and moveable-*do* solfège syllables (although scale degrees can be substituted). Arrows are used to denote the direction of any melodic leaps. Rests are represented by the absence of a horizontal line in a given beat or part of a beat. It can also be helpful to use an **X** instead of a blank, so you can distinguish a rest you are sure about from a part of the protonotation you haven't yet completed.

Converting Protonotation to Staff Notation

If you know 1) the clef, 2) the tonic pitch, and 3) either the beat duration or bottom number of the time signature, you can convert a melody in protonotation to staff notation easily.

1. Write the basic information about the example:
 - a. Draw the clef provided (or choose an appropriate one based on your perception of the register of the melody).
 - b. Determine the key signature from the tonic provided and the mode (major or minor) that you heard or that was provided.
 - c. Determine the time signature from the beat value / bottom number provided and from the meter reflected in your protonotation.
2. Each of the long protonotation lines becomes a bar line in staff notation.
3. Insert the notes into each bar:
 - a. The register, solfège syllable, and tonic will determine the pitches.
 - b. Use the time signature to determine how to translate the protonotated rhythms into specific note values. For example, a two-beat note in common time (quarter-note beat) is a half note ($2 \times \text{♩}$), while in cut time (half-note beat), it is a whole note ($2 \times \text{♩}$).

If the clef, tonic pitch, and/or time signature of the melody have not been specified, the same protonotation can be realized into staff notation in several different ways. **Example 12** shows a melody in protonotation that is realized in two different clefs, compound meters, and key signatures. The first realization is in bass clef in the key of G major, and the bottom number of its time signature is 8. The second realization is in alto clef in the key of B♭ major, and the bottom number of its time signature is 4.



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Example 12. Two different realizations of a melody in protonotation.

Example 13 shows a melody in protonotation that is realized in three different clefs, compound meters, and key signatures. The first realization is in treble clef in the key of E♭ major, and the bottom number of its time signature is 4. The second realization is in tenor clef in the key of C♯ major, and the bottom number of its time signature is 8. The third realization is in bass clef in the key of F major, and the bottom number of its time signature is 1.



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Example 13. *Three different realizations of a melody in protonotation.*

Like sight-singing and sight-counting, rhythmic and melodic dictation take many years to master. If you are an undergraduate music major, you will likely practice these skills throughout many classes, over many years. Again, be patient with yourself and meet with your instructor for help early on if you are struggling.

Further Reading

- Karpinsky, Gary. 2007. *Manual for Ear Training and Sight Singing*. New York: Norton.

Online Resources

- [Melodies for Sight Singing with Recordings \(How to Sing Smarter\)](#)
- [Melodies for Sight Singing \(Chorale Tech\)](#)
- [Melodies for Sight Singing \(Ronnie Sanders\)](#)
- [Rhythms for Sight Counting \(Blue Sky Music\)](#)
- [Sight Singing by Level \(YouTube\)](#)
- [Melodic and Rhythmic Dictations \(James Woodward, Youtube\)](#)
- [Rhythmic and Melodic Dictations \(freemusicdictations.net\)](#)
- [Rhythmic Dictation \(teoria\)](#)
- [Rhythmic Dictation \(Tone Savvy\)](#)
- [Melodic Dictation \(teoria\)](#)
- [Melodic Dictation \(Tone Savvy\)](#)

Assignments from the Internet

- A. Writing Counts ([.pdf](#))
- B. Writing Solfège or Scale Degrees ([.pdf](#))

Assignments

1. Solfège and Scale Degree Identification ([.pdf](#), [.docx](#))
2. Solfège and Scale Degree Identification in a Melodic Context ([.pdf](#), [.docx](#))

Worksheet playlist

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INTERVALS

Chelsey Hamm and Bryn Hughes

KEY TAKEAWAYS

- Two pitches form an interval, which is usually defined as the distance between two notes.
- Melodic intervals are played or sung separately, while harmonic intervals are played or sung together.
- Every interval has a size and a quality. An interval's size is the distance between two notes on a staff—i.e., it is a measurement of the number of lines and spaces between two notes.
- Size is considered generic. In other words, it doesn't matter what accidentals you apply to the notes, the size is always the same.
- A quality makes an interval specific when used in combination with a size. Unisons, fourths, fifths, and octaves form perfect intervals, while seconds, thirds, sixths, and sevenths form major and minor intervals.
- Any interval can be augmented or diminished. Augmented intervals are one half step larger than a perfect or major interval. Diminished intervals are one half step smaller than a perfect or minor interval.
- Intervals between a unison and an octave are called simple intervals. Any interval larger than an octave is a compound interval.
- Intervallic inversion occurs when two notes are “flipped.” When you need to identify an interval where the lower note is the tonic of a difficult or imaginary major key, inverting the interval can help.
- Consonant intervals are intervals that are considered more stable, as if they do not need to resolve, while dissonant intervals are considered less stable, as if they do need to resolve.

Two pitches form an interval, which is usually defined as the distance between two notes. But what does an interval measure? Physical distance on the staff? Difference in wavelength between pitches? Something else? Music theorists have had contradictory ideas on the definition of “interval,” and these definitions have varied greatly with milieu. This chapter will focus on intervals as a measure of two things: written distance between two notes on a staff, and an aural “distance” (or space) between two sounding pitches. It

will be important to keep in mind at all times that intervals are both written and aural, so that you are thinking of them musically (and not simply as an abstract concept that you are writing and reading).

Size

Intervals can be melodic (played or sung separately) or harmonic (played or sung together). In **Example 1**, the notes in the first measure sound together (harmonically), while in the second measure, they sound separately (melodically).



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Example 1. A harmonic and a melodic interval.

Every interval has a size and a quality. A size is the distance between two notes on a staff—i.e., it is a measurement of the number of lines and spaces between two notes. Sizes are written with Arabic numbers (2, 3, 4, etc.); however, they are spoken with ordinal numbers (second, third, fourth, fifth, sixth, seventh, etc.). Always begin with “one” when counting size. **Example 2** shows the eight sizes within a C major scale. As you can see, the sizes are labeled with ordinal numbers, with two exceptions: the interval between two notes on the same line or space is called a “unison,” not a “first,” and notes eight lines and spaces apart are said to be an “octave,” not an “eighth.”



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Example 2. Sizes of intervals.

Size is considered generic. In other words, it doesn’t matter what accidentals you apply to the notes—the size is always the same. **Example 3** demonstrates this: despite the different accidentals, each of these intervals is a third (or “generic third”) because there are three lines/spaces between the two notes.



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Example 3. Accidentals do not affect an interval's generic size.

Perfect, Major, and Minor Qualities

A quality makes an interval specific when used in combination with a size. Quality more precisely measures written distance between notes, and—in combination with an interval's size—it describes the aural sound of an interval.

There are five possible interval qualities:

- Augmented (designated as A or +)
- Major (ma)
- Perfect (P)
- Minor (mi)
- Diminished (d or °)

The quality comes before the size when saying or writing an interval. For example, an interval could be described as a “perfect fourth” (abbreviated P4), a “minor third” (abbreviated mi3), or an “augmented second” (abbreviated +2 or A2).

For now, we will only discuss three qualities: perfect, major, and minor. Different theorists (in different locations and time periods) have applied these qualities to different sizes of intervals, depending on milieu. **Example 4** shows how these qualities are applied today. The left column shows that seconds, thirds, sixths, and sevenths are major and/or minor, while the right column shows that unisons, fourths, fifths, and octaves are perfect intervals.

Major/Minor	Perfect
2nds	Unisons
3rds	4ths
6ths	5ths
7ths	Octaves

Example 4. Interval qualities.

The “Major Scale” Method for Determining Quality

There are several different methods for learning to write and identify qualities of intervals. One method you may have heard of is counting half steps. We do not recommend this method, because it is time consuming and often inaccurate. Instead, we recommend using what you know about major scales to identify interval quality.

To identify an interval (size and quality) using this method, complete the following steps:

1. Determine size (by counting lines and spaces between the notes).
2. Imagine that the bottom note of the interval is the tonic of a major scale.
3. Determine whether or not the top note is in the bottom note’s major scale (imagined in step 2) and assign the corresponding quality.
4. If it is: the interval is perfect (if it is a unison, fourth, fifth, or octave) or major (if it is a second, third, sixth, or seventh). If it is not: the interval could be minor (a lowered second, third, sixth, or seventh), or it could be augmented or diminished, which will be covered in the [next section](#).

Example 5 shows two intervals. Try identifying their size and quality:



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Example 5. Two intervals.

In **Example 5a**, the notes are F and C in treble clef. Here is how you would use the “Major Scale” method to identify the interval:

1. First, this interval is a generic fifth (F to itself is 1; to G is 2; to A is 3; to B is 4; to C is 5).
2. Second, C is within the key of F major (which has one flat, B $\flat$).
3. Therefore, the interval is a perfect fifth.

Let’s now use this process for **Example 5b**. The notes in this example are E $\flat$ and C $\flat$ in treble clef. Let’s go through the same process again:

1. First, this interval is a generic sixth (E $\flat$ to itself is 1; to F is 2; to G is 3; to A is 4; to B is 5; to C is 6).
2. Second, C $\flat$ is *not* in the key of E $\flat$ major (which has three flats: B $\flat$, E $\flat$, and A $\flat$).
3. Therefore, this is a minor sixth. If it were a major sixth, then the C would have to be C $\sharp$ instead of C $\flat$, because C $\sharp$ is in the key of E $\flat$ major.

Augmented and Diminished Qualities

To review, there are five possible interval qualities, of which we have covered major, minor, and perfect:

- Augmented (designated as A or +)
- Major (ma)
- Perfect (P)
- Minor (mi)
- Diminished (d or $^{\circ}$)

Augmented intervals are one half step larger than a perfect or major interval. The first measure of **Example 6a** first shows the notes F and C, which form a perfect fifth (because C is in the key of F major). The top note of this interval is then raised by a half step to a C $\sharp$, making the interval one half step larger. The interval from F to C $\sharp$ is therefore an augmented fifth (abbreviated as either A5 or +5). In the second measure of **Example 6a**, the first interval is a major sixth between G and E (because E is in the key of G major). The top note is then raised by a half step to E $\sharp$, making the interval into an augmented sixth (A6 or +6). The bottom note of an interval can be altered as well. In the first measure of **Example 6b**, the perfect fifth F–C is turned into an augmented fifth by lowering the F by a half step to F $\flat$, which makes the interval one half step larger than a perfect fifth. In the second measure of **Example 6b**, the major sixth G–E is turned into an augmented sixth by lowering the G by a half step to G $\flat$.



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Example 6. Augmented intervals created by (a) raising the top note and (b) lowering the bottom note.

Diminished intervals are one half step smaller than a perfect or minor interval. In the first measure of **Example 7a**, the perfect fifth F–C is made a half step smaller by lowering the top note to C $\flat$, forming a diminished fifth (also called a tritone, usually abbreviated as d5 or $^{\circ}5$). In the second measure, G–E form a major sixth, which becomes a minor sixth when the top note is lowered by a half step. The minor sixth then becomes a diminished sixth when the top note is lowered again to E $\flat$. Note that contracting an interval by one half step turns perfect and minor intervals into diminished intervals, but it turns major intervals into minor intervals. Again, it is not always the top note that is altered. In **Example 7b**, the perfect fifth F–C becomes diminished when the bottom note moves up a half step to F $\sharp$. In the second measure, the major sixth G–E first becomes a minor sixth when the G moves up a half step to G $\sharp$. This minor interval then becomes diminished when the G $\sharp$ moves to G $\times$ in the third measure, further contracting the interval by another half step.



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Example 7. Diminished intervals created by (a) lowering the top note and (b) raising the bottom note.

Example 8 again demonstrates and summarizes the relative size of intervals. Each bracket in this example is one half step larger or smaller than the brackets to its right and left. In **Example 8a**, the interval quality is changed by altering the top note with accidentals. As you can see, intervals one half step larger than perfect or major intervals are augmented; intervals one half step smaller than major intervals are minor; and intervals one half step smaller than perfect or minor intervals are diminished. **Example 8b** outlines the same qualities as **10a**, only with the bottom note altered by accidentals instead of the top note.





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Example 8. Relative size of intervals with (a) the top note altered and (b) the bottom note altered.

Doubly and Triply Augmented and Diminished Intervals

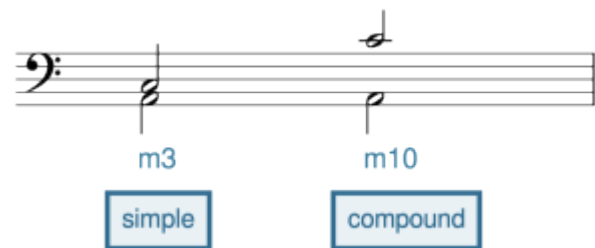
Intervals can be further contracted or expanded outside of the augmented and diminished qualities. An interval a half step larger than an augmented interval is a doubly augmented interval, while an interval a half step larger than a doubly augmented interval is a triply augmented interval. Likewise, an interval a half step smaller than a diminished interval is a doubly diminished interval, while an interval a half step smaller than a doubly diminished interval is a triply diminished interval.

Compound Intervals

The intervals discussed above, from unison to octave, are simple intervals, which have a size of an octave or smaller. Any interval larger than an octave is a compound interval. In **Example 9**, the notes A and C first form a minor third (a simple interval). When the C is brought up an octave in the second pair of notes, the interval becomes a minor tenth (a compound interval). Quality remains the same for simple intervals and their corresponding compound intervals.

If you want to make a simple interval a compound interval, add 7 to its size. Consequently:

- Unisons (which get the number 1) become octaves (8s)
- 2nds become 9ths
- 3rds become 10ths
- 4ths become 11ths
- 5ths become 12ths
- 6ths become 13ths



Example 9. A simple and compound interval.

These are the most common compound intervals that you will encounter in your music studies. Remember that octaves, 11ths, and 12ths are perfect like their simple counterparts, while 9ths, 10ths, and 13ths are major/minor.

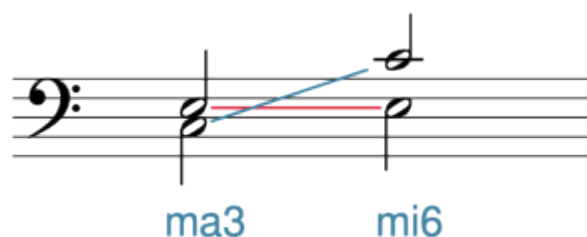
Intervallic Inversion

Intervallic inversion occurs when two notes are “flipped.” In **Example 10**, for instance, an interval with C on the bottom and E on the top is inverted by moving the C up by an octave. You might be wondering: why is this important? There are two reasons: first, because inverted pairs of notes share many interesting properties (which are sometimes exploited by composers), and second, because inverting a pair of notes can help you to identify or write an interval when you do not want to work from the given bottom note.

Let’s start with the first point: the interesting properties.

First, the size of inverted pairs always adds up to 9:

- Unisons (1s) invert to octaves (8s) ($1 + 8 = 9$) and octaves invert to unisons.
- Seconds invert to sevenths ($2 + 7 = 9$) and sevenths invert to seconds.
- Thirds invert to sixths ($3 + 6 = 9$) and sixths invert to thirds.
- Fourths invert to fifths ($4 + 5 = 9$) and fifths invert to fourths.



Example 10. Intervallic inversion.

Qualities of inverted pairs of notes are also very consistent:

- Perfect intervals invert to perfect intervals.
- Major intervals invert to minor intervals (and minor intervals to major intervals).
- Augmented intervals invert to diminished intervals (and diminished intervals to augmented intervals).

With that information, you can now calculate the inversions of intervals without even looking at staff paper. For example: a major seventh inverts to a minor second, an augmented sixth inverts to a diminished third, and a perfect fourth inverts to a perfect fifth.

Now for the second point: sometimes you will come across an interval that you do not want to calculate or identify from the bottom note. In the interval $E\flat-A\flat$ written in **Example 11**, for instance, identifying the interval using the “Major Scale” method would not work—the bottom note is $E\flat$, and there is no key signature for this note (its key signature is “imaginary”). So, if you were given this interval to identify, you might consider inverting the interval. Now the inversion of the interval can be calculated from the non-imaginary key of $A\flat$ major. The key of $A\flat$ major has four flats ($B\flat$, $E\flat$, $A\flat$, and $D\flat$). An $E\flat$ above $A\flat$ would therefore be a perfect fifth; however, this interval has been contracted (made a half step smaller) because the $E\flat$ has been lowered to $E\flat\flat$. That means this interval is a d5 (diminished fifth).



Example 11. Inverting an interval may help with identification by putting a simpler note on the bottom.

Now that we know the inversion of the first interval is a d5, we can calculate the original interval. A diminished fifth inverts to an augmented fourth (because diminished intervals invert to augmented intervals and because five plus four equals nine). Thus, the first interval is an augmented fourth (A4).

Consonance and Dissonance

Intervals are categorized as consonant or dissonant. Consonant intervals are intervals that are considered more stable, as if they do not need to resolve, while dissonant intervals are considered less stable, as if they do need to resolve. These categorizations have varied with milieu. **Example 12** shows a table of melodically consonant and dissonant intervals:

Melodically Consonant	Melodically Dissonant
Perfect Intervals	Augmented Intervals
ma2, mi2	Diminished Intervals
ma3, mi3	ma7, mi7
ma6, mi6	

Example 12. Melodically consonant and dissonant intervals.

Example 13 shows harmonically consonant and dissonant intervals:

Harmonically Consonant	Harmonically Dissonant
ma3, mi3	ma2, mi2
ma6, mi6	Augmented Intervals
P1, P8, P5	Diminished Intervals
	ma7, mi7
	P4

Example 13. *Harmonically consonant and dissonant intervals.*

The implications of consonant and dissonant intervals are discussed further in the [Introduction to Species Counterpoint](#).

Another Method for Intervals: The White-Key Method

Ultimately, intervals need to be committed to memory, both aurally and visually. There are, however, a few tricks to learning how to do this quickly. One such trick is the so-called “white-key method,” which refers to the piano keyboard.

This method requires you to memorize all of the intervals found between the white keys on the piano (or simply all of the intervals in the key of C major). Once you’ve learned these, any interval can be calculated as an alteration of a white-key interval. For example, we can figure out the interval for the notes D and F $\sharp$ if we know that the interval D to F is a minor third and this interval has been made one semitone larger: a major third.

Conveniently, there is a lot of repetition of interval size and quality among white-key intervals, summarized in **Example 14**. Memorize the most frequent type and the exceptions.

- All of the seconds are major except for two: E–F and B–C.
- All of the thirds are minor except for three: C–E, F–A, and G–B, which are major.
- All of the fourths are perfect except for one: F–B, which is an augmented fourth (a tritone).



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Example 14. White-key seconds, thirds, and fourths.

Believe it or not, you now know all of the white-key intervals, as long as you understand the concept of intervallic inversion, which was [previously explained](#). For example, if you know that all seconds are major except for E–F and B–C (which are minor), then you know that all sevenths are minor except for F–E and C–B (which are major), as seen in **Example 15**.



Example 15. White-key sevenths.

Once you’ve mastered the white-key intervals, you can figure out any other interval by taking into account any accidentals applied to the notes.

Intervallic Enharmonic Equivalence

Example 16 may be useful when thinking about enharmonic equivalence of intervals. In this chart, the columns are different intervallic sizes, while the rows present intervals based on the number of half steps they contain. Each row in this chart is enharmonically equivalent. For example, a major second (ma2) and diminished third (d3) are enharmonically equivalent (both are two half steps). Likewise, an augmented fourth (A4) and diminished fifth (d5) are enharmonically equivalent—both are six half steps in size.

number of semitones	unis.	2nd	3rd	4th	5th	6th	7th	oct.
0	P1	d2						
1	A1	mi2						
2		ma2	d3					
3		A2	mi3					
4			ma3	d4				
5			A3	P4				
6				A4	d5			
7					P5	d6		
8					A5	mi6		
9						ma6	d7	
10						A6	mi7	
11							ma7	d8
12							A7	P8

Example 16. Enharmonic equivalence of intervals.

Intervallic enharmonic equivalence is useful when you come across an interval that you do not want to calculate or identify from the bottom note. We have already discussed one method for this situation previously, which was intervallic inversion. You may prefer one method or the other, though both will yield the same result. **Example 17** reproduces the interval from **Example 11**. As you'll recall, there is no key signature for the bottom note ($E^{\flat\flat}$), making identification of this interval difficult. By using enharmonic equivalence, however, we can identify this interval more easily, recognizing that $E^{\flat\flat}$ is enharmonically equivalent with D and that $A^{\flat}$ is enharmonically equivalent with $G^{\sharp}$. Now we can identify the interval as an A4 (augmented fourth), using the key signature of the enharmonically equivalent bottom note (D).



Example 17. Use enharmonic equivalence to aid in identifying difficult intervals.

Online Resources

- [Specific Intervals \(musictheory.net\)](#)
- [Interval Introduction \(Robert Hutchinson\)](#)
- [Intervals \(Hello Music Theory\)](#)
- [Diminished and Augmented Intervals \(Open Textbooks\)](#)
- [Diminished and Augmented Intervals \(Robert Hutchinson\)](#)
- [Compound Intervals \(Hello Music Theory\)](#)
- [Interval Inversion \(musictheory.net\)](#)
- [Interval Ear Training \(musictheory.net\)](#)
- [Interval Ear Training \(Tone Dear\)](#)
- [Interval Ear Training \(teoria\)](#)
- [Interval Identification \(musictheory.net\)](#)
- [Keyboard Interval Identification \(musictheory.net\)](#)

Assignments from the Internet

- A. Interval Identification ([.pdf](#), [.pdf](#), [.pdf](#)), in Major Keys ([.pdf](#)), in Minor Keys ([.pdf](#))
- B. Interval Identification and Construction, pp. 18–19 ([.pdf](#))
- C. Interval Construction ([.pdf](#), [.pdf](#))
- D. Compound Intervals, pp. 15–17 ([.pdf](#))

Assignments

1. Writing and Identifying Intervals Assignment #1 ([.pdf](#), [.mcsz](#))
2. Writing and Identifying Intervals Assignment #2 ([.pdf](#), [.mcsz](#))
3. Writing and Identifying Intervals Assignment #3 ([.pdf](#), [.mcsz](#))

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TRIADS

Chelsey Hamm

KEY TAKEAWAYS

- A triad is a three-note chord whose notes can be arranged in thirds. A triad can always be “stacked” so that its notes are either on all lines or all spaces.
- When a triad is stacked in its most compact form in thirds, the lowest note is called the root, the middle note is called the third, and the highest note is called the fifth.
- There are four qualities of triad. A major triad's third is major and its fifth is perfect, while a minor triad's third is minor and its fifth is perfect. A diminished triad's third is minor and its fifth is diminished, while an augmented triad's third is major and its fifth is augmented.
- In chord symbols, major triads are represented with capital letters that correspond to the triad's root. Minor triads have a lowercase “mi” after the letter, diminished triads have a superscript circle (^o), and augmented triads have a plus sign (+). You may see other abbreviations in other contexts (a more exhaustive list is given in the [Chord Symbols](#) chapter).
- Within major and minor keys, triads have particular qualities that correspond to scale degree. These are the same in every major and minor key, which makes memorizing them useful.
- Triads are identified by their root, quality, and inversion.

A chord is any combination of three or more pitch classes that sound simultaneously. This chapter focuses on triads—three-note chords whose notes can be stacked into thirds.

Triads

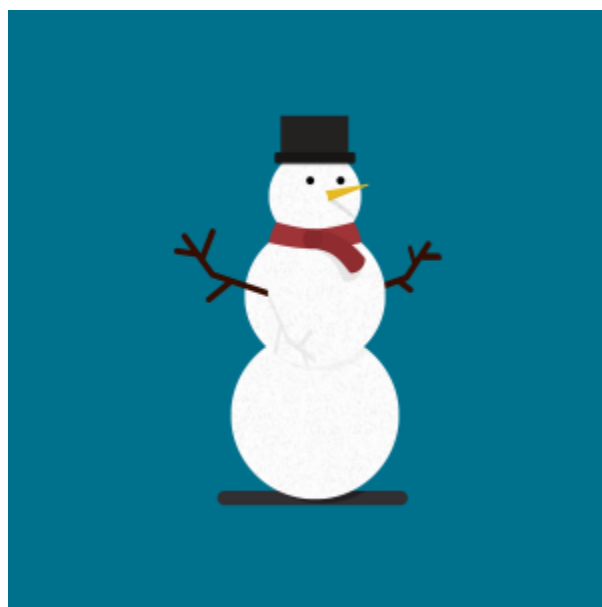
The three notes of a triad can always be arranged in thirds. **Example 1** shows two triads, each written both melodically and harmonically. The first triad is on three adjacent spaces, while the second triad is on

three adjacent lines. A triad can always be “stacked” so that its notes are either on all lines or all spaces. When a triad is stacked in its most compact form (measures 2 and 4 of **Example 1**), it looks like a snowperson (see **Example 2**). Just as a snowperson consists of a bottom, middle, and head, a triad consists of lowest, middle, and upper notes.



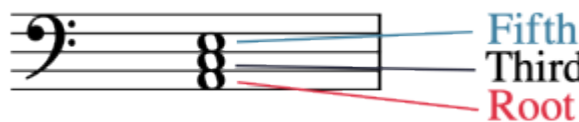
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Example 1. Two triads, shown melodically and harmonically.



Example 2. A snowperson.

Colloquially, when a triad is stacked in this fashion, we might call this “snowperson form,” but the official term is root position; this is explored more in the chapter titled [Inversion and Figured Bass](#). As **Example 3** shows, the lowest note of a triad is called the root, the middle note is called the third (a generic third above the root), and the highest note is called the fifth (a generic fifth above the root).



Example 3. A triad with the root, third, and fifth labeled.

Triadic Qualities and Listening to Triads

There are four qualities of triad—major, minor, diminished, and augmented—which are determined by the quality of the intervals from the root to the third and the root to the fifth. These qualities are labeled in **Example 4**: triad qualities are shown above the staff, the quality of the fifth to the root is given in red to the left of the triad, and the quality of the third is given in blue to the right of the triad. Augmented triads are shown last because the other three types are more common in most classical and popular music.

Note that triads are named for certain important intervals they contain:

- Major and minor triads are named for the quality of their third. (Both have perfect fifths.)
- Diminished and augmented triads are named for the quality of their fifth:
 - A diminished triad’s fifth is diminished. (Its third is minor.)
 - An augmented triad’s fifth is augmented. (Its third is major.)

Listen carefully to the different qualities of triad in **Example 4**. It is common to pair expressive qualities with triads when learning what they sound like. You might think of major triads as sounding “happy,” minor triads as “sad,” diminished triads as “scary,” and augmented triads as having a “fantasy” or “mystical” sound.



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Example 4. *Different qualities of triads.*

Chord Symbols

Chord symbols for triads include the letter name of the root and an indication of the triad’s quality, and sometimes the pitch class of the bass voice (meaning the lowest note in the chord, not any particular instrument or voice type).

A chord symbol begins with a capital letter (and, if necessary, an accidental) denoting the root of the

chord. That letter is followed by information about a chord's quality. *Open Music Theory* will use the following abbreviations.¹

- Major triad: no quality symbol is added
- Minor triad: lowercase “mi”
- Diminished triad: superscript circle (^o)
- Augmented triad: plus sign (+)

For example, the chord symbols C, Cmi, C^o, and C+ mean a C major triad, C minor triad, C diminished triad, and C augmented triad, respectively. If the root of the chord has an accidental, include it: for example, B $\flat$ mi is the chord symbol for a B $\flat$ minor triad, and F $\sharp$ ^o is the chord symbol for an F $\sharp$ diminished triad.

Finally, if a pitch class other than the chord root is the lowest note in the chord, a slash is added, followed by a capital letter denoting the pitch class in the bass. This topic will be explored more in the chapter titled [Inversion and Figured Bass](#). **Example 5** first shows C major and C minor triads with their chord symbols (C and Cmi). It then shows how the chord symbol for the C minor triad changes when a note other than C is on the bottom: when E $\flat$ is the lowest note, the chord symbol is Cmi/E $\flat$, and when G is the lowest note, the symbol is Cmi/G.



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Example 5. Four triads are shown with chord symbols.

Triad Qualities in Major and Minor

Any note of the major scale can be the root of a triad. As you can see in **Example 6**, which is in the key of G major, triads built on *do*, *fa*, and *sol* ($\hat{1}$, $\hat{4}$, and $\hat{5}$) in major keys are major, shown with the capital letter of the triad's root. Triads built on *re*, *mi*, and *la* ($\hat{2}$, $\hat{3}$, and $\hat{6}$) are minor, shown with a lowercase “mi” after the capital letter of the root. Triads built on *ti* ($\hat{7}$) are diminished; this is shown with a

1. You may see other abbreviations in other contexts (a more exhaustive list is given in the [Chord Symbols](#) chapter).

superscript “^o” (which you might know as the degree symbol). These triadic qualities do not change in different keys; in other words, the quality of a triad built on *do* ($\hat{1}$) will always be major in any major key.



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Example 6. *Qualities of triads in major keys.*

Example 7, in the key of G minor, shows the pattern of triad quality for minor scales. Note that this example contains two triads built on *sol* ($\hat{5}$) and two built on *te* ($\downarrow \hat{7}/\hat{7}$)—one without the raised leading tone (“natural minor”) and one with the raised leading tone (“harmonic minor”). As you can see in **Example 7**, triads built on *do*, *fa*, and *sol* ($\hat{1}$, $\hat{4}$, and $\hat{5}$) (without the raised leading tone) are minor (shown with the lowercase “mi”). Triads built on *me*, *le*, and *te* ($\downarrow \hat{3}$, $\downarrow \hat{6}$, and $\downarrow \hat{7}$) (without the raised leading tone) are major. A triad built on *sol* ($\hat{5}$) with the raised leading tone is also major. Triads built on *re* and *ti* ($\hat{2}$ and $\hat{7}$) (with the raised leading tone) are diminished (shown with the superscript degree symbol).



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Example 7. *Qualities of triads built on the minor scale.*

Spelling Triads

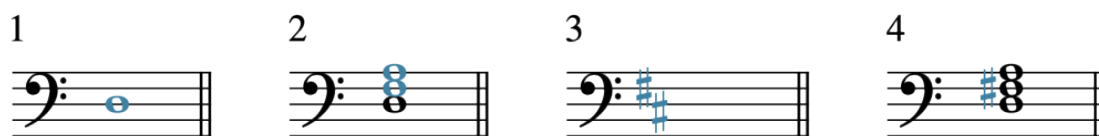
To build a triad from a chord symbol, you need to be aware of the triad’s root and quality. Complete the following steps:

1. Draw the root on the staff.
2. Draw notes a third and fifth above the root (i.e., draw a snowperson).
3. Think of (or write down) the [major key signature](#) of the triad’s root.
4. To spell a major triad, write any accidentals from the key signature that apply to the notes of the

triad.

- For a minor, diminished, or augmented triad, add additional accidentals to alter the chord's third and/or fifth when appropriate.

Example 8 shows this process for a D major triad:



Example 8. Drawing a D major triad in four steps.

- The note D, the chord's root, is drawn on the staff.
- A snowperson is drawn—an F and A, the notes a generic third and a fifth above the D.
- The key signature of D major has been recalled. D major has two sharps, F# and C#.
- A sharp (#) has been added to the left of the F, because F# is in the key signature of D major. No C# was necessary because there is no C in the chord.

Let's complete this process for an A $\flat$ minor triad (A $\flat$ mi), as seen in **Example 9**.



Example 9. Drawing an A $\flat$ minor triad in five steps.

- The note A $\flat$ is written because it is the root of the triad.
- A snowperson is drawn; in other words, the notes C and E are added because they are a generic third and fifth, respectively, above A $\flat$.
- The key signature of A $\flat$ major is recalled. A $\flat$ major has four flats: B $\flat$, E $\flat$, A $\flat$, and D $\flat$.
- E $\flat$ is added, because it is in the key signature of A $\flat$ major. B $\flat$ and D $\flat$ are not needed, because those notes aren't in an A $\flat$ triad. Now we have successfully spelled an A $\flat$ major triad (A $\flat$, C, and E $\flat$).
- Minor triads contain a minor third, which is one half step smaller than a major third. Therefore, our final step is to lower the chord's third (the C) by a half step (to a C $\flat$). Now we have an A $\flat$ minor triad (A $\flat$, C $\flat$, and E $\flat$).

Don't forget that diminished triads have a minor third and a diminished fifth, meaning you have to lower

both the third and the fifth by a half step from a major triad. An augmented triad has a major third and an augmented fifth, so its fifth must be raised by a half step from a major triad.

Identifying Triads, Doubling, and Spacing

Triads are identified according to their root, quality, and inversion; inversion is discussed in the [Inversion and Figured Bass](#) chapter, so we will focus on root and quality for now. You can identify triads in three steps:

1. Identify and write its root.
2. Imagine the major key signature of its root.
3. Identify and write its quality.

Example 10 shows a triad for the process of identification.



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Example 10. A triad for identification.

To identify this triad:

1. This triad is written in its most compact form, so the root is the lowest note, D.
2. The key of D major has two sharps, F $\sharp$ and C $\sharp$; we can use this information to identify the quality of the triad.
3. In this triad, the F is sharp, matching the major key signature. Therefore, we can correctly identify this as a D major triad.

Let's apply the same steps to the triad in **Example 11**:



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Example 11. *A second triad for identification.*

To identify this triad:

1. First, we identify and write its root, which is C $\sharp$.
2. Next, we can identify and write its quality. We imagine the key signature of C $\sharp$ major, which has seven sharps (every note is sharp).
3. Therefore, E and G would be sharp in the key of C $\sharp$ major, but we see that they are both natural in **Example 11**. Because both the third and the fifth have been lowered by a half step, this triad is diminished. We can now correctly identify this triad as a C $\sharp^0$ triad.

If the bottom note of a triad has an imaginary key signature (because there is a double accidental that applies to it), use enharmonic equivalence to respell the triad. The process for this will be the same as that outlined in the last section of [Intervals](#).

Because of the principle of octave equivalence, the doubling or spacing of notes does not affect a triad's identification. **Example 12** shows several different triads and their chord symbols. As you can see, the identification of these triads is the same, regardless of octave doublings (**Example 12a**) or the use of open spacing with wide intervals (**Example 12b**). Doublings and open spacing can be combined, as seen in **Example 12c**. In order to identify triads with doublings and open spacing, you need to either imagine or write the notes as a triad in closed spacing without any doublings.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=107>

Example 12. *Doublings do not affect chord symbols.*

Online Resources

- [Introduction to Chords \(musictheory.net\)](https://www.musictheory.net/)
- [Triad Introduction \(Robert Hutchinson\)](#)
- [What is a Triad? \(YouTube\)](#)

- [Building Triads \(YouTube\)](#)
- [Constructing Triads \(Columbia\)](#)
- [Lead-sheet Symbols \(Robert Hutchinson\)](#)
- [Triad Identification Practice Tool \(teoria\)](#)
- [Chord Ear Training \(musictheory.net\)](#)
- [Triad Ear Training \(Tone Dear\)](#)
- [Triad Ear Training \(teoria\)](#)

Assignments from the Internet

- A. Triad Identification ([.pdf](#), [.pdf](#), [.pdf](#), [.pdf](#), [.pdf](#), [.pdf](#), [.pdf](#), [.pdf](#))
- B. Triad Construction ([.pdf](#)), pp. 2, 4, 6, 7 ([.pdf](#)), p. 9 ([.pdf](#))

Assignments

1. Triads Assignment #1 ([.pdf](#), [.mcsz](#))
2. Triads Assignment #2 ([.pdf](#), [.mcsz](#))
3. Triads Assignment #3 ([.pdf](#), [.mcsz](#))

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Footnotes

SEVENTH CHORDS

Chelsey Hamm

KEY TAKEAWAYS

- A seventh chord is a four-note chord whose notes can be arranged in thirds. A seventh chord can always be “stacked” so that its notes are either on all lines or all spaces.
- When a seventh chord is stacked in thirds, the lowest note is called the root, the lower middle note is called the third, the upper middle note is called the fifth, and the highest note is called the seventh, which is sometimes called the “chordal” seventh to distinguish it from the seventh scale degree.
- There are five common qualities of seventh chord. These qualities are the major-major seventh chord, major-minor seventh chord, minor-minor seventh chord, half-diminished seventh chord, and fully diminished seventh chord.
- There is another common way of naming seventh chords: the major-major seventh chord is also often called the major seventh chord, the major-minor seventh chord is also often called the dominant seventh chord, the minor-minor seventh chord is also often called the minor seventh chord, and the fully diminished seventh chord is also often simply called the diminished seventh chord.
- Within major and minor keys, seventh chords have particular qualities that correspond to scale degrees. These are the same in every major and minor key, which makes memorizing them useful.
- Seventh chords are identified by their root, quality of triad and seventh, and inversion.

In this chapter, we will focus on seventh chords: four-note chords whose notes can be stacked into thirds.

Seventh Chords

Like triads, the notes of a seventh chord can always be arranged in thirds, on adjacent lines or spaces of the staff. If a triad in closed spacing looks like a snowperson, then a seventh chord in closed spacing (as in

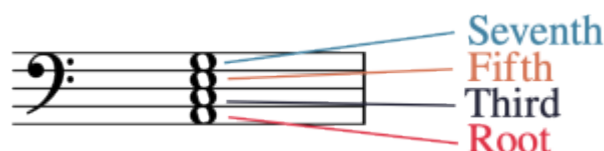
the second measure of **Example 1**) looks like an extra-long snowperson, with a bottom, two middles, and a head.



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Example 1. A seventh chord written melodically and harmonically.

Like in a triad, the lowest note of a seventh chord stacked in closed spacing is called the root, and the other notes are named for their generic intervals above the root, as shown in **Example 2**: the third, the fifth, and the seventh.



Example 2. A seventh chord with the root, third, fifth, and seventh labeled. Click to enlarge.

Seventh Chord Qualities and Nomenclature

Example 3 lists the five most common qualities of seventh chord: major-major, major-minor, minor-minor, half-diminished, and fully diminished. These qualities are determined by two factors:

1. The quality of the triad created by the root, third, and fifth (shown in the second column)
2. The quality of the seventh from the root to the seventh (shown in the third column)

A chord symbol for a seventh chord begins with the letter name of the triad's root followed by an indication of the quality of its triad and seventh. Examples of chord symbols for different seventh chord qualities are given in the last column of **Example 3**.¹

1. These chord symbols reflect those used in *Open Music Theory*, but you may come across others in your studies. See [Chord Symbols](#) for a more thorough explanation of these variations.

Seventh chord quality	Triad quality	Seventh (interval) quality	Example chord symbol
Major-major seventh chord (Major seventh chord)	major triad	major seventh	F ^{ma7}
Major-minor seventh chord (Dominant seventh chord)	major triad	minor seventh	F ⁷
Minor-minor seventh chord (Minor seventh chord)	minor triad	minor seventh	F ^{mi7}
Half-diminished seventh chord	diminished triad	minor seventh	F ^{ø7}
Fully diminished seventh chord (Diminished seventh chord)	diminished triad	diminished seventh	F ^{o7}

Example 3. *Summary of nomenclature for different qualities of seventh chord.*

For the first three qualities of seventh chord, the first word describes the quality of the triad, and the second word describes the quality of the seventh:

- **major-major** seventh chord = **major** triad + **major** seventh
- **major-minor** seventh chord = **major** triad + **minor** seventh
- **minor-minor** seventh chord = **minor** triad + **minor** seventh

The other two qualities are both built on diminished triads but differ in the quality of the seventh:

- half-diminished seventh chord (diminished triad, minor seventh)
- fully diminished seventh chord (diminished triad, diminished seventh)

Music theorists often use the names described above, but there is also another common way of naming these chords, given in parentheses in the first column of **Example 3**:

- The major-major seventh chord is also often called the major seventh chord.
- The major-minor seventh chord is also often called the dominant seventh chord.
- The minor-minor seventh chord is also often called the minor seventh chord.
- The fully diminished seventh chord is also often simply called the diminished seventh chord.
- The half-diminished seventh chord does not typically have an alternate name.

Your instructor may have you label these chords using one set of terminology or the other, or a mix of both.

Example 4 summarizes all this information in music notation.



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Example 4. *The qualities of sevenths and triads in various seventh chord types.*

Don't forget that when the root of a seventh chord has an accidental, you add that accidental into its name. For example, $B\flat mi^7$ is the chord symbol for a seventh chord with a $B\flat$ minor triad and a minor seventh. Likewise, a $G\sharp ma^7$ is the chord symbol for a seventh chord with a $G\sharp$ major triad and a major seventh.

In chord-symbol notation, if a pitch class other than the chord's root is the lowest note in a seventh chord, then a slash is added, followed by a capital letter denoting the pitch class in the bass (lowest) voice. **Example 5** shows a G half-diminished seventh chord ($G\ominus^7$). In the first measure, the chord appears in first position; in the second measure, the chord's seventh (F) is in the bass voice, so the chord symbol is written as $G\ominus^7/F$. This topic will be explored more in the chapter [Inversion and Figured Bass](#).



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Example 5. *Two seventh chords.*

Listening to Seventh Chords

Listen carefully to the different qualities of seventh chord in **Example 4**. It is common to pair expressive qualities with seventh chords when learning what they sound like. You might think of major-major seventh chords as sounding “happy and jazzy,” major-minor seventh chords as sounding “unresolved” (like they strongly need to move to another chord), minor-minor seventh chords as “sad and jazzy,” half-diminished seventh chords as “scary and jazzy,” and fully diminished seventh chords as “very scary.”

Seventh Chord Qualities in Major and Minor

Seventh chords can be built on any note of the major scale. As you can see in **Example 6**, which is in

the key of G major, seventh chords built on *do* ($\hat{1}$) and *fa* ($\hat{4}$) have a major triad and a major seventh, while seventh chords built on *sol* ($\hat{5}$) have a major triad and a minor seventh (a dominant seventh chord). Seventh chords built on *re*, *mi*, and *la* ($\hat{2}$, $\hat{3}$, and $\hat{6}$) have a minor triad and a minor seventh, while seventh chords built on *ti* ($\hat{7}$) are half-diminished—they have a diminished triad and a minor seventh. These seventh chord qualities do not change in different keys; consequently, memorizing these qualities can be very useful.



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Example 6. *Qualities of seventh chords in major keys.*

Seventh chords can also be built on any note of the minor scale. **Example 7**, which is in the key of G minor, contains only one seventh chord built on *sol* ($\hat{5}$) and one on *ti* ($\hat{7}$). It is common for these seventh chords to contain the raised leading tone—*ti* instead of *te* ($\hat{7}$ instead of $\downarrow \hat{7}$). In **Example 7**, seventh chords built on *do* and *fa* ($\hat{1}$ and $\hat{4}$) have a minor triad and a minor seventh, while seventh chords built on *sol* ($\hat{5}$) with the raised leading tone have a major triad and a minor seventh (a dominant seventh chord). Seventh chords built on *me* and *le* ($\downarrow \hat{3}$ and $\downarrow \hat{6}$) have a major triad and a major seventh, while those built on *re* ($\hat{2}$) are half-diminished (containing a diminished triad and a minor seventh), and those built on *ti* ($\hat{7}$) are fully diminished (containing a diminished triad and a diminished seventh).



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Example 8. *Qualities of seventh chords in minor keys.*

Spelling Seventh Chords

To build a seventh chord from a chord symbol, you need to be aware of its root and quality—inversion is discussed in the next chapter, titled [Inversion and Figured Bass](#). The steps for spelling a seventh chord are similar to the steps for drawing a triad. Let's start with spelling a major-major seventh chord:

1. Draw the root on the staff.
2. Draw notes a third, fifth, and seventh above the root (i.e., draw an “extra-long” snowperson).
3. Think of (or write down) the major key signature of the triad’s root.
4. Write any accidentals from the key signature that apply to the notes in the chord, creating a major triad and a major seventh.

For any other quality of seventh chord, add additional accidentals to alter the chord’s third, fifth, and/or seventh when appropriate.

Example 8 shows this process for a D major-major seventh chord (D^{ma7}):

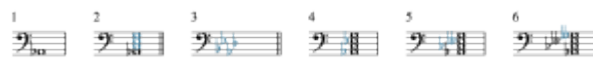
1. The note D, the chord’s root, is drawn on the staff.
2. An extra-long snowperson is drawn—an F, A, and C, the notes a generic third, fifth, and seventh above the D.
3. The key signature of D major has been recalled. D major has two sharps, $F\sharp$ and $C\sharp$.
4. Sharps ($\sharp$) have been added to the left of the F and the C, because $F\sharp$ and $C\sharp$ are in the key signature of D major.



Example 8. Spelling a D major-major seventh chord in four steps. [Click to enlarge.](#)

The quality of the next chord will require us to write additional accidentals, so the process has a couple more steps. **Example 9** shows the process for an $A\flat$ fully diminished seventh chord ($A\flat^{o7}$):

1. The note $A\flat$ is written because it is the root of the triad.
2. An extra-long snowperson is drawn: C, E, and G are added because they are a generic third, fifth, and seventh, respectively, above $A\flat$.
3. The key signature of $A\flat$ major is recalled. $A\flat$ major has four flats: $B\flat$, $E\flat$, $A\flat$, and $D\flat$.
4. $E\flat$ is added, because it is in the key signature of $A\flat$ major.
5. We have now followed the process to spell a major-major seventh chord, but we want a fully diminished seventh chord, which means adding accidentals that are not in the key signature of $A\flat$ major:
 - a. C and $E\flat$ are lowered by a half step to $C\flat$ and $E\flat\flat$ to change the triad from major to diminished.
 - b. To change the chord’s seventh from major to diminished, it needs to be lowered by two half steps, from G to $G\flat\flat$.



Example 9. Spelling an $A\flat$ fully diminished seventh chord in six steps. [Click to enlarge.](#)

Following these steps is a reliable way for beginners to spell seventh chords, but it’s a time-consuming

Like with triads, a seventh chord's identification is not affected by the doubling of notes or open spacing of notes (even across multiple clefs). **Example 11** shows two different seventh chords in [pb_glossary open spacing with doublings. Simply imagine or write the notes of seventh chords in closed spacing without any doublings to identify these chords, as we did previously.



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Example 11. Two seventh chords with doublings in open spacing.

Online Resources

- [Seventh Chords \(musictheory.net\)](https://www.musictheory.net)
- [Understanding Seventh Chords in Music \(Hello Music Theory\)](https://www.hello-music-theory.com/understanding-seventh-chords)
- [Introduction to Seventh Chords \(Robert Hutchinson\)](https://www.robert-hutchinson.com/introduction-to-seventh-chords)
- [Seventh Chords \(Kaitlin Bove\)](https://www.kaitlinbove.com/seventh-chords)
- [Seventh Chords \(Music Theory Academy\)](https://www.musictheoryacademy.com/seventh-chords)
- [Seventh Chords \(Carleton College\)](https://www.carletoncollege.edu/seventh-chords)
- [Seventh Chords For Dummies \(YouTube\)](https://www.youtube.com/watch?v=...)
- [Seventh Chords – Music Theory Crash Course \(YouTube\)](https://www.youtube.com/watch?v=...)
- [Seventh Chord Ear Training \(teoria\)](https://www.teoria.com/seventh-chord-ear-training)
- [Chord Ear Training \(musictheory.net\)](https://www.musictheory.net/chord-ear-training)
- [Chord Ear Training \(Tone Savvy\)](https://www.tonesavvy.com/chord-ear-training)

Assignments from the Internet

- Seventh Chord Construction ([.pdf](#), [.pdf](#)), p. 1 ([.pdf](#))
- Constructing and Identifying Seventh Chords ([.pdf](#))
- Identifying Root Position Diatonic Seventh Chords, Major, p.1 ([.pdf](#))
- Identifying Root Position Diatonic Seventh Chords, Minor, p.1 ([.pdf](#))

Assignments

1. Seventh Chords Assignment #1 ([.pdf](#), [.mcsz](#))
2. Seventh Chords Assignment #2 ([.pdf](#), [.mcsz](#))
3. Seventh Chords Assignment #3 ([.pdf](#), [.mcsz](#))

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abdim7 © Megan Lavengood is licensed under a CC BY-NC-SA (Attribution NonCommercial ShareAlike) license

Footnotes

INVERSION AND FIGURED BASS

Chelsey Hamm and Samuel Brady

KEY TAKEAWAYS

- The bass voice of triadic harmonies, often simply called the “bass,” determines inversion.
- Inverted harmonies do not have the root in the bass. When the third appears in the bass, we say the chord is in first inversion, when the fifth appears in the bass we say the chord is in second inversion, and when the seventh appears in the bass we say the chord is in third inversion.
- In addition to chord symbols, musicians also use figured bass to indicate inversion. Each triad and seventh chord is indicated by unique figures, which are often abbreviated.
- Figured bass is not usually added to chord symbols; however, it is added to triadic shorthand notation.
- It is called realizing figured bass when musicians turn figured bass into chords, either on paper or in performance.
- Triads and seventh chords are identified according to their root, quality, and inversion. Inversion includes the appropriate figures if applicable.
- In order to denote chromatic alterations to notes, musicians put accidentals (♭, ♯, ♮) before the figure that is altered. Musicians also use slashes through a figure or a plus sign before a figure, in order to indicate raising the note by a half step.

Triadic Inversion and Figures

Musicians often prioritize the note that is in the bass voice of triadic harmonies, often simply called the “bass,” which is the lowest part (or voice) of a composition, regardless of what instrument or voice type is singing or playing that lowest note. **Example 1** shows an A major triad with three different notes in the bass and chord symbols (above the staff):



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Example 1. An A major triad in root position, first inversion, and second inversion.

An A major triad consists of three notes, the root (A), the third (C♯), and the fifth (E). When a triad is stacked in thirds (i.e. “snowperson form”), we say the triad is in root position. The bass note in root position is the root. Chords that do not have the root in the bass are said to be inverted, as summarized in **Example 2**:

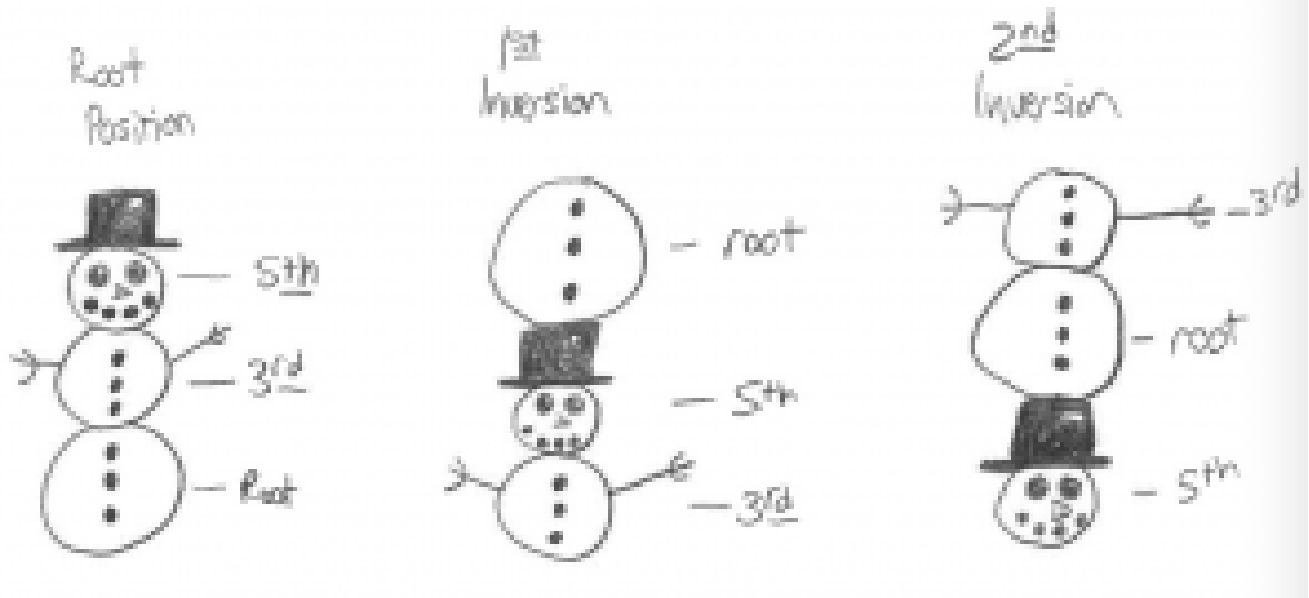
Inversion	Root	Bass
Root Position	Root	Root
First Inversion	Root	Third
Second Inversion	Root	Fifth

Example 2. A summary of triadic inversions, root, and bass.

As seen in **Example 2**, when the third appears in the bass, we say the triad is in first inversion, and when the fifth appears in the bass we say the triad is in second inversion.

It is important to note that the bass voice of the chord is NOT the same thing as the chord’s root. The root of an A major triad is always A, regardless of whether the triad is in root position, first inversion, or second inversion. However, the bass voice changes between these inversions, from A to C♯ to E, as seen in **Example 1** and **Example 2**.

You might think of first inversion triads as looking like a snowperson whose feet have been moved above their head, while a second inversion triad looks like a snow person whose head has been moved to where their feet would normally appear. **Example 3** demonstrates this similarity:



Example 3. Visual similarity between snowpeople and inverted triads.

Sometimes musicians use chord symbols to indicate inversions, as seen in **Example 1**. However, musicians also use figured bass to indicate inversion. Figured bass uses Arabic numerals and some symbols which indicate intervals above the bass (NOT the root) note. These are then interpreted as chords by musicians.

Example 4 shows the full figured bass for triads underneath their chord symbols:



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Example 4. The full figured bass for triadic inversions.

As you can see in **Example 4**, a root position triad has a third and a fifth above the bass. A first inversion triad has a third and a sixth above the bass, while a second inversion triad has a fourth and a sixth above the bass. In figured bass, the larger numerals (intervals) always appear above the smaller ones.

Many centuries ago, however, musicians abbreviated the full figured bass for triads and seventh chords in order to save time and supplies (paper and ink were very expensive before the industrial revolution).

Example 5 shows the abbreviated figured bass for triads that we usually use today underneath their chord symbols:



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Example 5. *The abbreviated figured bass for triadic inversions.*

As you can see, no figure appears for root position. First inversion triads are abbreviated with the superscript number “6,” while a second inversion triad keeps its full figures, “ $\frac{6}{4}$,” to distinguish it from a first inversion triad.

Figured bass is not usually added to chord symbols; however, it is added to triadic shorthand notation. For example, the last measure of **Example 5** would be notated as “A/E” in chord symbols. Using triadic shorthand, this chord would be notated as “A $\frac{6}{4}$.”

When musicians turn figured bass into chords—either on paper or in performance—this is called realizing the figured bass. **Example 6** shows the process of realization for several triads:



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Example 6. *Some triads with figured bass and their realizations.*

As seen in the first measure of **Example 6**, an E $\flat$ appears with no figured bass next to it. Therefore, we can assume that we are realizing an E $\flat$ major triad in root position. This chord is realized (written out with notes) in the next measure. In measure 3, we see the number “6” below the bass note G. We can understand that notation to mean that we are realizing an E $\flat$ major triad in first inversion. This chord is realized in the next measure. In measure 5, we see the figures “ $\frac{6}{4}$ ” below the bass note B $\flat$. This notation means that we are realizing an E $\flat$ major triad in second inversion, realized in the next measure.

Example 7 shows the process of realization for a triad in first inversion in more detail:





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Example 7. Realizing a Gm triad in first inversion in three steps.

As seen in **Example 7**, we first see the bass note B $\flat$ with the figure “6” underneath. This means that the third of the triad is in the bass. We can now find the root of the chord, which is G. In the second measure of **Example 7**, a G minor triad in root position has been realized in parentheses. In the third measure of **Example 7**, the third of the chord (the B $\flat$) is in the bass; now the triad is in first inversion. The last measure of **Example 7** is the correct “answer” or realization of this chord symbol.

Example 8 shows the process of realization for a triad in second inversion in more detail:



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Example 8. Realizing a B triad in second inversion in three steps.

As seen in **Example 8**, we are realizing a B $\frac{6}{4}$ triad—a B major triad in second inversion. In the first measure, we see an F $\sharp$ with the figured bass “ $\frac{6}{4}$ ” underneath. This means that the fifth of the triad is in the bass, and we must find the root of the chord, which is B. In the second measure of **Example 8**, a B major triad in root position has been realized in parentheses. In the third measure of **Example 8**, the fifth of the chord (the F $\sharp$) appears in the bass; this chord is now in second inversion. The last measure of **Example 8** is the correct “answer” or realization of this figure.

Identifying Triads

Triads are identified according to their root, quality, and inversion. With the addition of inversion, you can identify triads in four steps:

1. Identify and write its root.
2. Identify and write its quality.

3. Identify its inversion.
4. Write the appropriate figured bass figures if applicable.

Example 9 shows a triad in inversion (measure 1) and root position (measure 2):



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Example 9. A triad in inversion (measure 1) and root position (measure 2).

The four-step process of identification for the triad in measure 1 is as follows:

1. In measure 2, the chord has been put into root position. Now we can see the root of the triad is D.
2. This triad is minor.
3. The third of the triad is in the bass; therefore this triad is in first inversion.
4. Using figured bass, we would identify this triad as Dm^6 . Using chord symbols, we would identify this triad as Dm/F.

Example 10 shows another triad in inversion (measure 1) and root position (measure 2):



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Example 10. A triad in inversion (measure 1) and root position (measure 2).

The four-step process of identification for the triad in measure 1 is as follows:

1. In measure 2, the chord has been put into root position. Now we can see the root is A.
2. This triad is major.
3. The fifth of the triad in the bass; therefore this triad is in second inversion.
4. Using figured bass, we would identify this triad as A^6_4 . Using chord symbols, we would identify this triad as A/E.

Note that the second measure of **Example 9** and **Example 10** are in parentheses. It is recommended that you imagine the chord in root position rather than write it out in order to save time.

Seventh Chord Inversion and Figures

Like triads, seventh chords can also be inverted; in other words, their root doesn't necessarily have to be the bass. **Example 11** shows an A⁷ chord in root position, first inversion, second inversion, and third inversion:



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Example 11. Seventh chord inversions.

As you can see in **Example 11**, when a seventh chord has its root in the bass it is in root position. When the third appears in the bass it is in first inversion, and when the fifth appears in the bass it is in second inversion. Seventh chords have one more note than triads, so they have one additional inversion. When the chordal seventh of a seventh chord is in the bass it is in third inversion. Don't forget that the bass and the root of the chord are NOT synonymous. In **Example 11** the root of the chord is always A, regardless of its inversion and bass note.

A summary of the different seventh chord inversions can be seen in **Example 12**:

Inversion	Root	Bass
Root Position	Root	Root
First Inversion	Root	Third
Second Inversion	Root	Fifth
Third Inversion	Root	Seventh

Example 12. A summary of seventh chord inversion, root, and bass.

We also use figured bass to indicate the inversion of seventh chords. **Example 13** shows the full figured bass for seventh chords underneath their chord symbols:



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Example 13. *Seventh chord inversions with chord and figured bass.*

As you can see in **Example 13**, a root position seventh chord has a third, fifth, and chordal seventh above the bass. A first inversion seventh chord has a third, fifth, and a sixth above the bass, while a second inversion seventh chord has a third, a fourth, and a sixth above the bass. Finally, a third inversion seventh chord has a second, a fourth, and a sixth above the bass.

Example 14 shows the abbreviated figured bass for seventh chords that musicians use today underneath their chord symbols:



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Example 14. *The abbreviated figures for seventh chord inversion.*

As seen in **Example 14**, a root position seventh chord is abbreviated with just the number “7,” while a first inversion seventh chord is abbreviated as “ $\overset{6}{5}$.” A second inversion seventh chord is abbreviated “ $\overset{4}{3}$,” and a third inversion seventh chord is abbreviated as “ $\overset{4}{2}$.” Sometimes, in older style figured bass notation, a third inversion seventh chord is notated as “2.”

You can realize figured bass for inverted seventh chords in a similar way to how you realized them for triads. To realize an inverted seventh chord, first realize the chord in root position, then invert the chord.

Example 15 shows this process for a Gmm^6_5 chord (chord symbol $Gmi^7/B\flat$).



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Example 15. *Realizing an inverted seventh chord.*

As seen in **Example 15**, we first see the bass note B $\flat$ with the figured bass “ $\overset{6}{5}$ ” underneath. This means that the third of the seventh chord is in the bass. We can now find the root of the chord, which is G. In the second measure of **Example 15**, a Gmm7 (chord symbol Gmi⁷) seventh chord has been realized in parentheses. In the third measure of **Example 15**, the third of the chord (B $\flat$) is in the bass; now the triad is in first inversion.

Example 16 shows another figured bass realization with inversion:



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Example 16. Realizing an inverted seventh chord.

As seen in **Example 16**, we first see the bass note F with the figured bass “ $\overset{4}{3}$ ” underneath. This means that the fifth of the seventh chord is in the bass. We can now find the root of the chord, which is B $\flat$. In the second measure of **Example 16**, a B $\flat$ MM⁷ (chord symbol B $\flat$ M⁷) seventh chord has been realized in parentheses. In the third measure of **Example 16**, the fifth of the chord (F) is in the bass; now the triad is in second inversion.

Identifying Seventh Chords

Like triads, seventh chords are also identified according to their root, quality, and inversion. You can identify seventh chords in five steps:

1. Identify and write its root.
2. Identify and write its quality of triad.
3. Identify and write its quality of seventh.
4. Identify its inversion if applicable.
5. Write the appropriate figured bass figures if applicable.

Example 17 shows a seventh chord in inversion and the process of identification:

—



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Example 17. A seventh chord in inversion (measure 1) and root position (measure 2).

The five-step process of identification for the seventh chord in measure 1 is as follows:

1. In measure 2, the seventh chord has been put into root position (measure 2). Now we can see the root of the chord is E.
2. This triad is minor.
3. The chordal seventh is also minor.
4. The original example is in first inversion, because the third is in the bass.
5. This chord is an Emm_5^6 (chord symbol Emi_7^6/G) chord.

Another seventh chord in inversion is shown in **Example 18**, along with the process of identification:



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Example 18. A seventh chord in inversion (measure 1) and root position (measure 2).

The five-step process of identification for the seventh chord in measure 1 is as follows:

1. In measure 2, the seventh chord has been put into root position (measure 2). Now we can see the root of the chord is G.
2. The triad is major.
3. The chordal seventh is minor.
4. The original example is in third inversion, because the seventh is in the bass.
5. This chord is an GMm_2^4 (chord symbol G_7^4/F) chord.

Note that the second measure of **Example 17** and **Example 18** are in parentheses. It is recommended that you imagine the chord in root position rather than write it out in order to save time.

Other Figured Bass Symbols

In order to denote chromatic alterations to notes, musicians put accidentals (♭, ♯, ♮) before the figure that is altered. **Example 19** shows a few realizations of figures with accidentals:



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Example 19. Realizations of figures with accidentals.

Musicians also use slashes through a figure or a plus sign before a figure, in order to indicate raising the note by a half step. These symbols and their realizations are shown in **Example 20**:



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Example 20. Realization of figures with other symbols.

An orphaned accidental (or hanging accidental) is also common. These are accidentals, that appear by themselves, not accompanying any other figure or symbol. In these cases, the accidental is assumed to apply to the third above the bass, as seen in **Example 21**:



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Example 21. Realization of orphaned accidentals.

Take note that if only a “7” appears below the bass, a root position seventh chord is assumed. If no figures appear below the bass, a root position triad is assumed.

Online Resources

- [Understanding Inversions of Triads and Seventh Chords \(Justin Rubin\)](#)
- [Triad Inversion \(musictheory.net\)](#)
- [Seventh Chord Inversion \(musictheory.net\)](#)
- [Figured Bass Inversion Symbols \(Robert Hutchinson\)](#)
- [Triad Chord Inversions \(musictheoryacademy.com\)](#)
- [How Do Chord Inversions Work? \(Hello Music Theory\)](#)
- [Chord Inversions \(key-notes.com\)](#)
- [Triad Chord Inversion \(teoria\)](#)
- [Figured Bass: How to Read Chord Inversion Symbols \(LANDR\)](#)
- [7th Chord inversion \(Gracemusic.us\)](#)
- [Figured Bass \(thinkingmusic.ca\)](#)
- [What are Chord Inversions? \(YouTube\)](#)
- [What are Chord Inversions? Piano \(YouTube\)](#)
- [Seventh Chord Ear Training \(teoria\)](#)
- [Chord Ear Training \(musictheory.net\)](#)
- [Chord Ear Training \(Tone Savvy\)](#)

Assignments from the Internet

- A. Triad Construction (Inversion) ([.pdf](#))
- B. Triad Construction and Identification (Inversion), p.10 ([.pdf](#)), pp.4–8 ([.pdf](#)),
- C. Triad Chord Identification (Inversion) ([.pdf](#), [.pdf](#))
- D. Seventh Chord Construction (Inversion) ([.pdf](#))
- E. Seventh Chord Identification, Major (Root Position and Inversion), pp. 2–4 ([.pdf](#))
- F. Seventh Chord Identification, Minor (Root Position and Inversion), pp. 2–4 ([.pdf](#))

Assignments

- 1. Triadic Inversions ([.pdf](#), [.mcsz](#))
- 2. Seventh Chord Inversions ([.pdf](#), [.mcsz](#))

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ROMAN NUMERALS AND SATB CHORD CONSTRUCTION

Samuel Brady and Kris Shaffer

KEY TAKEAWAYS

- Roman numeral analysis is an analytical procedure in which musicians use Roman numerals to identify chords within the context of key signatures.
- Roman numerals identify the scale degree of the chord's root, the chord's quality, and any extensions or inversions the chord may include.
- Uppercase Roman numerals denote major triads, and lowercase Roman numerals denote minor triads. A ^o symbol after a lowercase Roman numeral represents a diminished triad, while a ⁺ sign after an uppercase Roman numeral represents an augmented triad.
- The Roman numeral quality of a seventh chord is dependent on the chord's triad; the exceptions are half-diminished and fully diminished seventh chords, whose qualities are dependent on their chordal seventh.
- When constructing a chord in SATB style, there are six rules to keep in mind: stem direction, chord construction, range, spacing, voice crossing, and doubling.

Writing Roman Numerals

Music theorists use Roman numerals to identify chords within the context of key signatures. Roman numerals identify the scale degree of the chord's root, the chord's quality, and any extensions or inversions the chord may include. Because Roman numerals convey the same information across major and minor key signatures, using them can save time in analyzing Western common practice music.

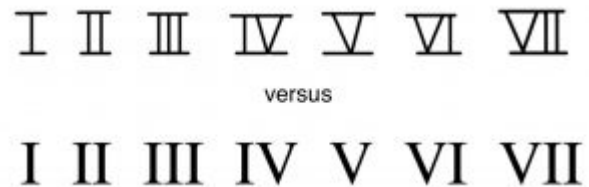
The three columns of **Example 1** show the Arabic numerals 1 through 7 alongside the corresponding uppercase and lowercase Roman numerals.

Arabic Numeral	Uppercase Roman Numeral	Lowercase Roman Numeral
1	I	i
2	II	ii
3	III	iii
4	IV	iv
5	V	v
6	VI	vi
7	VII	vii

Example 1. Arabic and Roman numerals.

To type uppercase Roman numerals, use the uppercase Latin alphabet letters “I” and “V”; likewise, for lowercase Roman numerals, type the lowercase “i” and “v.” The Roman numerals IV (4) and VI (6) are often confused; to remember the difference, think of IV (4) as V minus I (5 minus 1), and VI (6) as V plus I (5 plus 1).

Handwritten uppercase Roman numerals have horizontal bars across the top and bottom of the numeral, in order to further distinguish between uppercase and lowercase (**Example 2**). There is no such difference with lowercase Roman numerals.



Example 2. The difference between handwritten and typed Roman numerals.

Roman Numerals and Triad Quality

Roman numerals indicate three things: the scale degree of a chord’s root, the quality of the chord, and the chord’s inversion (see [Inversion](#) below). The number represented by the Roman numeral (see **Example 1**) corresponds to the scale degree of the chord’s root in whatever key the music is in. Uppercase Roman numerals denote major triads, and lowercase Roman numerals denote minor triads. For example, in a major key, a chord built on the first scale degree, $\hat{1}$ or *do*, is identified as “I,” and a chord built on the second scale degree, $\hat{2}$ or *re*, is identified by the lowercase Roman numeral “ii.” Lowercase Roman

numerals followed by a superscript “o” (such as vii^o) represent diminished triads. Uppercase Roman numerals followed by a + sign (for example, the rare V+) represent augmented triads.

In the analysis of Western music, Roman numerals are generally placed below the bottom staff. Some music theorists prefer to use only uppercase Roman numerals, a system which assumes chord quality is intuited; in this textbook, we privilege the distinction of triadic qualities as denoted by uppercase and lowercase Roman numerals.

Example 3 shows the triads and seventh chords of a G major scale, labeled with chord symbols and now Roman numerals (in blue). The solfège and scale degree of the roots are also labeled.



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Example 3. Roman numerals of triads in major and minor keys.

The Roman numerals and qualities of triads in major keys are as follows:

- I: major
- ii: minor
- iii: minor
- IV: major
- V: major
- vi: minor
- vii^o: diminished

The Roman numerals and qualities of triads in minor keys are as follows:

- i: minor
- ii^o: diminished
- III: major
- iv: minor
- v: minor
- V: major (raised leading tone)
- VI: major
- VII: major

- vii° : diminished (raised leading tone)

Note that the quality of v/V and $\text{VII}/\text{vii}^\circ$ differs depending on whether or not the leading tone is raised.

Roman Numerals and Seventh Chord Quality

Roman numeral labels for seventh chords add a superscript 7: for example, V^7 , ii^7 , and $\text{vii}^{\circ 7}$. The capitalization of the Roman numeral depends on the quality of its triad: uppercase for a major triad (e.g., V^7), lowercase for a minor or diminished triad (e.g., ii^7). Half-diminished and fully diminished seventh chords, which both contain a diminished triad, are distinguished by an additional symbol after the lowercase Roman numeral: $^\circ$ for half-diminished (e.g., $\text{vii}^{\circ 7}$) and $^\circ$ for fully diminished (e.g., $\text{vii}^{\circ 7}$).

Example 4 shows the triads and seventh chords of a G minor scale labeled with chord symbols and now Roman numerals (in blue). The solfège and scale degree of the roots are also labeled.



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Example 4. Roman numerals of seventh chords in major and minor keys.

The Roman numeral and qualities of seventh chords in major keys are as follows:

- I^7 : major-major seventh (major seventh)
- ii^7 : minor-minor seventh (minor seventh)
- iii^7 : minor-minor seventh (minor seventh)
- IV^7 : major-major seventh (major seventh)
- V^7 : major-minor seventh (dominant seventh)
- vi^7 : minor-minor seventh (minor seventh)
- $\text{vii}^{\circ 7}$: half-diminished seventh

The Roman numeral and qualities of seventh chords in minor keys are as follows:

- i^7 : minor-minor seventh (minor seventh)
- $\text{ii}^{\circ 7}$: half-diminished seventh
- III^7 : major-major seventh (major seventh)

- iv^7 : minor-minor seventh (minor seventh)
- v^7 : minor-minor seventh (minor seventh)
- V^7 : major-minor seventh (dominant seventh)
- VI^7 : major-major seventh (major seventh)
- VII^7 : major-minor seventh (dominant seventh)
- $vii^{\circ 7}$: fully diminished seventh (diminished seventh)

Note that the quality of v^7/V^7 and $VII^7/vii^{\circ 7}$ differs depending on whether or not the leading tone is raised.

Additionally, major seventh and dominant seventh chords have the same Roman numeral nomenclature; in other words, a I^7 chord and a V^7 chord are written the same even though the former is a major seventh chord and the latter is a dominant seventh chord. The difference would be discerned from the musical context.

Inversion

Roman numerals also denote inversions, shown through figured bass symbols placed after the Roman numeral (see the [Inversion and Figured Bass](#) chapter). For example, a superscript 6 represents a first inversion triad, and the figures $\frac{4}{3}$ would indicate a second inversion seventh chord. **Example 5** shows four different inverted chords with Roman numerals:



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Example 5. Four inverted chords with Roman numerals and figures.

Roman Numeral Analysis

To complete a Roman numeral analysis, begin by [identifying the work's key](#) and writing it under the key signature at the beginning of the work, using an uppercase letter name for a major key and a lowercase letter name for a minor key. It can also be helpful to write a lowercase “m” following the letter name of a

minor key (e.g., “dm” for D minor). Be sure to apply any applicable accidental (e.g., “E $\flat$ ” for E-flat major).

After you identify and write the key at the start of the work, follow these steps for each chord to complete the Roman numeral analysis:

1. If a chord is in inversion, stack it in root position (preferably mentally).
2. Identify all the notes of the chord, taking its quality into account.
3. Write the Roman numeral that corresponds with the scale degree of the chord’s root, reflecting the quality in the Roman numeral (uppercase or lowercase).
4. Write any additional quality symbols ($^{\circ}$, $^{\flat}$, $^{+}$) as needed.
5. Write figures after the Roman numeral.

Example 6 shows a Roman numeral analysis for Johann Sebastian Bach’s chorale “Jesu meiner Seelen Wonne” (1642), which translates to “Jesus, delight of my soul.” When analyzing this chorale, ignore the notes in parentheses. It is recommended that you cover up the Roman numerals in this example and try to generate them on your own before uncovering them:



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Example 6. Roman numeral analysis of an excerpt of Johann Sebastian Bach’s “Jesu, meiner Seelen Wonne” (BWV 359).

Roman numeral analysis is not just limited to chorales; indeed, you can apply them to many different genres of music. **Example 7** shows an excerpt from “Caro Mio Ben” (c. 1783), which translates to “Dearly beloved” and is attributed to Giuseppe Giodani, with a Roman numeral analysis:



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Example 7. Roman numeral analysis of an excerpt of Giuseppe Giordani’s “Caro Mio Ben.”

When the same chord occurs two or more times in a row, which is common, you can choose whether to repeat the Roman numeral (as in measure 1 of [Example 7](#)) or not (as in measure 2 of [Example 6](#)).

Writing Chords in SATB Style

Music theorists sometimes simplify compositions into four parts (or voices) in order to make their harmonic content more readily accessible. This practice is called SATB style, abbreviated after the four common voice parts of a choir—soprano (S), alto (A), tenor (T), and bass (B). When constructing a chord in strict SATB style, there are six rules musicians generally follow:

- Stem Direction
- Chord Construction
- Range
- Spacing
- Voice Crossing
- Doubling

These six parameters form the basis of counterpoint and part writing, explored further in the sections [Counterpoint and Galant Schemas](#) and [Diatonic Harmony, Tonicization, and Modulation](#).

Stem Direction

On a grand staff in SATB style, the soprano and alto are written in the treble clef (upper staff), while the tenor and bass are written in the bass clef (lower staff). The soprano and tenor voices receive up-stems, while the alto and bass parts receive down-stems. If the stem direction is crossed, this is an error. [Example 8](#) shows a chord with incorrect stemming, followed by the corrected version.

Example 8. A stemming error.

Chord Construction

Be sure to check each chord for correct notes and accidentals, and make sure that your chords are not missing any notes. In **Example 9**, the first chord has accidentals erroneously added to two of the pitches, which are removed in the second chord to create a correct B diminished triad in first inversion.

Example 9. A chord construction error.

The bass voice must always correspond with the inversion that the Roman numeral's figures indicate.

However, the order of the upper notes can be arranged in many ways. In other words, there is not necessarily just one correct way to voice a chord.

Range

There is a generally accepted range for each voice (**Example 10**):

- Soprano – C₄ to G₅
- Alto – G₃ to D₅
- Tenor – C₃ to G₄
- Bass – F₂ to D₄

Example 10. Vocal ranges.

In **Example 11**, the soprano and bass notes are out of range; this is corrected by moving the soprano note down by an octave and the bass note up by an octave.

Example 11. A range error.

Spacing

There should be no more than an octave between adjacent upper voices (soprano and alto, alto and tenor) and no more than a twelfth between the tenor and bass. The most common spacing error occurs between the alto and tenor because the notes appear in different clefs. **Example 12** first shows a chord with incorrect spacing—the soprano and alto are more than an octave apart, as are the alto and tenor—followed by a corrected version:

Example 12. A spacing error.

Voice Crossing

The ranges of voices should not cross. In other words, the soprano must always be higher than the alto, the alto must always be higher than the tenor, and the tenor must always be higher than the bass. In **Example 13**, the alto and tenor voices are crossed. This error is also the most common between the alto and tenor voices.

Example 13. A voice crossing error.

Doubling

In a triad, the note in the bass is usually doubled in an upper voice. However, there is an exception to this: the leading tone is never doubled. Other tendency tones, such as chordal sevenths, are also never doubled. Seventh chords don't have any notes doubled because they contain four notes, one for each voice part. Incorrect doubling is seen in the first measure of **Example 14**, where the leading tone is doubled, followed by a corrected voicing in the second measure.

Example 14. A doubling error.

Online Resources

- [Roman Numeral Analysis: Triads \(musictheory.net\)](#)
- [Harmonizing Scales & Roman Numeral Analysis \(Kaitlan Bove\)](#)
- [Roman Numerals \(learnmusictheory.net\)](#)
- [Roman Numeral Analysis \(Phillip Magnuson\)](#)
- [Roman Numeral Analysis \(8notes.com\)](#)
- [Roman Numeral Chord Symbols \(Robert Hutchinson\)](#)
- [Roman Numerals in Major Flashcards \(gmajormusictheory.org\)](#)
- [Roman Numerals in Minor Flashcards \(gmajormusictheory.org\)](#)
- [Inversion & Roman Numerals in Major Flashcards \(gmajormusictheory.org\)](#)
- [Inversion & Roman Numerals in Minor Flashcards \(gmajormusictheory.org\)](#)
- [How the Roman Numeral System Works \(YouTube\)](#)

Assignments from the Internet

- A. Roman Numeral Identification, pp. 15–16, 18 ([.pdf](#)), pp. 5–7 ([.pdf](#)), pp. 1, 3, 4 ([.pdf](#)), ([.pdf](#), [.pdf](#), [.pdf](#), [.pdf](#))
- B. Roman Numeral Identification and Construction, p. 14 (triads) and 17 (seventh chords) ([.pdf](#)), p. 11 ([.pdf](#)), p. 8 ([.pdf](#)), p. 5 ([.pdf](#)), ([website](#), [website](#))
- C. Roman Numeral Construction, p. 22 ([.pdf](#))

Assignments

- 1. Roman Numerals Identification Assignment #1 ([.pdf](#), [.mscz](#), [.mp3](#))
- 2. Roman Numerals Identification Assignment #2 ([.pdf](#), [.mscz](#), [.mp3](#))
- 3. Roman Numerals Identification Assignment #3 ([.pdf](#), [.mscz](#), [.mp3](#))

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TEXTURE

Samuel Brady and Mark Gotham

KEY TAKEAWAYS

- Musical texture is the density of and interaction between a work's different voices.
- Monophony is characterized by an unaccompanied melodic line.
- Heterophony is characterized by multiple variants of a single melodic line heard simultaneously.
- Homophony is characterized by multiple voices harmonically moving together at the same pace.
- Polyphony is characterized by multiple voices with separate melodic lines and rhythms.
- Most music does not conform to a single texture; rather, it can move between them.

CHAPTER PLAYLIST

Texture is an important (and sometimes overlooked) aspect of music. There are many types of musical texture, but the four main categories used by music scholars are monophony, heterophony, homophony, and polyphony.

Monophony

A monophonic texture is characterized by a single unaccompanied melodic line of music. Monophony involves all instruments playing or singing in unison, making it the simplest and most exposed of all musical textures. The first movement of *Cello Suite no. 1 in G Major* (1717) by Johann Sebastian Bach is an example of a monophonic texture. Notice how the solo cello line is the only voice in this work.



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Example 1. Cello Suite no. 1 in G Major, I. Prelude, (BWV 1007) by Johann Sebastian Bach, performed by Yo-Yo Ma.

Now let's listen to "Where Have All the Flowers Gone?" (1955) by Pete Seeger. Note that Seeger's voice is the only musical line; therefore, this work is a second example of monophony.



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Example 2. "Where Have All the Flowers Gone?" by Pete Seeger.

Heterophony

A heterophonic texture is characterized by multiple variations of the same melodic line that are heard simultaneously across different voices. These variations can range from small embellishing tones to longer runs in a single voice, as long as the melodic material stays relatively constant.

Listen to "Ana Hasreti" (2001) by Göskel Baktagir, an example of Turkish classical music. Notice how the winds embellish the melody presented by the plucked strings. While the instruments play different embellishments, they present essentially the same melodic material.



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Example 3. "Ana Hasreti" (2001) by Göskel Baktagir.

Now listen to the traditional Irish reel "The Wind That Shakes the Barley," recorded by the Chieftains in

1978 (beginning at 0:50), and notice the slight variation between the melodic lines of the fiddle (violin) and the flute. This slight variation between the violin and flute presents a second example of heterophony.



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Example 4. “The Wind That Shakes The Barley/The Reel With The Beryle” by The Chieftains; listen starting at 0:50.

Homophony

A homophonic texture is characterized by having multiple voices moving together harmonically at the same pace. This is a very common texture. Many times, this takes the form of having a single melody that predominates, while other voices are used to fill out the harmonies. Homophony is sometimes further divided into two subcategories, homorhythm and melody and accompaniment.

Homorhythm

Homorhythm is a type of homophonic texture in which all voices move in an extremely similar or completely unison rhythm. This is most often seen in chorale-like compositions, where the melody and harmonies move together in block chords.

Let’s listen to Six Horn Quartets: no. 6, Chorale (1910), written by Nikolai Tchernepin. Notice how both the melody and harmony move mostly in block chords, creating a unified rhythm.



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Example 5. Six Horn Quartets: no 6, Chorale by Nikolai Tchernepin, performed by the Deutsches Horn Ensemble.

Now let’s listen to the folk song “Wild Mountain Thyme” recorded by The Longest Johns in 2018 (0:20–0:44). Remember that in a homorhythmic texture, there is a similarity of rhythm throughout all of

the voices. In this example, there is a melody that stands out from the texture, but the voices still move in rhythmic unison.



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Example 6. “Wild Mountain Thyme,” by The Longest Johns; listen from 0:20–0:44.

Melody and Accompaniment

A melody and accompaniment texture is perhaps the most common type of homophony. This texture is characterized by a clear melody that is distinct from other supporting voices, which are called an accompaniment. Often the melody will have a different rhythm from the supporting voice(s).

Let’s listen to the second movement of Paul Hindemith’s Flute Sonata (1936). This example features a very clear melody (flute) and accompaniment (piano). Notice how the piano is never completely in rhythmic unison with the flute; however, it provides the role of accompaniment by filling out the texture harmonically.



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Example 7. Flute Sonata by Paul Hindemith, performed by Emmanuel Pahud and Eric Le Sage.

Now let’s listen to “Misty” (1954), written by Erroll Garner and performed by Ella Fitzgerald. Notice how the piano accompanies the primary melody sung by Fitzgerald (the vocalist).



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Example 8. “Misty” (1954), written by Erroll Garner and performed by Ella Fitzgerald.

Polyphony

Polyphony is characterized by multiple voices with separate melodic lines and rhythms. In other words, each voice has its own independent melodic line, and the independent voices blend together to create harmonies.

In Western classical music, polyphony is commonly heard in fugues, such as Fugue no. 5 in D Major (1951–1952), written by Dmitri Shostakovich. Notice how each individual melodic line is independent, yet the voices create harmonies overall when heard together.



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Example 9. *Fugue no. 5 in D Major by Dmitri Shostakovich, performed by Joachim Kwetzinsky.*

This can also be heard in the final chorus of “I’ll Cover You – Reprise” from the Broadway musical *Rent* (1996), written by Jonathan Larson (2:20–2:45). Notice how there are three independent vocal layers, singing different melodies and rhythms, but working together to create new harmonies overall:



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Example 10. *“I’ll Cover You – Reprise” from the Broadway musical *Rent* (1996), written by Jonathan Larson; listen from 2:20–2:45.*

Most musical works have some variety in texture. For example, you may have heard a work that opened with a solo voice or instrument, then changed to a melody with accompaniment. There are many different possibilities!

Online Resources

- [Terms That Describe Texture \(Lumen\)](#)
- [Texture in Music \(Hello Music Theory\)](#)
- [Texture in Music \(learnmusictheory.net\)](#)
- [Texture \(Emory University\)](#)
- [Texture \(Robert Hutchinson\)](#)
- [Texture \(Phillip Magnuson\)](#)
- [Four Types of Texture in Music \(perennialmusicandarts.com\)](#)

Assignments from the Internet

- A. Interactive Musical Textures Worksheet ([website](#), [website](#))
- B. Study Guide to Texture and Worksheet ([.pdf](#))
- C. Texture: Homophonic or Polyphonic? ([website](#))
- D. Texture Composition Assignment, pp. 17–22 ([.pdf](#))

Assignments

1. Identifying Textures ([.pdf](#), [.docx](#)) [Worksheet playlist](#)

II. COUNTERPOINT AND GALANT SCHEMAS

Punctum contra punctum... point against point... note against note.

This section on “counterpoint” takes that term to concern the combination of notes in general. Although “counterpoint” is sometimes used as the “horizontal” or “melodic” complement to harmony’s “vertical” aspect, the two are clearly not so easily separated in practice and we do not attempt to make any such hard-and-fast distinction here, beyond simply emphasising linear elements.

This section also places a prominent emphasis on “try it yourself” exercises in species counterpoint and pastiche composition in 16th- and 18th-century styles, including digital versions of all the Fux Part I exercises.

Prerequisites

This second part of *Open Music Theory* assumes knowledge of [Fundamentals](#), but nothing from the later parts.

COUNTERPOINT AND GALANT SCHEMAS CHAPTERS

- Introduction to Species Counterpoint
- First-species Counterpoint
- Second-species Counterpoint
- Third-species Counterpoint
- Fourth-species counterpoint
- Fifth-Species Counterpoint
- “Gradus ad Parnassum” Exercises
- 16th-Century Contrapuntal Style
- High Baroque Fugal Exposition
- Ground Bass
- Galant Schemas
- Galant Schemas – Summary
- Galant Schemas – The Rule of the Octave and Harmonizing the Scale with Sequences

Organization

This section covers some of the main kinds of repertoires and techniques historically used in the teaching of counterpoint:

- We begin with probably the best-known, so-called [species counterpoint](#) approach (after Fux).
- Species counterpoint is sometimes conflated with the [imitative polyphonic style of the 16th century](#), so after our chapters on species, we move on to a closer look at that repertoire in particular.
- 16th-century polyphony can be viewed as a precursor to another imitative style: [the fugue](#). Here, we take a look at the opening section of fugues in the early 18th century specifically.
- Finally, staying in the 18th century, we take a step away from strict imitation to look at some other kinds of approaches relevant to the contrapuntal thinking, particularly the practice of [Galant schemas](#): short pre-existing templates for combining voices that can be elaborated into “real” music (compositions or improvisation).

INTRODUCTION TO SPECIES COUNTERPOINT

Kris Shaffer and Mark Gotham

KEY TAKEAWAYS

- Species counterpoint is a step-by-step method for learning to write melodies and to combine them.
- While the “rules” involved are somewhat linked to music in the 16th century, the idea really is to train basic skills, independent of a specific repertoire or style.
- This chapter recaps some key concepts we met in the [Fundamentals](#) section and introduces some basic “rules” that will be relevant for each of the following chapters, including some terms for:
 - Consonance and dissonance:
 - Perfect consonances: perfect unisons, fifths, and octaves
 - Imperfect consonances: major and minor thirds and sixths
 - Dissonances: all seconds, sevenths, and diminished and augmented intervals
 - Types of two-part motion:
 - Contrary: the two parts move in opposite directions (one up, the other down)
 - Similar: the two parts move in the same direction (both up or both down)
 - Parallel: the two parts move in the same direction (both up or both down) by the same distance, such that the starting and ending intervals are of the same type (e.g., parallel thirds)
 - Oblique: one part moves, the other stays on the same pitch

We begin with a specific method called species counterpoint. The term “species” is probably most familiar as a way of categorizing animals, but it is also used in a wider sense to refer to any system of grouping similar elements. Here, the species are types of exercises that are done in a particular order, introducing one or two new musical “problems” at each stage. (So no, we won’t have any elephants or monkeys singing polyphony, sorry!)

While there are many variants on this approach, the chapters here are closely based on Johann Joseph Fux's *Gradus ad Parnassum (Steps to Parnassus, 1725)*. Many composers from the 18th to the 21st centuries have used this method, or some variation on it. In the first part of *Gradus ad Parnassum*, Fux works through five species for combining two voices, which will be the focus of our next five chapters. The “[Gradus ad Parnassum](#)” [Exercises](#) chapter provides all of the exercises from *Gradus ad Parnassum* in an editable format so you can try this yourself.

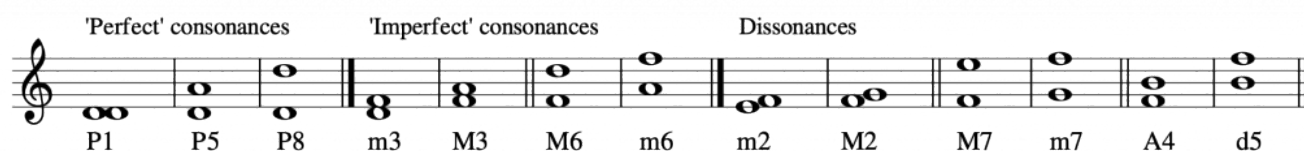
Before getting into the five species, we begin in this chapter by introducing principles that apply to writing lines in any species. These principles build on concepts from the [Fundamentals](#) section, such as [intervals](#) and scale degrees.

Consonance and dissonance

[Consonance and dissonance](#) was introduced in a previous chapter, but in counterpoint, we further distinguish between:

- Perfect consonances (perfect unisons, fifths, and octaves)
- Imperfect consonances (major and minor thirds and sixths)
- Dissonances (all seconds, sevenths, and diminished and augmented intervals)

These categories are summarized in [Example 1](#) below.



Example 1. Perfect consonances, imperfect consonances, and dissonances.

The elusive perfect fourth

As in many theories of tonal music, the perfect fourth has a special status in species counterpoint that depends on where it appears in the texture. Basically, the interval of a perfect fourth is dissonant when it involves the lowest voice in the texture, but it is consonant when it occurs between two upper voices.

As this survey of species counterpoint will only cover two-voice textures, all fourths will involve the lowest part and therefore be classed as dissonant. Later chapters in this section will address the resolution

of this dissonance, and the [Strengthening Endings with Cadential \$\frac{6}{4}\$](#) and [Chords as Forms of Prolongation](#) chapters in the [Diatonic Harmony section](#) discuss this topic further.

Types of motion

Species counterpoint also concerns the motion between melodic lines (demonstrated in [Example 2](#)):

- Contrary: the two parts move in opposite directions (one up, the other down)
- Similar: the two parts move in the same direction (both up or both down)
- Parallel: the two parts move in the same direction (both up or both down) by the same distance, such that the starting and ending intervals are of the same type (e.g., parallel thirds)
- Oblique: one part moves, the other stays on the same pitch



Example 2.
Examples of different types of motion.

Composing a Cantus Firmus

Exercises in strict voice leading, or species counterpoint, begin with a single well-formed musical line called the cantus firmus (“fixed voice” or “fixed melody”; plural “cantus firmi”). Cantus firmus composition gives us the opportunity to engage the following fundamental musical traits:

- smoothness
- independence and integrity of melodic lines
- variety
- motion (toward a goal)

[Example 3](#) contains all the cantus firmi that Fux uses throughout *Gradus at Parnassum*: one for each mode, presented here in the upper and lower of two parts. Apart from using this to review the type of cantus firmi Fux composed, you can use this to practice any of the species, on any of the modes, and in both the upper and lower parts.



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Example 3. *Cantus firmi from Gradus ad Parnassum.*

Notice how in each case, the general musical characteristics of smoothness, melodic integrity, variety, and motion toward a goal are worked out in specific characteristics. The following characteristics are typical of all well-formed cantus firmi:

- length of about 8–16 notes
- arhythmic (all whole notes; no long or short notes)
- begin and end on *do* ($\hat{1}$)
- approach final tonic by step: usually *re–do* ($\hat{2} - \hat{1}$), sometimes *ti–do* ($\hat{7} - \hat{1}$)
- all note-to-note progressions are melodic consonances
- range (interval between lowest and highest notes) of no more than a tenth, usually less than an octave
- a single climax (high point) that usually appears only once in the melody
- clear logical connection and smooth shape from beginning to climax to ending
- mostly stepwise motion, but with some leaps (mostly small leaps)
- no repetition of “motives” or “licks”
- any large leaps (fourth or larger) are followed by step in opposite direction
- no more than two leaps in a row and no consecutive leaps in the same direction (except in the F-mode cantus firmus, where the back-to-back descending leaps outline a consonant triad)
- the leading tone progresses to the tonic
- leading notes in all cases, including in “minor”-type modes for which that seventh degree needs to be raised

Melodic tendencies

Some of the characteristics listed above are specific to strict species counterpoint; however, taken together, they express some general tendencies of melodies found in a variety of styles.

David Huron (2006) identifies five general properties of melodies in Western music that connect to the basic principles of perception and cognition listed above, but play out in slightly different ways in specific musical styles. They are:

- **Pitch proximity:** The tendency for melodies to progress by steps more than leaps and by small leaps more than large leaps. An expression of smoothness and melodic integrity.
- **Step declination:** The tendency for melodies to move by descending step more than ascending. Possibly an expression of goal-oriented motion, as we tend to perceive a move down as a decrease in energy (movement toward a state of rest).
- **Step inertia:** The tendency for melodies to change direction less frequently than they continue in the same direction. (That is, the majority of melodic progressions are in the same direction as the previous one.) An expression of smoothness and, at times, goal-oriented motion.
- **Melodic regression:** The tendency for melodic notes in extreme registers to progress back toward the middle. An expression of motion toward a position of rest (with non-extreme notes representing “rest”). Also an expression simply of the statistical distribution of notes in a melody: the higher a note is, the more notes there are below it for a composer to choose from, and the fewer notes there are above it.
- **Melodic arch:** The tendency for melodies to ascend in the first half of a phrase, reach a climax, and descend in the second half. An expression of goal orientation and the rest–motion–rest pattern. Also a combination of the above rules in the context of a musical phrase.

Rules for melodic and harmonic writing

In species counterpoint, we both write and combine such melodic lines. The following set of rules invoked in all the species begins with the melodic matters discussed already, then presents some harmonic considerations that we will focus on in the following chapters.

Melodic writing (horizontal intervals)

- Approach the final octave/unison of each exercise by step (this creates the *clausula vera*).
- Limit the number of:
 - consecutive, repeated notes: the same pitch more than once in a row
 - non-consecutive repeated notes: the same pitch more than once across the whole exercise
 - consecutive leaps: multiple intervals of a third or greater in a row (separate them with stepwise motion)
 - non-consecutive leaps: the total number of leaps within a short span, even if they’re not successive
 - consecutive repeated generic intervals: the same interval size (e.g., second) even if not the same specific interval (minor second)
- Control the melodic climax (highest note):

- Aim for exactly one unique climax in each melodic part
- Avoid ending on that climax
- Preferably leap to that climax
- Avoid the two parts reaching their respective climax pitches at the same time
- Avoid melodic leaps of:
 - an augmented interval
 - a diminished interval
 - any seventh
 - any sixth, except perhaps the ascending minor sixth
 - any interval larger than an octave
- Also avoid outlining (**Example 4**):
 - an augmented interval
 - a diminished interval
 - any seventh

Melodic Outlinings

Avoid changing direction at the tritone: Continue instead to the 5th:

Avoid changing direction at the 7th: Continue instead to the 8ve:

Example 4. Melodic outlinings.

Harmonic writing (vertical intervals and the combination of parts)

- The first interval should be a perfect unison, fifth, or octave, and the last interval should be a perfect unison or octave (not fifth).
- Restrict the gap between parts to a twelfth (compound fifth) maximum, and to an octave for the most part.
- Avoid “overlapping” parts (where the nominally “upper” part goes below the “lower” one).
- Make sure to avoid:
 - parallel octaves: when two parts start an octave apart and both move in the same direction by

- the same interval to also end an octave apart
- parallel fifths: when two parts start an perfect fifth apart and both move in the same direction by the same interval to also end a perfect fifth apart
- Also try to avoid:
 - direct fifths and octaves: when two parts begin any interval apart and move in the same direction to a perfect fifth or octave
 - unisons at any point in the exercise other than the first and last intervals

The Psychology of Counterpoint

The chapters on species counterpoint will not involve a specific style (classical, baroque, romantic, pop/rock, etc.). Instead, these exercises will set aside important musical elements like orchestration, melodic motives, formal structure, and even many elements of harmony and rhythm, in order to focus very specifically on a small set of fundamental musical problems. These fundamental problems are closely related to how some basic principles of auditory perception and cognition (i.e., how the brain perceives and conceptualizes sound) play out in Western musical structure.

For example, our brains tend to assume that sounds similar in pitch or timbre come from the same source. Our brains also listen for patterns, and when a new sound continues or completes a previously heard pattern, we typically assume that the new sound belongs together with those others. This is related to some of the most deep-seated, fundamental parts of our human experience, and even evolution. Hearing a regular pattern typically indicates a predictable (and safe) environment, while any change can signal danger and will tend to heighten our attention to the source. This system for directing attention (and adrenaline) where it is most likely to be needed has been essential to the survival of the human species. While listening to music in the 21st century does not (usually!) require us to listen out for animal predators, some part of that evolutionary experience is “hard-wired” into the psychology of human listening, and it has a role in what gives music its emotional effect—even in a safe environment.

For Western listeners, music that simply makes it easy for the brain to parse and process sound is boring—it calls for no heightened attention; it doesn’t increase our heart rate, make the hair on the back of our neck stand up, or give us a little jolt of dopamine. On the other hand, music that constantly activates our innate sense of danger is hardly pleasant for most listeners. That being the case, a balance between tension and relaxation, motion and rest, is fundamental to most of the music we will study.

The study of counterpoint helps us to engage several important musical “problems” in a strictly limited context, so that we can develop composition and analytical skills that can then be applied widely. Those problems arise as we seek to bring the following traits together:

- smooth, independent melodic lines
- tonal fusion (the preference for simultaneous notes to form a consonant unity)
- variety
- motion (towards a goal)

These traits are based in human perception and cognition, but they are often in conflict in specific musical moments and need to be balanced over the course of larger passages and complete works. Counterpoint will help us begin to practice working with that balance.

Finally, despite abstractions, it's still best to treat counterpoint exercises as miniature compositions and to perform them—vocally and instrumentally, and with a partner where possible—so that the ear, the fingers, the throat, and ultimately the mind can internalize the sound, sight, and feel of how musical lines work and combine.

Further Reading

- Huron, David. 2006. *Sweet Anticipation: Music and the Psychology of Expectation*. Cambridge, MA: MIT Press.

Assignments

1. Cantus firmus A ([.pdf](#), [.mscx](#)). Asks students to critique one cantus firmus and write their own.
2. Cantus firmus B ([.pdf](#), [.mscx](#)). Asks students to critique one cantus firmus and write their own.
3. For the complete set of Fux exercises, see the [Gradus ad Parnassum chapter](#).

Media Attributions

Consonance

Motion

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FIRST-SPECIES COUNTERPOINT

Kris Shaffer and Mark Gotham

KEY TAKEAWAYS

- First-species counterpoint is a traditional compositional exercise that teaches beginning musicians to consider how to start and end melodic lines, and most importantly, how to keep them independent of each other.
- When writing in first species, follow these rules:
 - Begin on a perfect unison, fifth, or octave.
 - Both voices move at exactly the same rate and have no rhythmic variety (for example, all notes are whole notes).
 - Harmonically, the intervals between the two voices are all consonances.
 - Melodically, prefer stepwise motion and leap only occasionally. Melodic leaps of a tritone or seventh are forbidden.
 - Parallel perfect consonances are forbidden.
 - End with a perfect unison or octave.
- This chapter presents additional guidelines that will help in writing a successful first-species counterpoint.

Counterpoint is the mediation of two or more musical lines into a meaningful and pleasing whole. In first-species counterpoint, we not only write a smooth melody that has its own integrity of shape, variety, and goal-directed motion, but we also write a second melody that contains these traits. Further, and most importantly, we combine these melodies to create a whole texture that is smooth, that exhibits variety and goal-oriented motion, and in which these melodies both maintain their independence and fuse together into consonant simultaneities (the general term for two or more notes sounding at the same time). In first-species counterpoint, we begin with a *cantus firmus* (new or existing) and compose a single new line—called the counterpoint—above or below it. That new line contains one note for every note in the

cantus: both the cantus firmus and the counterpoint will be all whole notes. Thus, first species is sometimes called “one-against-one” or 1:1 counterpoint.

The Counterpoint Line

In general, the counterpoint should follow the principles of writing a good cantus firmus discussed in the previous chapter, [Introduction to Species Counterpoint](#). There are some minor differences, to be discussed below, but generally a first-species counterpoint should consist of two cantus-firmus-quality lines.

Example 1 shows the complete exercises of first-species counterpoint from Part I of *Gradus ad Parnassum*. Each example sees one of the cantus firmi we’ve already met combined with a new counterpoint line either above or below. We’ve annotated each one with the interval that the counterpoint line makes with the cantus firmus. For the complete examples from *Gradus ad Parnassum* as exercises, solutions, and annotations, see [Gradus ad Parnassum Exercises](#).



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Example 1. All first-species exercises from *Gradus ad Parnassum*.

Beginning and Ending

Beginning a first-species counterpoint

Note that each exercise in **Example 1** begins with a perfect consonance. This creates a sense of stability at the opening of the line.

When writing a counterpoint *above* a cantus firmus, the first note of the counterpoint should be *do* ($\hat{1}$) or *sol* ($\hat{5}$) (a P1, P5, or P8 above the cantus).

When writing a counterpoint *below* a cantus firmus, the first note of the counterpoint must always be on the [modal final](#), *do* ($\hat{1}$) (P1 or P8 below the cantus firmus). Beginning on *sol* ($\hat{5}$) would create a

dissonant fourth; beginning on *fa* ($\hat{4}$) would create a P5 but confuse listeners about the tonal context, since *fa-do* ($\hat{4} - \hat{1}$) at the beginning of a piece is easily misheard as *do-sol* ($\hat{1} - \hat{5}$).

Ending a first-species counterpoint

The final note of the counterpoint must always be *do* ($\hat{1}$) (P1 or P8 above/below the cantus).

To approach this ending smoothly, with variety, and with strong goal orientation, always approach the final interval by contrary stepwise motion, as follows:

- If the cantus ends *re-do* ($\hat{2} - \hat{1}$), the counterpoint's final two pitches should be *ti-do* ($\hat{7} - \hat{1}$).
- If the cantus ends *ti-do* ($\hat{7} - \hat{1}$), the counterpoint's final two pitches should be *re-do* ($\hat{2} - \hat{1}$).

Thus, the penultimate bar will either be a third or a sixth between the two lines (**Example 2**). This ending formula is known as the *clausula vera*. The exercises in **Example 1** each end with a *clausula vera*.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=3764>

Example 2. Examples of the *clausula vera*.

Independence of the Lines

Like the cantus firmus, the counterpoint line should have a single climax. To maintain the independence of the lines and the smoothness of the entire passage (so no one moment is hyper-emphasized by a double climax), these climaxes should not coincide.

A single repeat/tie in the counterpoint is allowed, but try to avoid repeating at all. This promotes variety in the exercise, since there are so few notes to begin with.

Avoid voice crossing. Voice crossings diminish the independence of the lines and make them more difficult to distinguish by ear.

Avoid voice overlap, where one voice leaps past the previous note of the other voice. For example, if the

upper part sings an E₄, the lower part cannot sing an F₄ in the following bar. This also helps maintain the independence of the lines.

Intervals and Motion

The interval between the cantus firmus and counterpoint at any moment should not exceed a perfect twelfth (octave plus fifth). In general, try to keep the two lines within an octave where possible, and only exceed a tenth in “emergencies” and only briefly (one or two notes). When the voices are too far apart, tonal fusion is diminished. Further, it can diminish performability, which, though not an essential principle of human cognition, is an important consideration for composers, and it has a direct effect on the smoothness, melodic integrity, and tonal fusion of what listeners hear during a performance.

In general, all harmonic consonances are allowed. However, unisons should only be used for the first and last intervals. Unisons are very stable and serve best as goals rather than midpoints. They also diminish the independence of the lines.

Imperfect consonances are preferable to perfect consonances for all intervals other than the first and last dyads, in order to heighten the sense of arrival at the end and to promote a sense of motion toward that arrival. In all cases, aim for a variety of harmonic intervals over the course of the exercise.

Never use two perfect consonances of the same size in a row: P5–P5 or P8–P8. This includes both simple and compound intervals; for example, P5–P12 is considered the same as P5–P5. (Two different perfect consonances in a row, such as P8–P5, are allowed, but try to follow every perfect consonance with an imperfect consonance if possible.) Parallel fifths and octaves promote tonal fusion at the expense of melodic independence, and these consecutive stable sonorities also limit variety and motion in the exercise. Thus, they are far from ideal, and are to be avoided in species counterpoint.

Vary the types of motion between successive intervals, aiming to use each type (except perhaps oblique motion). Contrary motion is best for variety and preserving the independence of the lines, so it should be preferred where possible.

Because similar and parallel motion diminish variety and melodic independence, their use should be mediated by other factors:

- Do not use more than three of the same imperfect consonance type in a row (e.g., three thirds in a row).
- Never move into a perfect consonance by similar motion (this is called direct fifths/octaves. This draws too much attention to an interval that already stands out of the texture).

- Avoid combining similar motion with leaps, especially large ones.

Assignments

1. First-Species Counterpoint A ([.pdf](#), [.mscx](#)). Asks students to compose a first-species example and do error detection.
2. First-Species Counterpoint B ([.pdf](#), [.mscx](#)). Asks students to compose a first-species example and do error detection.
3. For the complete set of Fux exercises, see the [Gradus ad Parnassum](#) chapter.

SECOND-SPECIES COUNTERPOINT

Kris Shaffer and Mark Gotham

KEY TAKEAWAYS

The second species of species counterpoint sees the counterpoint line move twice as fast as the cantus firmus. This introduces the ideas of *strong* versus *weak* beats.

Strong beats are always consonant. Weak beats may be consonant or dissonant. Dissonance may occur on weak beats may arise through passing motion. Consonant weak beats connect two consonant strong beats to create a succession of 3 consonances. These can be of many types:

1. consonant passing tone: two steps in the same direction to outline a third.
2. substitution: leap a fourth, then step in the opposite direction.
3. skipped passing tone: a third and a step in the same direction to outline a fourth.
4. interval subdivision: two leaps in the same direction to divide a larger melodic interval, for example, with two thirds to make a fifth.
5. change of register: a large, consonant leap (perfect fifth, sixth, or octave) from strong beat to weak beat, followed by a step in the opposite direction.
6. delay of melodic progression: leap a third, then step in the opposite direction.
7. consonant neighbor tone: step in one direction, then step back to the original tone.

In second-species counterpoint, the counterpoint line moves in half notes against a cantus firmus in whole notes. This 2:1 rhythmic ratio leads to two new “fundamental musical problems”—one metric and one harmonic: the differentiation between strong beats and weak beats, and the introduction of the passing-tone dissonance. The introduction of harmonic dissonance into second species adds to the variety of the musical texture. However, it brings a tension that must be balanced with consonance to promote tonal fusion, and it requires careful attention in order to maintain smoothness in and out of the dissonance.

Here are the complete examples of second-species counterpoint from Part I of *Gradus ad Parnassum*, annotated (as before) with the interval that the counterpoint line makes with the cantus firmus. For the complete examples from *Gradus ad Parnassum* as exercises, solutions, and annotations, see [Gradus ad Parnassum Exercises](#).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=3768>

Example 1. All second-species exercises from *Gradus ad Parnassum*.

The Counterpoint Line

As in first species, the counterpoint line should be singable and have a good shape, with a single climax and primarily stepwise motion (with some small leaps and an occasional large leap for variety). However, because a first-species counterpoint had so few notes, in order to maintain smoothness in other aspects of the exercise, the melody frequently employed small leaps. In second species, the increase in notes and the added freedom involving the use of dissonance makes it easier to move by step without causing other musical problems. Thus, a second-species counterpoint is even more dominated by stepwise motion than in first species. If the counterpoint must leap, take advantage of the metrical arrangement to diminish the attention drawn to the leap: leap from strong beat to weak beat (within the bar) rather than from weak beat to strong beat (across the bar line) when possible. Also, because there are more notes in a second-species line, there should usually be one or two secondary climaxes—notes lower than the overall climax that serve as “local” climaxes for portions of the line. This will help the integrity of the line by ensuring that it has a coherent shape and does not simply wander around.

Beginning and Ending

Beginning a second-species counterpoint

As in first species, begin a second-species counterpoint above the cantus firmus with *do* ($\hat{1}$) or *sol* ($\hat{5}$). Begin a second-species counterpoint below the cantus firmus with *do* ($\hat{1}$).

A second-species line can begin with two half notes in the first bar, or a half rest followed by a half note.

Beginning with a half rest establishes the rhythmic profile more readily, making it easier for the listener to parse, so it is often preferable. It is also easier to compose. Regardless of rhythm, the first pitch in the counterpoint should follow the intervallic rules above.

Ending a second-species counterpoint

As in first species, you should end with a *clausula vera*: the final pitch of the counterpoint should be *do* ($\hat{1}$); the penultimate note of the counterpoint should be *ti* ($\hat{7}$) if the cantus is *re* ($\hat{2}$), and *re* ($\hat{2}$) if the cantus is *ti* ($\hat{7}$).

The penultimate bar of the counterpoint can either be a whole note (making the last two bars identical to [first species](#)) or two half notes. This allows you to begin your *clausula vera* on either the strong beat or the weak beat of the penultimate measure.

Strong Beats

The inclusion of dissonance in a musical texture creates new musical problems that need to be addressed. Because the philosophy of species counterpoint is to present only a small number of new musical difficulties with each successive species, second-species counterpoint introduces dissonance in a very limited way.

Strong beats (downbeats) in second species are always consonant. As in first species, prefer imperfect consonances (thirds and sixths) to perfect consonances (fifths and octaves), and avoid unisons.

Because motion across bar lines (from weak beat to strong beat) involves the same kind of voice motion as first species (two voices moving simultaneously), follow the same principles as [first-species counterpoint](#). For instance, if a weak beat is a perfect fifth, the following downbeat cannot also be a perfect fifth.

Likewise, progressions from downbeat to downbeat must follow the principles of first-species counterpoint described in the previous chapter, such as:

- Do not begin two consecutive bars with the same perfect interval.
- Do not outline a dissonant melodic interval between consecutive downbeats. (Exception: if the counterpoint leaps an octave from the strong beat to the weak beat, the leap should be followed by step in the opposite direction, making a seventh with the preceding downbeat. This is okay, since it is the result of smooth voice motion.)

- Do not begin more than three bars in a row with the same imperfect consonance.

Hidden or direct fifths/octaves between successive downbeats are fine, as the effect is weak, and diminished by the intervening note in the counterpoint.

Weak Beats

Since harmonic dissonances can appear on weak beats, a mixture of consonant and dissonant intervals on weak beats is the best way to promote variety.

Unisons were problematic in first species because they diminished the independence of the lines. However, when they occur on the weak beats of second species and are the result of otherwise smooth voice leading, the rhythmic difference in the two lines is sufficient to maintain that independence. Thus, unisons are permitted on weak beats when necessary to make good counterpoint between the lines.

Any weak-beat dissonance must follow the pattern of the *dissonant passing tone*, explained [below](#). Also explained below are a number of standard patterns for [consonant weak beats](#). Chances are high that if your weak beats do not fit into one of the following patterns, there is a problem with the counterpoint, so use them as a guide both for composing the counterpoint and for evaluating it.

These principles should help guide your use of weak-beat notes in a second-species counterpoint line. A good general practice is to start with a downbeat note, then choose the following downbeat note, and finally choose a pattern below that will allow you to fill in the space between downbeats well.

Most of these principles are used as examples in the demonstration video at the bottom of the page.

Dissonant passing tones (weak beats only)

All dissonant weak beats in second species are dissonant passing tones, so called because the counterpoint line passes from one consonant downbeat to another consonant downbeat by stepwise motion. The melodic interval from downbeat to downbeat in the counterpoint will always be a third, and the passing tone will come in the middle in order to fill that third with passing motion.

Since all dissonances in second species are passing tones, you will not leap into or out of a dissonant tone, change directions on a dissonant tone, nor write a dissonance on a downbeat.

Consonant weak beats

Unlike dissonant weak beats (of which there is only one type), there are several types of consonant weak beats available (**Example 2**):¹

1. The terms used here are either standard or taken from Salzer & Schachter's Counterpoint in Composition.

- a. A consonant passing tone outlines a third from downbeat to downbeat, and it has the same pattern as the dissonant passing tone, except that all three tones (downbeat, passing tone, downbeat) are consonant with the cantus firmus. A consonant passing tone will always be a sixth or perfect fifth above/below the cantus.
- b. A substitution also outlines a third from downbeat to downbeat. However, instead of filling it in with stepwise motion, the counterpoint leaps a fourth and then steps in the opposite direction. It is called a substitution because it can substitute for a passing tone in a line that needs an extra leap or change of direction to provide variety. Like the consonant passing tone, all three notes in the counterpoint must be consonant with the cantus.
- c. A skipped passing tone outlines a fourth from downbeat to downbeat. The weak-beat note divides that fourth into a third and a step. Again, all three intervals (downbeat, skipped passing tone, downbeat) are consonant with the cantus.
- d. An interval subdivision outlines a fifth or sixth between successive downbeats. The large, consonant melodic interval between downbeats is divided into two smaller consonant leaps. A melodic fifth between downbeats would be divided into two thirds. A melodic sixth between downbeats would be divided into a third and a fourth, or a fourth and a third. Not only must all three melodic intervals be consonant (both note-to-note intervals and the downbeat-to-downbeat interval), but each

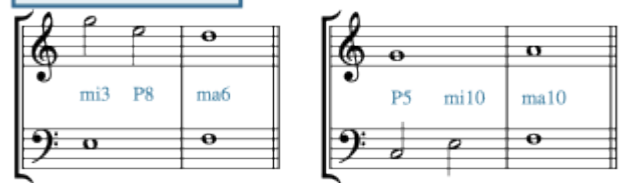
a. consonant passing tone



b. substitution



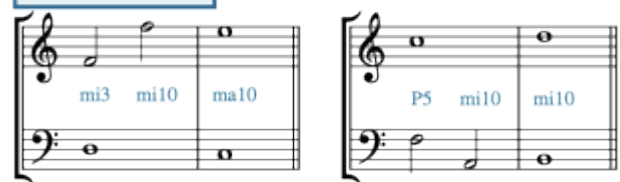
c. skipped passing tone



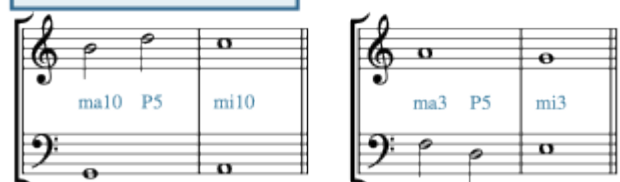
d. interval subdivision



e. change of register



f. delay of melodic progression



g. consonant neighbor tone



note in the counterpoint must be consonant with the cantus.

Example 2. *Examples of consonant weak beat types, above and below a cantus firmus.*

- e. A change of register occurs when a large, consonant leap (perfect fifth, sixth, or octave) from strong beat to weak beat is followed by a step in the opposite direction. It is used to achieve melodic variety after a long stretch of stepwise motion, to avoid parallels or other problems, or to get out of the way of the cantus to maintain independence. It should be used infrequently. And as always, each note must be consonant with the cantus.
- f. A delay of melodic progression outlines a step from downbeat to downbeat. It involves a leap of a third from strong beat to weak beat, followed by a step in the opposite direction into the following downbeat. It is called a “delay” because it is used to embellish what otherwise is a slower first-species progression (motion by step from downbeat to downbeat).
- g. A consonant neighbor tone occurs when the counterpoint moves by step from downbeat to weak beat, and then returns to the original pitch on the following downbeat. If the first downbeat makes a fifth with the cantus, the consonant neighbor will make a sixth, and vice versa.

Demonstration

Example 3 is a video by Kris Shaffer illustrating the process of composing a second-species counterpoint. This video provides new information about the compositional process, as well as concrete examples of the above rules and principles.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=3768#oembed-1>

Example 3. *Video lesson on composing a second-species counterpoint.*

Assignments

1. Second-Species Counterpoint A (.pdf, .mscx). Asks students to compose a second-species example

and do error detection.

2. Second-Species Counterpoint B ([.pdf](#), [.mscx](#)). Asks students to compose a second-species example and do error detection.
3. For the complete set of Fux exercises, see the [Gradus ad Parnassum](#) chapter.

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Footnotes

THIRD-SPECIES COUNTERPOINT

Kris Shaffer and Mark Gotham

KEY TAKEAWAYS

The third species of species counterpoint sees the counterpoint line move four times as fast as the cantus firmus. This introduces:

- a further metrical level (strong, weak, *medium*, weak)
- a neighbor tone and other new dissonance types so that the total includes:
 - The dissonant passing tone: fills in the space of a melodic third via stepwise motion.
 - The dissonant neighbor tone: a step away from and back to the same consonant tone.
 - The double neighbor: both the higher and lower neighbour tones together (e.g., C–D–B–C or C–B–D–C).
 - The nota cambiata (changing tone) is special five-note figure that highly unusually includes a leap from a dissonance.

In third-species counterpoint, the counterpoint line moves in quarter notes against a cantus firmus in whole notes. This 4:1 rhythmic ratio creates a still greater differentiation between beats than in second species: strong beats (downbeats), moderately strong beats (the third quarter note of each bar), and weak beats (the second and fourth quarter notes of each bar). Third species also introduces the neighbor-tone dissonance and two related figures in which dissonances can participate in leaps.

Example 1 provides the examples of third-species counterpoint from Part I of *Gradus ad Parnassum*, annotated (as before) with the interval that the counterpoint line makes with the cantus firmus. For the complete examples from *Gradus ad Parnassum* as exercises, solutions, and annotations, see [Gradus ad Parnassum Exercises](#).



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Example 1. All third-species exercises from *Gradus ad Parnassum*.

The Counterpoint Line

As in first and second species, the counterpoint line should be singable and have a good shape, with a single climax that does not coincide with the climax of the cantus firmus, and primarily stepwise motion (with some small leaps and an occasional large leap for variety). Like second species, a third-species counterpoint should be dominated by stepwise motion, more so than in first species, because there are fewer sticky situations that would require a leap. If the counterpoint must leap, it is preferable to do so within the bar rather than across the bar line. Also like second species, there should usually be one or two secondary climaxes—notes lower than the overall climax that serve as “local” climaxes for portions of the line.

Beginning and Ending

Beginning a third-species counterpoint

Begin a third-species counterpoint above the cantus firmus with *do* ($\hat{1}$) or *sol* ($\hat{5}$). Begin a third-species counterpoint below the cantus firmus with *do* ($\hat{1}$).

A third-species line can begin with four quarter notes in the first bar, or a quarter rest followed by three quarter notes. Regardless of rhythm, the first pitch in the counterpoint should follow the intervallic rules above.

Ending a third-species counterpoint

As in other species, end with a clausula vera. The final pitch of the counterpoint must always be *do* ($\hat{1}$), and it must be a whole note.

The penultimate note of the counterpoint (the last quarter note of the penultimate bar) should be *ti* ($\hat{7}$) if the cantus is *re* ($\hat{2}$), and *re* ($\hat{2}$) if the cantus is *ti* ($\hat{7}$).

Strong Beats

Principles for strong beats (downbeats) are generally the same as in second species:

- Strong beats are always consonant, and not unisons.
- Prefer imperfect consonances (thirds and sixths) to perfect consonances (fifths and octaves).

Motion across bar lines (from beat 4 to downbeat) follows the same rules as [first-species counterpoint](#).

Progressions from downbeat to downbeat follow principles of [second-species counterpoint](#) (except that direct fifths/octaves between successive downbeats *are* allowed). The following is a review of some of the most important principles from second species that apply in third species as well:

- No three consecutive bars can begin with the same perfect interval (two in a row are fine).
- No more than three bars in a row should begin with the same imperfect consonance.
- The pitches that begin consecutive downbeats must not make a dissonant melodic interval.

If a downbeat contains a perfect fifth, neither beat 3 nor 4 of the previous bar can be a fifth. If a downbeat contains an octave, neither beat 2, 3, nor 4 of the previous bar can be an octave. Like in second species, the negative effects of parallel fifths and octaves are not mitigated by the addition of a note or two.

Other Beats

Beats 2–4 should exhibit a mixture of consonant and dissonant intervals to promote variety. Among consonances, unisons are permitted on weak beats when necessary to make good counterpoint between the lines. Any dissonance must follow the pattern of the dissonant passing tone or the dissonant neighbor tone, explained below.

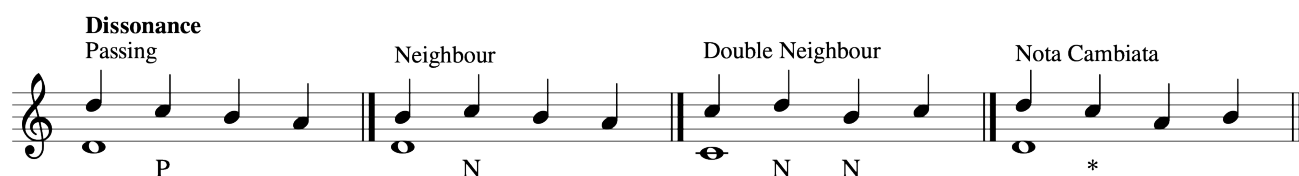
Consonance

The counterpoint can move in and out of consonant tones freely by step, as well as by leap from another consonance, with the following considerations:

- All melodic leaps, of course, must be melodic consonances.
- A large leap should be followed by a step in the opposite direction.
- Motion from the fourth beat into the following downbeat should follow the constraints above for motion into strong beats.

Dissonance

Dissonances in third species can occur on beat 2, 3, or 4, and should be preceded and followed by stepwise motion (with the exception of the double neighbor and the *nota cambiata*, explained below). This promotes smoothness, both by keeping the dissonances away from the strongest beat of the bar and by coupling them with the smoothest melodic motion. Dissonance handling in third-species counterpoint centered on the types illustrated in **Example 2** and described below:



Example 2. *Third-species dissonance types.*

- The dissonant passing tone fills in the space of a melodic third via stepwise motion. The notes before and after the passing tone must be consonant with the cantus firmus. However, it is possible to have two dissonant passing tones in a row (P4–d5 or d5–P4). As long as these dissonances do not fall on downbeats and the counterpoint moves in stepwise motion in a single direction, there is no negative effect.
- The dissonant neighbor tone ornaments a consonant tone by stepping away and stepping back to the original consonance (6–7–6 over the cantus, for example). It is melodically identical to the consonant neighbor tone of second species, with the difference being the harmonic dissonance. Employing it on a weak beat (2 or 4) ensures the greatest smoothness.
- The double neighbor occurs when beats 1 and 4 in the counterpoint are the same tone, and beats 2 and 3 include the notes a step higher and a step lower than the original tone: for example, C–D–B–C or C–B–D–C. Both beats 2 and 3 are dissonant, but since both are embellishing the original tone by step, the leap between them does not significantly diminish the smoothness of the line. When using a double neighbor, the direction between beats 3 and 4 should be the same as between beat 4 and the following downbeat. That motion across the bar line should also be stepwise. This further maintains smoothness to temper the effect of the dissonances.
- The *nota cambiata* (changing tone) is a five-note figure that outlines a step progression from

downbeat to downbeat. It follows one of two patterns shown in **Example 3**). For a *nota cambiata* to be effective, the first, third, and fifth notes must be consonant with the cantus. The second note will be dissonant and will leap to the third tone. However, like the double neighbor, the overall pattern minimizes the negative effect of the leap away from the dissonance. It is surrounded by stepwise motion, the overall progression is a single step, and the dissonant tone and the following downbeat are the same pitch.



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Example 3. Two forms of *nota cambiata*. From downbeat to downbeat, the *nota cambiata* may fill in (a) a step down or (b) a step up.

Assignments

1. Third-Species Counterpoint A (.pdf, .mscx). Asks students to compose a third-species example and do error detection.
2. Third-Species Counterpoint B (.pdf, .mscx). Asks students to compose a third-species example and do error detection.
3. For the complete set of Fux exercises, see the [Gradus ad Parnassum](#) chapter.

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FOURTH-SPECIES COUNTERPOINT

Kris Shaffer and Mark Gotham

KEY TAKEAWAYS

The fourth species of species counterpoint is characterized by use of the suspension and its proper handling with:

- “consonant preparation”: a consonance interval before the suspension;
- “dissonant suspension”: one part stay while the other part moves to create a dissonant interval;
- “consonant resolution”: the part that stayed before now moves to resolve the dissonance to a consonance.

In fourth-species counterpoint, the counterpoint line and cantus firmus both move once per bar, but they are rhythmically offset from each other by a half note. (Think syncopation on the bar level.) The counterpoint line will be notated in half notes, with each weak-beat half note tied across the bar line to the following strong beat. This arrangement means that in pure fourth-species counterpoint, the two lines always move in oblique motion. It also introduces a new kind of dissonance: the suspension.

Example 1 provides the complete examples of fourth-species counterpoint from Part I of *Gradus ad Parnassum*, annotated (as before) with the interval that the counterpoint line makes with the cantus firmus. For the complete examples from *Gradus ad Parnassum* as exercises, solutions, and annotations, see [Gradus ad Parnassum Exercises](#).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=3777>

Example 1. All fourth-species exercises from *Gradus ad Parnassum*.

The Suspension

The suspension is an accented dissonance, meaning it always occurs on strong beats. Because of the increased emphasis, even greater care must be taken to promote smoothness and overall coherence. Thus, like the passing-tone and neighbor-tone dissonances, the suspension is always preceded and followed by harmonic consonances. A suspension figure has three parts:

- *Preparation*: a weak-beat note in the counterpoint that is consonant with the cantus. This note is tied to the suspension, and the two are the same pitch.
- *Suspension*: a strong-beat note in the counterpoint, tied from the preparation, that is dissonant with the cantus.
- *Resolution*: a weak-beat note in the counterpoint that is one step below the preparation-suspension pitch and consonant with the cantus.

Use dissonant suspensions as much as possible in fourth-species counterpoint. The primary purpose of the exercise is to practice handling dissonant suspension.

Types of suspensions

Suspensions are categorized according to the intervals of the suspension and resolution tones above or below the cantus firmus (**Example 2**). A 7–6 suspension, for example, includes a strong-beat suspension that forms a *seventh* with the cantus, which resolves down by step to a weak-beat tone that forms a *sixth* with the cantus.

- Possible dissonant suspensions above the cantus firmus are 7–6, 4–3, and 9–8 (2–1). These are the only options that start on a dissonance and resolve down by step to an allowable consonance. 7–6 and 4–3 are preferable due to the resolution to imperfect consonances.
- The main dissonant suspension to use below the cantus firmus is 2–3.
- Other motions like 5–6 can be used, but they do not constitute dissonant suspensions, as the suspended note is not dissonant.

Suspensions

The image shows three musical examples of suspensions in fourth-species counterpoint. Each example consists of a cantus firmus line (bottom) and a counterpoint line (top).
 1. **7-6 (Above)**: The counterpoint has a whole note on G4 (seventh above C4) tied to a half note on F#4 (sixth above C4) on the next strong beat.
 2. **2-3 (Below, inversion of 7-6 above)**: The counterpoint has a whole note on D3 (second below C4) tied to a half note on E3 (third below C4) on the next strong beat.
 3. **4-3 (Above)**: The counterpoint has a whole note on E4 (fourth above C4) tied to a half note on D#4 (third above C4) on the next strong beat.

Example 2. Fourth-species suspension types.

Using suspensions

The pattern set forward by a fourth-species line invites listeners to interpret the weak beats as the main consonances, so treat suspensions in fourth species the same way you would treat their intervals of resolution in first species. Use 7–6 and 4–3 (above) or 2–3 and 5–6 (below) liberally, but no more than three times in a row (like thirds and sixths in [first species](#)). Since you cannot use two octaves or two fifths in a row in first species, do not use two 9–8, 6–5, or 4–5 suspensions in a row. In fact, avoid any configuration that would create two fifths or two octaves on consecutive weak beats in fourth species (after-beat fifths or octaves).

The Fourth-Species Counterpoint Line

Use dissonant suspensions whenever possible. This will create a line consisting mostly of downward stepwise motion, and it will also make it hard to direct motion toward a climax, but this is fine. Do not worry about the shape of the line as long as it is smooth and singable and the suspensions are properly prepared and resolved. (It is difficult to create a fourth-species counterpoint with the same shape as a *cantus firmus*, and the main goal of fourth species is the treatment of the suspensions, so we focus on that over melodic shape.)

If a dissonant suspension is not possible, try to use a tie from weak beat to strong beat. This can be a “consonant suspension,” or you can leap up from downbeat consonance to weak-beat consonance. At least one or two upward leaps will be necessary to counteract the downward resolutions in order to keep the line in a singable range.

If neither a dissonant suspension nor a consonant tied figure is possible, it is permissible to break species (see video demo below). When you break species, follow the principles of second-species counterpoint and resume fourth-species ties as soon as possible. Try not to break species more than once per exercise, and do so for just a bar or two.

Beginning and Ending

Beginning a fourth-species counterpoint

Begin a fourth-species counterpoint above the *cantus firmus* with *do* ($\hat{1}$) or *sol* ($\hat{5}$). Begin a fourth-species counterpoint below the *cantus firmus* with *do* ($\hat{1}$).

Always begin with a half rest.

Ending a fourth-species counterpoint

There is only one option for ending fourth species. The cantus firmus *must* end with *re-do* ($\hat{2} - \hat{1}$). Do not use a cantus that ends with *ti-do* ($\hat{7} - \hat{1}$).

The counterpoint will end with a dissonant suspension. The penultimate bar will contain *do-ti* ($\hat{1} - \hat{7}$), and the final bar will contain a whole note *do* ($\hat{1}$). The *do-ti* ($\hat{1} - \hat{7}$) will form a 7–6 suspension above the *re* ($\hat{2}$) in the cantus, or a 2–3 suspension below the *re* ($\hat{2}$) in the cantus. As a dissonant suspension, that *do* ($\hat{1}$) will always be tied over from the previous bar.

Demonstration

Examples 3 and **4** are video lessons by Kris Shaffer illustrate the process of composing a fourth-species counterpoint above and below a cantus firmus. These videos provide new information about the compositional process, as well as concrete examples of the above rules and principles.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=3777#oembed-1>

Example 3. Composing fourth-species above a cantus firmus.



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Example 4. Composing fourth-species below a cantus firmus.

Assignments

1. For the complete set of Fux exercises, see the [Gradus ad Parnassum](#) chapter.

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FIFTH-SPECIES COUNTERPOINT

Kris Shaffer and Mark Gotham

KEY TAKEAWAYS

The fifth species of species counterpoint primarily involves combining the tricks we've learned so far along with a little decoration into something that starts to resemble real music! Specifically:

- Elements from all previous species combine such that the counterpoint line may include motion in whole notes (1st species), half notes (2nd), quarter notes (3rd), and suspensions (4th) in almost any combination and order.
- New to the 5th species are:
 - certain embellishments such as notes of anticipation which ...
 - may include 8th note motion for the first time (not seen in species 1–4).

In fifth-species counterpoint, we combine the tricks developed in species 1–4 with only a few additions. As such, the fifth species starts to resemble real music in a way that none of the previous species did, and the challenge is to balance not only types of consonance but also types of counterpoint.

Beginning and Ending

Once again, fifth-species counterpoint observes the now-familiar practice of handling of perfect consonances and reduced motion in the first and last measures. Begin with a perfect consonance and end with a *clausula vera*.

Embellishing Suspensions

While suspensions are a [fourth-species](#) consideration, in fifth-species counterpoint we add the option of decorating those suspensions with some common embellishments. **Example 1** illustrates the main types, set out on a single chain of 7-6 suspensions.



Example 1. A chain of suspensions with common embellishments.

Note that if you simplify the line by sustaining the first note of the measure for a half note, you get right back to unembellished fourth-species suspensions.

Eighth notes

Note too that the last of the suspension embellishments in **Example 1** introduces eighth-note motion for the first time. Fux introduces embellished suspensions and eighth-note motion “in between” fourth and fifth species. Apart from this “anticipation with turn” embellishment of a suspension, Fux also introduces the possibility of a pair of passing eighth notes. In all cases, these eighth notes come in pairs, and they occur on weak beats (filling the second or fourth quarter note of the measure).

Gradus ad Parnassum Examples

Example 2 gives the complete examples of fifth-species counterpoint from Part I of *Gradus ad Parnassum*, annotated (as before) with the interval that the counterpoint line makes with the cantus firmus. For the complete examples from *Gradus ad Parnassum* as exercises, solutions, and annotations, see [Gradus ad Parnassum Exercises](#).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=4448>

***Example 2.** All fifth-species exercises from *Gradus ad Parnassum*.*

Assignments

1. For the complete set of Fux exercises, see the [Gradus ad Parnassum](#) chapter.

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GRADUS AD PARNASSUM EXERCISES

Mark Gotham

The previous chapters have introduced species counterpoint and the iconic pedagogical treatise on cantus firmus composition, Johann Joseph Fux's *Gradus ad Parnassum* (1725). This page provides the full cantus firmus exercises of that treatise so you can try your hand at species counterpoint à la Fux.

Gradus ad Parnassum is in three sections:

1. **Two Voices** (46 exercises)
2. **Three Voices** (44 exercises)
3. **Four Voices** (32 exercises)

For each of these sections, we provide four files:

1. **Exercises:** all of the cantus firmus exercises with only the cantus firmus present and the other part(s) left blank for you to complete.
2. **Solutions:** all of Fux's solutions to those exercises—i.e., both the cantus firmus and the additional part(s) that Fux wrote as answers.
3. **Annotations:** Those solutions annotated with the interval that every note in each additional part forms with the cantus firmus part.
4. **Distinct:** Every distinct cantus firmus in all parts. All of the exercises are based on this format, so these simple files distill all possibilities: you can use this file to do any species exercise, on any cantus firmus, in any part arrangement.

Everything is provided in an editable format so teachers can adjust and combine exercises freely for their own classes' needs. Specifically, the files are provided in the following formats:

- .mxl: open these in any music notation package like MuseScore, Sibelius, or Finale
- .mscz: for MuseScore specifically, preserving all original formatting
- .pdf

View Online and/or Download

View these files on MuseScore.com (and download in multiple formats if you have an account):

- [The “Annotations” files on OMT’s MuseScore page](#)
- [All of the files on Four Score and More’s MuseScore page](#)

Click on the links to download any particular type. Please note that the .mxl files are hosted externally on <http://fourscoreandmore.org/species/>, so you will be redirected and may prefer to open in a new tab.

Part	Exercises	Solutions	Annotated	Distinct
I	.mxl , .mscz , .pdf	.mxl , .mscz , .pdf	.mxl , .mscz , .pdf	.mxl , .mscz , .pdf
II	.mxl , .mscz , .pdf	.mxl , .mscz , .pdf	.mxl , .mscz , .pdf	.mxl , .mscz , .pdf
III	.mxl , .mscz , .pdf	.mxl , .mscz , .pdf	.mxl , .mscz , .pdf	.mxl , .mscz , .pdf

Gradus ad Parnassum Data

Each exercise includes the following information:

- Figure number (in the modern Norton/Mann edition, 1965)
- Species type
- Modal final
- Cantus firmus part

For ease of reference, the following subsections and tables set out that information in full.

Finally, a note on clefs. These files use the clefs in the Norton/Mann edition (1965) for parts I and II. Part III keeps the same clefs throughout to be consistent both internally and with the modern choral score layout (treble, treble, treble 8vb, bass). Teachers may wish to choose their own clefs as part of adapting these files for class.

Part I (Two Voices)

Figure	Species	Mode (final)	Cantus firmus part
5	1	d	Lower
6	1	d	Upper
11	1	e	Lower
12	1	e	Upper
13	1	f	Lower
14	1	f	Upper
15	1	g	Lower
21	1	g	Upper
22	1	a	Lower
23	1	a	Upper
33	2	d	Lower
35	2	d	Upper
36	2	e	Lower
37	2	e	Upper
38	2	f	Lower
39	2	f	Upper
40	2	g	Lower
41	2	g	Upper
42	2	a	Lower
43	2	a	Upper
44	2	c	Lower
45	2	c	Upper
55	3	d	Lower
56	3	d	Upper
57	3	e	Lower
58	3	e	Upper
59	3	f	Lower
59	3	f	Upper
73	4	d	Lower
74	4	d	Upper

Figure	Species	Mode (final)	Cantus firmus part
75	4	e	Lower
76	4	e	Upper
77	4	f	Lower
78	4	f	Upper
82	5	d	Lower
83	5	d	Upper
84a	5	e	Lower
84b	5	e	Upper
85a	5	f	Lower
85b	5	f	Upper
86a	5	g	Lower
86b	5	g	Upper
87a	5	a	Lower
87a	5	a	Upper
88a	5	c	Lower
88b	5	c	Upper

Fux basically uses one cantus firmus for each modal final throughout. The note sequences are as follows, along with their usage counts (46 total) and the minor exceptions:

Modal final	Pitches	Number of times used, and exceptions
D	D ₄ –F ₄ –E ₄ –D ₄ –G ₄ –F ₄ –A ₄ –G ₄ –F ₄ –E ₄ –D ₄	10 counts
E	E ₄ –C ₄ –D ₄ –C ₄ –A ₃ –A ₄ –G ₄ –E ₄ –F ₄ –E ₄	10 counts
F	F ₃ –G ₃ –A ₃ –F ₃ –D ₃ –E ₃ –F ₃ –C ₄ –A ₃ –F ₃ –G ₃ –F ₃	10 counts including one at the octave above, (fig. 13: starting F ₄)
G	G ₃ –C ₄ –B ₃ –G ₃ –C ₄ –E ₄ –D ₄ –G ₄ –E ₄ –C ₄ –D ₄ –B ₃ –A ₃ –G ₃	6 counts
A	A ₃ –C ₄ –B ₃ –D ₄ –C ₄ –E ₄ –F ₄ –E ₄ –D ₄ –C ₄ –B ₃ –A ₃	6 counts including one lacking the first D (fig. 42: A ₃ –C ₄ –B ₃ –C ₄ –E ₄ ...)
C	C ₄ –E ₄ –F ₄ –G ₄ –E ₄ –A ₄ –G ₄ –E ₄ –F ₄ –E ₄ –D ₄ –C ₄	2 counts; the most anomalous case
C	C ₄ –D ₄ –F ₄ –E ₄ –G ₄ –E ₄ –F ₄ –E ₄ –D ₄ –C ₄	2 counts; more divergent than for the other modes

Part II (Three Voices)

Figure	Species	Mode (final)	Cantus firmus part
101	1	d	1
104	1	d	2
105	1	d	3
106	1	e	1
108	1	e	2
109	1	e	3
110	1	f	1
111	1	f	2
112	1	f	3
113	1	g	1
114	1	g	2
115	1	a	1
116	1	a	2
117	1	a	3
118	1	c	1
119	1	c	2
121	2	d	1
122	2	d	2
123	2	d	2
124	2	e	2
125	2	e	3
126	2	e	1
127	2	f	1
128	2	f	2
129	2	f	2
130	3	d	2
131	3	d	3
132	3	d	2
134	2, 3	d	3
141	4	d	2

Figure	Species	Mode (final)	Cantus firmus part
143	4	d	3
144	4	d	1
146	4	e	2
147	4	e	1
148	4	e	2
149	4	f	2
150	4	f	3
151	4	f	1
154	5	d	2
155	5	d	1
156	5	d	2
157	5	e	2
158	5	e	1
159	5	e	2

The table below summarizes the cantus firmi used in Part II:

Modal final	Pitches	Number of times used, and exceptions
D	D ₄ –F ₄ –E ₄ –D ₄ –G ₄ –F ₄ –A ₄ –G ₄ –F ₄ –E ₄ –D ₄	16 counts at two octaves (D ₃ and D ₄)
E	E ₄ –C ₄ –D ₄ –C ₄ –A ₃ –A ₄ –G ₄ –E ₄ –F ₄ –E ₄	12 counts at two octaves (E ₃ and E ₄)
F	F ₃ –G ₃ –A ₃ –F ₃ –D ₃ –E ₃ –F ₃ –C ₄ –A ₃ –F ₃ –G ₃ –F ₃	9 counts at two octaves (F ₃ and F ₄)
G	G ₃ –C ₄ –B ₃ –G ₃ –C ₄ –E ₄ –D ₄ –G ₄ –E ₄ –C ₄ –D ₄ –B ₃ –A ₃ –G ₃	2 counts
A	A ₃ –C ₄ –B ₃ –D ₄ –C ₄ –E ₄ –F ₄ –E ₄ –D ₄ –C ₄ –B ₃ –A ₃	3 counts at three octaves (A ₂ , A ₃ and A ₄)
C	C ₄ –E ₄ –F ₄ –G ₄ –E ₄ –A ₄ –G ₄ –E ₄ –F ₄ –E ₄ –D ₄ –C ₄	2 counts; corresponds to the first case for Part I

Part III (Four Voices)

Figure	Species	Mode (final)	Cantus firmus part
160	1	d	2
163	1	d	1
164	1	d	3
165	1	d	4
166	1	e	1
167	1	e	2
168	1	e	3
169	1	f	2
170	1	f	1
171	1	f	3
172	1	f	4
173	2	d	1
174	2	d	2
175	2	d	3
176	2	d	4
177	3	d	2
180	3	d	4
181	3	d	2
182	3	d	2
183	3	e	2
184	3	e	1
185	3	e	2
186	3	e	3
193	4	d	2
195	4	d	4
196	4	d	1
197	4	d	2
200	5	d	2
201	5	d	1
202	5	d	4

Figure	Species	Mode (final)	Cantus firmus part
203	5	d	2
204	2, 3, 4	d	4

The table below summarizes the cantus firmi used in Part III:

Modal final	Pitches	Number of times used, and exceptions
D	D ₄ –F ₄ –E ₄ –D ₄ –G ₄ –F ₄ –A ₄ –G ₄ –F ₄ –E ₄ –D ₄	21 counts at two octaves (D ₃ and D ₄)
E	E ₄ –C ₄ –D ₄ –C ₄ –A ₃ –A ₄ –G ₄ –E ₄ –F ₄ –E ₄	7 counts, one at E ₅ (fig. 184)
F	F ₃ –G ₃ –A ₃ –F ₃ –D ₃ –E ₃ –F ₃ –C ₄ –A ₃ –F ₃ –G ₃ –F ₃	4 counts at two octaves (F ₃ and F ₄)

Further Reading

- Fux, Johann Joseph. (1725) 1965. *Gradus ad Parnassum*. Translated and edited by Alfred Mann. New York: W. W. Norton.

16TH-CENTURY CONTRAPUNTAL STYLE

Mark Gotham

KEY TAKEAWAYS

- The 16th-century contrapuntal style is related—but not identical—to the principles outlined in species counterpoint.
- This chapter sets out some key principles and practice exercises especially for imitation.

The 16th-century contrapuntal style has historically enjoyed a prominent position in the teaching of music theory. “Pastiche” or “counterfactual” composition of 16th-century imitative choral polyphony (especially in the style of Palestrina) has frequently appeared in curricula and is sometimes conflated with the later, 18th-century notion of species counterpoint which we met in the previous chapters. This chapter sets out some rules of thumb to bear in mind when completing style-composition exercises based on this repertoire where you are given a partial score to complete. At the end, you’ll find a couple of example exercises in this format.

Imitation

Imitation involves two or more parts entering separately with the same melody, or versions of the same melody. This is a common practice in 16th-century contrapuntal music, particularly for beginning whole movements and large sections in those movements (with the introduction of a new line of text, for instance). You might think of it as a precursor to the later fugue (which we’ll return to in the [High Baroque Fugal Exposition](#) chapter).

Here is an example from Vicente Lusitano’s “Ave spes nostra” from the *Liber primus epigramatum* ([click here for the source on IMSLP](#)).¹



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=915>

Ave Spes Nostra by openmusictheory

In this opening passage, a “point of imitation” setting the text “Ave spes nostra” appears in all five voices. The imitation is exact, give or take small changes. The first voice to enter starts on F and descends to C, then it repeats the text a second time, now starting on C and descending to F with a similar melody, adding one more note at the end. Other parts imitate either this pattern (F–C then C–F) or this pair the other way round (C–F, then F–C).

The end of this example sees the start of a second imitative point setting the next line “Dei genitrix ...”. This new figure has a “turn”-like shape: original note, note above, note below, original note (C-D-Bb-C). What follows is a section based on that second point. As is common in this style, the two phrases overlap (i.e., the new phrase begins before the end of the previous one) and the imitation for this second point is treated more freely than the first. You can even see a couple of subtle rhythmic changes to the first point in this last bar shown where this overlap takes place.

When completing an exercise involving imitation, let the existing material be your guide and consider the following guidelines:

- Identify (potential) points of imitation: In any given part, look for changes of text (often preceded by a comma or rest), and particularly any repetition of text with the same music.
- Pitch interval: The interval between imitative parts at the start of a section or movement is usually a perfect consonance. That said, others are eminently possible, especially later in the movement. Note that we are talking about the primary corresponding interval between the parts and not necessarily the very first pitch. We sometimes see examples of the tonal answer typical of the later high Baroque fugue, discussed in [the next chapter](#).
- Meter: Imitate at metrically comparable positions (strong beat → strong beat; weak beat → weak

1. IMSLP has this numbered simply as No. “10”, but if consulting the source, note that the parts are numbered as follows in book order: Supranus 24 (“XXIII”, name and numbering sic), Altus 26 (“XXVI”), Tenor 25 (XXV), Bassus 23 (XXIII, sic even though the source index page says 22), and Quinta Pars 25 (XXV), remaining parts not applicable. The transcription is in modern notation, but preserves original pitch and note values.

beat).

- When working out what imitative relationships will work, try out all options in both directions. As the section governed by one imitative point often overlaps with the next, imitative entries around that section change may come from other point.
- Make sure there is meaningful overlap between consecutively entering imitative parts. To achieve that, shorter points of imitation may require correspondingly shorter intervals between entering parts.
- Consider how much of the point to imitate. Longer melodies eventually go from being a point to imitate exactly, to free counterpoint. Where does that change occur in this case?
- Consider how closely to imitate the point. Try to preserve at least the rhythm and the distinctive intervals/contour/shape of the point's opening.
- Remember that phrases and sections can overlap, even at strong cadences.

Melody

- Contrary motion predominates between parts (partly to maintain independence of lines). Avoid too much parallel writing even of permitted intervals (but note the exceptional case of the “fauxbourdon,” which is an extended passage of parallel $\frac{6}{3}$ triads).
- Conjunct motion predominates within parts.
 - Approach the final by step (in most parts).
 - Raise the leading note when approaching the final from below (in most modal contexts, though not Phrygian).
- Melodic intervals:
 - Seconds, thirds, fourths, fifths, and octaves are all permitted;
 - The status of sixths is more complex. Rising minor sixths are used fairly freely (814 times in the Palestrina masses), rising major sixths are rarer (54 times), and descending sixths are extremely rare (7 descending minor, 1 single case of descending major).
 - Sevenths and tritones are avoided. Do not even outline these intervals with successive leaps or by the boundaries (high and low points) of a melodic gesture.
 - Successive leaps in the same direction are generally avoided. If you do have such successive leaps, then position the larger leap lower (first when rising, second when descending).
 - Large leaps are to be followed (and often preceded) by motion in the opposite direction. This is connected to both the idea of gap-fill and regression to the middle of the tessitura.
 - Avoid outlining triads as if you were arpeggiating chords.
- Contour: The arch shape is common for melodies (what goes up must come down!).
- Range per part: A common recommendation is to place each voice within an octave, corresponding

to either the authentic or plagal ranges of the piece's mode. But in practice, parts more often span a slightly wider range of 14 semitones. Extremely few parts exceed the twelfth (octave plus fifth), so take that as a maximum.

- Common melodic devices:
 - Suspensions: Suspended notes are to be “prepared” as a consonance on a weak metrical tied to a dissonance (on a strong position) and resolved by moving the suspended dissonant part down a step. For 7–6 and 4–3 suspensions, this involves dissonance in the upper voice; for 2–3 suspension, the dissonance is in the lower voice (as an inversion of 7–6). This is explained further in the chapter on [fourth-species counterpoint](#).
 - While not a suspension, the oblique motion from fifth to sixth is also common.
 - Decorations at the end of a phrase are more common than at the beginning.

Rhythm and Meter

- The original notation for this repertoire lacks bar lines, but metrical thinking is abundantly clear. While modern editions will usually put bar lines in explicitly, remember that these are editorial interventions, not original. Editors may also change the tactus-level note values to be shorter than what was originally notated (from half to quarter notes, for instance). With those caveats borne in mind, the editorial intervention can be helpful—barlines are helpful for rehearsal and for conducting, and some performers may feel more comfortable reading in shorter note values. Editorial choices may also offer subtler hints, such as the use of “longer” meters ($\frac{2}{2}$ in place of $\frac{4}{4}$) to hint at the possibility of thinking in terms of longer beat, and thus the possibility of longer dissonances, for instance.
- Melodic lines frequently start (and often end) with slower rhythmic movement.
- Half-tactus (quarter-note) movement should begin on weak metrical positions—on an unaccented beat (2 or 4), or between beats (as part of a dotted rhythm).
- Ties connect long notes to shorter ones (not vice versa).
- In the (relatively rare) cases of triple meter, rhythms generally divide into 2+1 rather than 1+2 (as in many styles).

Text Setting

- Clarity of music and text was held in high regard by many composers of this time.²
- Meter: The above caveats notwithstanding, match textual and musical meters by placing strong syllables on “strong beats.” Systematic exceptions follow the conventions outlined above including

syncopations, suspensions, and “metrical dissonance” (use of a consistent meter in one part that is contrary to that prevailing in other parts (usually the one notated in modern editions)).

- Musical phrases follow the text.
 - Typically use at least one beat (half note) for each syllable.
 - Exceptions include dotted rhythms, where the shorter (quarter) note frequently receives its own syllable. This may be thought of as a modification of a “straight” rhythm, which meets the “one per beat” guideline.
 - Syllable changes immediately after sub-tactus (quarter-note) motion are rare.

Texture

- The appropriate texture is usually clear from the given parts in these exercises.
- To generalize rather crudely, broad conventions for textures in Mass settings are as follows (where I = usually imitative; H = may be [more] homophonic):
 - Kyrie (I).
 - Gloria (H). The “qui tollis” frequently exists as a separate section.
 - Credo (H). Especially often homophonic at important moments. “Crucifixus” separable.
 - Sanctus (I). Hosanna (H).
 - Benedictus (I). Often for fewer voices. (Second Hosanna usually a repeat of the first.)
 - Agnus Dei (I). There may be a second or third Agnus, often with more parts and canons.
- The Magnificat tends to be a freer genre that is more flexible with the points of imitations.

Harmony

Composers of this era did not think in terms of chords, Roman numerals, inversions, and so on the way that we typically do today. Instead, they were principally concerned with intervallic relationships among parts. With this in mind, following are some guidelines for the vertical combination of parts in this style.

- Parallel fifths and parallel octaves: Avoid, as in later idioms. However, unlike in later idioms, those involving diminished fifths must also be avoided.
- Direct fifths or octaves:
 - Avoid in principle (some rationalize this on the basis that they imply parallels that would

2. This is said to be especially true of Palestrina, and further said to have appeased the Council of Trent in its review of recent developments in music.

present if the intervening passing notes were added).

- More common at cadences and/or when mitigated by strong contrary motion in one or more other parts.
- Diminished triad:
 - Used not infrequently in Palestrina's music, mostly in first inversion.
 - Useful especially as a solution for cadences in multi-part music with $\hat{2} - \hat{1}$ motion in the bass, for instance.
 - Resolve according to standard voice-leading: *re-do, ti-do, fa-mi* ($\hat{2} - \hat{1}$, $\hat{7} - \hat{8}$, $\hat{4} - \hat{3}$).
- Dissonance: types and treatment:
 - Suspensions: preparation (weak beat) – suspension (strong) – resolution (weak).
 - “Inessential” dissonances: passing tones, neighbor tones at the sub-tactus (quarter-note) level.
 - Nota cambiata, “changed note”: generally *do-ti-sol-la* ($\hat{8} - \hat{7} - \hat{5} - \hat{6}$). The only case of a dissonance left by leap.
- Final chord: Bare fifth or major triad (picardy third).
 - The raised (“Picardy”) third “originated c. 1500 when for the first time, the third was admitted in the final chord of a piece ... in the second half of the sixteenth century this practice became fairly common” (Apel 1969, 677).
 - By Palestrina, major triads are the most common kind of final chord (accounting for around 85% of cases in the Palestrina masses).

Further Reading

- Apel, Willi. “Picardy Third.” 1969. *Harvard Dictionary of Music*. 2nd ed. Cambridge, MA: Harvard University Press.

Online Resources

In addition to well-known libraries like [IMSLP](#), there are some interesting projects dedicated specifically to Renaissance music.

- Perhaps most notable and relevant is [Citations: The Renaissance Imitation Mass Project \(CRIM\)](#), where you can explore a wide range of relevant repertoire in attractive, modern editions, along with related information.

- For a similar curatorial approach to a slightly earlier repertoire, you may wish to explore the [Josquin Research Project \(JRP\)](#)

Assignments

1. Imitative writing in the 16th-century contrapuntal style. These exercises provide at least one complete part for reference, and one part with missing passages to complete in a suitable style. Original note values are used, with modern time signatures for those values ($\frac{4}{2}$), some editorial accidentals (ficta), and only G and F clefs.
 - Lassus: Benedictus from the *Missa Venatorum*. 2 voices. [.mscz](#), [.pdf](#)
 - Lassus: Bicinum IV. 2 voices. [.mscz](#), [.pdf](#)
 - Palestrina: Benedictus from the *Missa Brevis*. 3 voices. [.mscz](#), [.pdf](#)
 - Palestrina: *Surge Propera a 4* (excerpt). 4 voices. [.mscz](#), [.pdf](#)

Footnotes

HIGH BAROQUE FUGAL EXPOSITION

Mark Gotham

KEY TAKEAWAYS

- The fugue is a contrapuntal genre popular since at least the 18th century.
- This chapter sets out some key principles of the opening exposition section.
- We introduce new terms including these (click on the term for the glossary entry):
 - Subject
 - Answer
 - Countersubject
 - Exposition
- We also meet some fugue-specific variants of familiar terms, notably:
 - Voices
 - SATB

We now move on from imitative practices common in the 16th century to the fugue, which may be thought of as the 18th-century equivalent and successor to this tradition. Fugues can vary quite a bit, and thus “fugue” is a surprisingly difficult term to define satisfactorily. Fugues in general are contrapuntal compositions that are defined by the strict use of a certain number of independent voices; each voice enters one by one, stating the main theme (subject) of the fugue. In this chapter, we will treat fugue as a process and show how to construct (the first part of) a fugue from first principles. This chapter deals with the basics of writing a fugal exposition from a given subject according to the “high Baroque” technique of Bach, Handel, and their contemporaries.

Basic Definitions

First, let’s define some of the terms we’ll need.

- **Subject:** A short tune that forms the melodic basis of a fugue, recurring throughout.
- **Answer:** A transposition of the subject that is also sometimes slightly altered, as discussed below.
- **Countersubject:** A melodic line that is sounded with (and complements) the subject/answer.
- **Exposition:** The first part of a fugue, during which each of the voices enters with the subject or answer. Note that this is distinct from the use of the term “exposition” in sonata form; they both refer to a first section setting out the main material, but they otherwise differ.
- **Voices:** The separate contrapuntal lines, which may be either instrumental or vocal. The number of voices does not necessarily correspond to the number of parts or musicians involved—a keyboard fugue for one player may have three, four, five, or six voices, and there are even some fugues for solo violin (which is quite a compositional feat!).
- **SATB:** Although a fugue may not involve any singers, it is customary to refer to the lines in a four-voice texture with S (soprano), A (alto), T (tenor), and B (bass) from highest to lowest. The ranges do not need to match those of the vocal parts exactly.

Structure / Voice Entries

Basically, the fugal exposition works as shown in **Example 1**: one voice begins with the subject, then the next voices enters with the answer while the first continues with a countersubject, and so on.

Voice 1	Subject	Countersubject	Free counterpoint
Voice 2		Answer	Countersubject
Voice 3			Subject

***Example 1.** Hypothetical structure of voice entries at the beginning of a fugue.*

Note that the voices are numbered according to the order in which they enter. While it is perfectly common for the voices to enter in order from highest to lowest or lowest to highest, this is not strictly necessary. However, when a new part enters, it should be the highest or lowest voice at that stage, so it is uncommon for an inner part (alto or tenor) to enter last. That leaves us plenty of options. For instance, the order of voice entries in a four-voice fugue could be:

- In register order from highest to lowest (SATB), or vice versa (BTAS)

- Starting in the middle with the alto: ASTB, ATSB, ATBS
- Starting in the middle with the tenor: TBAS, TABS, TASB

Any further subjects/answers entering (beyond the total number of voices) are described as “redundant” entries.

Subject

When considering how to handle a subject, look at its structure and character.

The structure of a subject can often be thought of in three parts. Like many tonal phrases, the subject charts a course from a distinctive opening to a generic cadence:

- *Kopfmotiv* (literally “head motive”): an opening gesture
- *Fortspinnung*: prolongation that may include sequence and/or motor rhythm
- Cadence

Types of character include:

- Toccata style: this has a motor-rhythm feel, is often chromatic, and may have irregular rhythmic placement.
- Ricercar: deriving from the plainsong/motet tradition, this is slow moving, has an antiquated feel, and makes extensive use of suspensions.

Answer

We distinguish between two types of answer: real for an exact transposition, and tonal for one that has been altered further.

A real answer simply transposes the original subject by perfect fifth/fourth. All generic intervallic relationships remain the same between the notes.

We need a tonal answer if the subject:

- starts on *sol* ($\hat{5}$) or otherwise uses it prominently at the outset. In this case, we must adjust the transposed version such that *sol* ($\hat{5}$) is not transposed up to *re* ($\hat{2}$), but instead to *do* ($\hat{1}$).
- includes any other V–I suggestion at start. Prominent dominant note in subject becomes tonic note in

answer, so $T \rightarrow D$ progressions often become $D \rightarrow T$ and vice versa.

- modulates. In this case, split the subject into two phrases, one in each key, and adapt accordingly. If the subject modulates at its end to the dominant, the answer must modulate back to the tonic.

In all cases, we seek to make minimal adjustment such that the subject and answer are still as alike as possible, and both make melodic sense.

Countersubject

Try working up a skeletal version of your countersubject first before fully fleshing it out. It's frustrating to dash off a lovely tune and then realize that it doesn't fit. Additionally, sketch the version that will go with the answer at the same time as the version that goes with the subject. It's just as frustrating to write a countersubject that works beautifully with the subject but which the answer makes harmonically nonsensical.

Indeed, countersubjects are melodies, but they only work if they make sense harmonically as well. To that effect, remember that your countersubject will first appear in a two-voice passage, so consider how best to outline clear larger harmonies (triads and sevenths) with only two voices.

You may wish to set yourself the additional constraint of a countersubject which is invertible at the octave—basically, one that can appear above or below the subject and still work. In this case, again work on both versions as you go, and specifically make sure to:

- Avoid fifths, because fifths invert to fourths, which have special rules in two-voice writing. Stick to unisons (/ octaves), thirds (/ sixths), and in the case of seventh chords, also seconds (/ sevenths). The fifth is not a problem in the free part, so “reserve” that note as the completion of the chord and use it there.
- Similarly, avoid 4–3 suspensions, because the first note is not dissonant when inverted (5–6). Instead, use 7–6 and 2–3 suspensions (which invert to each other).

To create your skeletal countersubject, first look for skeletal patterns in the subject. Find the simple, unembellished form of the subject and treat it as a kind of tonal cantus firmus against which to write your counterpoint (skeletal countersubject), which you can then embellish into a more interesting musical line.

When it comes to embellishing, try to:

- be true to the character of the subject when composing the countersubject
- establish complementary rhythmic motion such that one voice moves while the other is stationary

- make changes to the countersubject when moving between subjects and answers only and exactly where those changes appear in the subject/answer

Free Counterpoint

Frankly, the idea of “free” counterpoint is a bit of a misnomer, especially if you’re writing an invertible countersubject, because the subject and countersubject will leave your options highly constrained. This part is “free” in the sense that it doesn’t necessarily recur later on, so you might like to think of it as a *freer* part, relative to the even less free subject and countersubject! Alternatively, you can embrace the extreme order and replace the free counterpoint with a second regular countersubject that does recur later.

Links

Your fugal exposition may include short interpolations between the subject/answer entries. We call these links. Links frequently make use of a motive from the subject, for instance with sequential repetition of a short fragment. They may appear between any or all voice entries and may be of varying lengths.

There are many musical motivations for including one or more links. Links provide an opportunity to:

- Change harmony: The end of one subject/answer and the beginning of the next may not match up harmonically. In that case, you can use the link to get where you need to be.
- Change register: If you have a continually descending line, for instance, links can be a useful way of resetting the register so you don’t go outside the instrument’s range.
- Vary the phrase lengths: If you have a subject of exactly two measures and just proceed through several voices entering successively, then you may well want to use a link to make the hypermetrical and phrase groupings a little more interesting. That said, the voices should always enter on metrically comparable positions: for example, if your subject comes in on a pickup, all the subject/answer entries should do the same, at least in the exposition.
- Dovetail entries: Apart from varying the phrase lengths, we can also vary the melodic context in which a voice enters. For instance, if a link develops the Kopfmotiv sequentially, then you can bring in the next subject/answer in seamlessly, as it begins with that motive.

General Matters

Apart from the specific considerations of the fugue, naturally much of the general practice of writing (tonal) music applies here. Remember in particular to:

- Control rhythmic flow: If and when continuous use of a given metrical level has built up (e.g., quarter/eighth/sixteenth notes), consider carefully whether and when it is appropriate to discontinue that motion.
- Graduate the relative strength of [cadences](#), for instance by controlling the scale degrees in the top and bottom voices.
- Write idiomatically for the instrument/s. Remember to observe practical limitations of hand span, instrument range, and the like.

Example

For an example of all of this in action, let's consider **Example 2**: the C minor fugue from Book I of Bach's Well-Tempered Clavier (BWV 847).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=919>

Example 2. *Exposition of the Fugue in C minor (BWV 847) by Johann Sebastian Bach.*

Note that:

- The exposition runs from from measures 1–8 (the extract here includes the start of the following “episode”).
- All the subject and answer entries are highlighted with blue noteheads.
- There are two regular countersubjects (annotated as CS1 and CS2).
- The answer is tonal.
- The link between entries 2 and 3 (mm. 5–6) and the episode following the last voice to enter (starting in m. 9) are built on sequential handling of a motive from the subject, as indicated with brackets.

Online Resources

Head to dezrann.net for a full version of this Bach fugue, complete with on-score annotations and an aligned audio recording of a real performance. You can even choose between using this friendly version in modern notation with the fugal voices on separate staves, or following along with Bach's manuscript.

Assignments

1. In the Bach C minor fugue shown above, the answer is “tonal.” Given what has been said about tonal answers in this chapter, try explaining how the subject and answer differ, and why.
2. Pick another fugue, identify how many “voices” there are, and locate each voice's entry and the end of the exposition.
3. Try writing your own answers and countersubjects. The template file below provides the subjects for all 48 fugues in both books of the Well-Tempered Clavier. An empty second staff is provided for your practice. (Note that the last note in many of the fugue subjects is given without a stem to indicate the pitch without specifying the duration rhythm.) If you know some of these fugues well, you may want to work on ones you're less familiar with.
4. Once you are feeling confident with writing answers and countersubjects, try writing up a full exposition. Again, you may wish to work on fugues you're less familiar with.

For 3 and 4, you may wish to compare your solutions to Bach's. Note that Bach's solutions are not the only possible ones, so don't expect to come up with exactly the same music. Note too that not every fugue has a regular invertible countersubject. Here are direct downloads in [.mscz](#) and [.pdf](#) formats.

GROUND BASS

Mark Gotham

KEY TAKEAWAYS

Ground bass compositions have a bass line that repeats continually throughout.

This chapter focussed on the use of grounds in baroque context (like trio sonatas) where variety is created through textural and harmonic change in parts above the bass line, notably with:

- re-harmonisation of the bass, often to suggest local tonicizations of other keys;
- lively imitation and interplay between the upper parts.

Ground bass compositions are based on a bass line that repeats throughout the piece, usually exactly, or nearly so. Many musicians have found this a compelling compositional constraint for keeping themselves ... well ... grounded!

How many musicians are we talking about? Well, this practice was highly popular in the Baroque (Purcell was a particularly keen and expert protagonist), it is even more common in popular songs of recent years (see [Harmonic Schemas in Pop Music](#)), and there are more than a few examples from in between. In short, it is an extremely and enduringly popular form.

It's easy to confuse "ground bass" with some other terms; going from broad to specific, the key terms to distinguish are:

- Ostinato: any pattern that repeats throughout a long section or whole work in one voice, like the motto side drum rhythm of Ravel's *Boléro*.
- Ground bass: a specific type of ostinato in which a bass line repeats throughout a work or section. The work itself can also be called a ground bass.

- Chaconne and Passacaglia (and international variant spellings such as “Chacony”): sub-genres of the Baroque ground bass. Among their other characteristics, both of these two are in triple meter. Every Chaconne or Passacaglia is also a ground bass, and every ground bass is also an ostinato, but the reverse is *not* true: not every ostinato is a ground bass, and not every ground bass is a Chaconne or Passacaglia.

This chapter provides some files and instructions to help you explore some of the ways to create effective ground bass compositions. We focus on the Baroque model, and on creating variety through re-harmonizing the same bass in different ways and varying the texture.

Multiple Harmonizations of a Given Bass

Continually using the same repeating bass line throughout could get tedious, and is especially liable to make the harmony extremely static. To that effect, inventive composers find ways to re-harmonize the same bass line to move to other keys, or at least hint at such a move. This often relies on seeing the different ways in which a single interval in the bass could be reinterpreted.

While this might not seem like much to work with, [this bass harmonization “cheat sheet” \(PDF\)](#) shows that there are many ways to re-harmonize bass intervals. It is organized by bass interval: both ascending and descending forms of each interval from minor seconds to tritones. Note that this is supposed to help you work out your options—you definitely don’t need to use all of these! We’ll see below how Purcell uses just a few of these to create harmonic variety in a very long work that’s almost entirely in G minor. We’ll be especially interested in moments where Purcell avoids the main perfect cadence at the start/end of each iteration of the ground, joining two grounds together with a subtler seam and thereby varying not only the harmony but also the phrase rhythm of the piece.

Analysis: Purcell’s Sonata in G Minor (Z 807)

To explore some of the options here, let’s take a look at Purcell’s Sonata in G Minor (Z 807). We’ll look at how Purcell uses (extensive) imitation and (occasional) tonicization. All of these matters are also included on the score as text annotations at the relevant moment ([Example 1](#)).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=1031>

Harmony

Harmonically, the piece is resolutely in G minor almost throughout, though Purcell tonicizes several keys along the way. The full list of tonicizations is (arguably):

- Dmi in measure 17
- F in measure 27
- B $\flat$ in measure 28
- Cmi in measure 33
- E $\flat$ in measure 78
- F in measure 87
- E $\flat$ in measure 88
- Cmi in measure 93
- Dmi in measure 107
- F in measure 117
- Cmi in measure 131 (beat 3) and in measure 133
- E $\flat$ in measure 158
- E $\flat$ in measure 163

Notice especially how Purcell finesses that boundary between the start and end of a ground iteration by avoiding yet another perfect cadence in G minor. For instance, see m. 16 and m. 106 for uses of G major as part of $V_2^4/v-v^6$, broadly reversing tonic and dominant function, and likewise m. 26 and m. 86 for G diminished as $vii^{06}-I$ in F major. These special cases are marked on the score.

As a wider matter, notice how extensively Purcell uses 5–6 steps in the melodic parts and how this creates ambiguity in the harmony, as in m. 1 and m. 12. Is the 5 or the 6 harmonic, or perhaps both? Is this consistent, or does it change? This all makes it harder to pin down exactly what the harmony is and where it changes, adding ever further layers of interest to the score. It also helps set up the sequences of 7–6 suspensions such as from m. 71.

Imitation

Imitation is prevalent throughout. The melodic imitations are labeled “D” and “C” on the score. This is short for *dux* (leader) and *comes* (follower). For instance, the violin 1 part starts a melodic line in measure 1 (beat 1), which is imitated by the violin 2 entering in measure 3 (beat 1).

Notice how often these imitations start in the same part of the bar. This is consistent with what we discussed in the context of [16th-century](#) and [18th-century](#) imitative traditions. Entering on equivalent beats leads to temporal gaps between entries of three or six beats (beat gaps on the table). Then again, note how Purcell occasionally uses closer imitation in measures 36, 41, 56, 63, 71, 133, 171, 178, 181, and 182.

As the score shows, there is a great deal of imitation in this piece; almost every iteration of the ground is accompanied by a new imitative relationship in the upper parts (the exceptions are given in the second table below). Perhaps the two most special and interesting cases are:

1. the double imitation starting in m. 196 and imitated with parts swapped in m. 201
2. the imitation of the ground itself in the violin 2 part at m. 99/102

Rhythm and Meter

Finally, note how Purcell continually varies the rhythmic values (metrical levels) involved, using a wide range of options. This includes introducing continuous eighth notes (m. 36), sixteenth notes (m. 81 and m. 146), syncopation (m. 126), dotted rhythms (m. 136), and for one passage near the end, changing the notated meter to compound time (mm. 166–185). This is a common device in Baroque ground bass (and other variations-style works of the time); again, these changes usually (but not always) coincide with the start of a new iteration of the ground.

Online Resources

Click on the following links for:

- [the above Purcell score hosted on OMT's MuseScore page](#)
- [a more thoroughly annotated version of this Purcell score on FourScoreAndMore's MuseScore page](#)

Here are some additional files you may find useful in two types:

1. **Annotate scores:** Baroque ground bass compositions with analytical annotations including an attempt at full Roman numeral analysis, despite the contrapuntal nature of many of these works. The Purcell above is an example of this.
2. **Template scores:** this same ground bass scores, with the bass on its own and the upper parts blank so you can compose your own completion of the rest (see the Assignments below).

In all of these templates and annotated scores, there is exactly one iteration of the ground per system so you can compare equivalent moments directly (vertically). Below is the full list with links for direct downloads from [Four Score and More](#). You can also view this [wider set of templates and annotations files on Four Score and More's MuseScore.com page](#).

	Annotate scores	Template Score
Bach Crucifixus B Minor mass BWV232	.mscz , .mxl	.mscz , .mxl
Corelli La Folia		.mscz , .mxl
Purcell Chacony in G Minor Z730	Highlights .mscz / .mxl ; Full .mscz / .mxl	.mscz , .mxl
Purcell Here the deities approve		.mscz , .mxl
Purcell Sonata in G Minor Z807 (the example on this page)	.mscz , .mxl	.mscz , .mxl

Assignments

These template scores allow you to try your hand at composing music based on some of the repertoire's great ground basses.

Take a template and try to compose your own ground bass composition, following these steps:

1. A simple, predominantly diatonic harmonization of the ground, with simple block chords, making sure to follow good voice-leading practice. Use this as a prototype.
2. A set of alternative harmonizations including tonicizations of other keys and re-harmonizations of the first note in particular to vary the apparent phrase length (as discussed above in reference to the "cheat sheet").
3. Melodic parts that fit with the bass and create more interesting textures. Seek out ways of writing upper parts that can recur in another voice in imitation (and refer back to the Purcell analysis above for ideas!).

4. Finally, combine the best of your ideas into an overall piece that balances textural and harmonic interest and charts an overall trajectory. Why not try a piece with six iterations of the ground, of which the first and last are simple and alike?

GALANT SCHEMAS

Kris Shaffer and Mark Gotham

KEY TAKEAWAYS

- Schemas are basic musical patterns that composers and improvisers of the 18th century would learn and use as a simple basis for creating new music.
- There are many types of patterns, and they are typically associated with a particular place or function within the music, for instance as a way of beginning.

Schemas are “stock musical phrases” (Gjerdingen 2007, 6) that act as melodic, harmonic, and rhythmic/metric skeletons for creating new music in the Galant style. We can apply the term “schema” in three specific ways. First, a schema is a *prototype*—an idealized version of a common pattern. Second, a schema can be an *exemplar*—a single pattern that resembles the prototype. Third, a schema can be a *theory*—an explanation of a commonly occurring musical event. All of these ideas go into how we understand schemas. We understand an individual pattern (exemplar) as a version of an ideal general pattern (prototype), and that relationship helps us understand how that pattern is functioning within a particular passage of music (theory).

Schemas are often given names, sometimes based on descriptions from earlier theorists (the Monte, Fonte, and Ponte were described by Joseph Riepel, for example) or, at other times, named after theorists themselves (the Meyer is named after Leonard Meyer).

Schemas are defined both by what happens in the schema and by where it typically appears in a piece. The “what” part involves two or more “stages” (basically, events) and includes:

1. melodic features, shown by scale degrees, usually for both the top (melodic) and bottom (bass) voices;
2. harmonic features, shown with figured bass notation

- metric features, showing whether a stage occurs on a strong (“S”) or weak (“W”) beat of the bar

The “when” part basically distinguishes between schemas that are typically used to start a piece (“opening gambits”), as a “continuation,” or as a concluding “cadence.” This section introduces one of each type, and the [Galant Schemas – Summary](#) chapter sets out many more examples.

Opening Gambits Such as the Meyer

The Meyer is an example of an opening schema. It is four stages long: the first and last are tonic chords, and the two in the middle are not-tonics. Here’s a summary of what the melody, harmony, and meter do during this schema:

Stage	1	2	3	4
Meter	W	S	W	S
Melody	<i>do</i> 1̂	<i>ti</i> 7̂	<i>fa</i> 4̂	<i>mi</i> 3̂
Bass	<i>do</i> 1̂	<i>re</i> 2̂	<i>ti</i> 7̂	<i>do</i> 1̂
Figures	5 3	4 3	6 5	5 3
Roman numerals	I	V	V	I

We can break this schema down into two parts, a first, opening one that moves from I to V:

Stage	1	2
Meter	W	S
Melody	<i>do</i> 1̂	<i>ti</i> 7̂
Bass	<i>do</i> 1̂	<i>re</i> 2̂
Figures	5 3	4 3
Roman numerals	I	V

... and a closing part moving back from V to I:

Stage	1	2
Meter	W	S
Melody	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	$\frac{6}{5}$	$\frac{5}{3}$
Roman numerals	V	I

As the [Galant Schemas – Summary](#) chapter shows, there are many other schemas with a similar pattern to the Meyer, such as the Pastorella, the Jupiter, and the Aprile. In each of these cases, the schema starts with a tonic chord, moves away for two stages, and then returns to the tonic at the end. Like the Meyer, they are prototypes for the first phrase of an opening theme. As with the Meyer, the bass and harmonic structure are less fixed than the melody. The two central stages may articulate dominant harmony in all three schemas, and the second stage is also commonly accompanied by predominant harmony.

When each stage of a Meyer schema is given one measure of music, it is commonly found in the presentation or antecedent part of an opening theme. If those stages occur at the rate of two per measure, the Meyer may form a basic idea that would be followed by a closing gesture, such as the Prinner described below.

Closing Gestures Such as the Prinner

The Prinner is a typical response to an opening schema. It has four stages corresponding to four bass notes: *fa* – *mi/me* – *re* – *do* ($\hat{4}$ – $\hat{3}$ – $\hat{2}$ – $\hat{1}$). The Prinner's melody typically accompanies the bass in parallel tenths: *la/le* – *sol* – *fa* – *mi/me* ($\hat{6}$ – $\hat{5}$ – $\hat{4}$ – $\hat{3}$). Harmonically, the *fa* ($\hat{4}$) and *do* ($\hat{1}$) bass notes tend to take $\frac{5}{3}$ chords while the two middle bass notes, *mi/me* ($\hat{3}$) and *re* ($\hat{2}$), take $\frac{6}{3}$ chords. There is often a 7–6 suspension on the third stage:

Stage	1	2	3	4
Meter	S	W	S	W
Melody	<i>la/</i> <i>le</i> $\hat{6}$	<i>sol</i> $\hat{5}$	<i>fa</i> $\hat{4}$	<i>mi/</i> <i>me</i> $\hat{3}$
Bass	<i>fa</i> $\hat{4}$	<i>mi/</i> <i>me</i> $\hat{3}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$
Figures	5	6	7-6	I
Roman numerals	IV	I	vii	I

There are a few variants on the Prinmer, including one that modulates to the dominant by using a version of the Prinmer transposed up a fifth. In this version, the first stage of the Prinmer is still a $\frac{5}{3}$ chord and can also still be viewed as a subdominant (IV) chord, but now relative to the dominant key.

The Prinmer can also be used to modulate from the tonic to the dominant. This variant is called the Modulating Prinmer:

Stage	1	2	3	4
Meter	S	W	S	W
Melody	<i>mi</i> $\hat{3}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$
Bass	<i>do</i> $\hat{8}$	<i>ti</i> $\hat{7}$	<i>la</i> $\hat{6}$	<i>sol</i> $\hat{5}$
Figures	$\frac{5}{3}$	6	7- $\sharp 6$	$\frac{5}{3}$
RNs in the tonic key	I	V	vii/V	V
RNs in the dominant key	IV	I	vii	I

Other

Apart from schemas for opening and closing, others are typically used for “continuation” and “cadences,”

and we even have one common “post-cadential” type. The [Galant Schemas – Summary](#) chapter provides examples of the main types, along with information about further variants and details. Additionally, while abstract layouts like the tables above are best for setting out what these schemas are, it’s obviously also useful to check them out in musical notation. Here is a simple realization for exploring the schemas discussed in these chapters:



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=310>

[Partimenti Prototypes With Chords](#) by [FourScoreAndMore](#)

References

Gjerdingen, Robert O. 2007. *Music in the Galant Style*. Oxford University Press.

Online Resources

For all the musical notation files used in these schema chapters, head to:

- [This site on MuseScore.com](#) for copies of the scores playable online.
- [This site on fourscoreandmore.org](#) for direct download without login.

For much more on this topic, and especially on the historical sources, head to Gjerdingen’s own [partimenti.org](#).

Assignments

Learning schemas really calls for hands-on practice.

1. **Playing:** Begin by playing through these examples from the files provided, preferably in a range of

different keys. (Note: you can transpose scores in MuseScore with the Notes menu: Notes/Transpose).

2. **Memorization:** See if you can memorize some of these patterns. Test yourself by:
 - writing them out on paper (start with a blank scale)
 - playing them from memory
3. **Embellishment:** Schemas help to structure music, but they are not really musical pieces in themselves: it takes a lot of fleshing out to get from these skeletons to real music. That being the case, try improvising embellishments of these basic patterns. Start with simple turns, passing notes and the like, then move on to more ambitious changes.
4. **Full pieces:** When you're confident with individual cases, try piecing them together, according to their usual position and ordering. Start by using templates like these:
 - Template 1: [.pdf](#)
 - Template 2: [.mscz](#), [.mxl](#), [.pdf](#)

These templates each provide a combination of schemas which can be thought of as prototype pieces, both to illustrate how they work and as a template for scaffolding exercises in pastiche composition. Use these templates, but bury them beneath layers of musical character and embellishment. Here are some tips for getting started:

- **Rhythm:** Try picking a single characteristic rhythm to serve as the basis for your piece and use it often (but not exactly: see how many different ways you can adapt it).
- **Melody:** Introduce embellishments, decorating some stepwise motions with turns, for instance, and filling in some large leaps.
- **Accompaniment:** Use one or more characteristic patterns for chordal accompaniments, like the Alberti Bass.
- **Texture:** Particularly for longer pieces, vary the number of voices present and the way they relate.

GALANT SCHEMAS – SUMMARY

Mark Gotham

KEY TAKEAWAYS

There are many different schemas. This chapter provides an introductory overview of the main ones along with some (brief) discussion of variants and details.

We begin with an at-a-glance summary of some important schemas, then proceed to set out each of the schemas listed one by one.

Overall Short Summary

Musical notation

Here are files in musical notation with all the schemas listed on this page:

- With chordal realizations: [.mscz](#), [.mxl](#), [.pdf](#)
- Without chords (outer voices only): [.mscz](#), [.mxl](#), [.pdf](#)

These files provide a set of schemas, with the constituent parts set out as prototypically as is possible in musical notation: that is, with melody and figured bass lines, along with (in the first file's case) chords in a middle part realizing those figures. Musical notation is obviously useful, though really, schemas are prototypes that exist apart from any specific realization, so the more abstract representations in tables and the like are better in some ways. That's why you'll see them set out in this fashion here and in other literature on this topic.

Summarizing table

Name	When		
Romanesca	Opening	do-sol-do-do [latex]{\hat{1}-\hat{5}-\hat{1}-\hat{1}}[/latex]	do-ti-la-mi [latex]{\hat{1}-\hat{7}-\hat{6}}
Do-Re-Mi	Opening	do-re-mi [latex]{\hat{1}-\hat{2}-\hat{3}}[/latex]	do-ti-do [latex]{\hat{1}-\hat{7}-\hat{1}}
Sol-Fa-Mi	Opening	sol-fa-fa-mi [latex]{\hat{5}-\hat{4}-\hat{4}-\hat{3}}[/latex]	do-re-ti-do [latex]{\hat{1}-\hat{2}-\hat{7}}
Meyer	Opening	do-ti-fa-mi [latex]{\hat{1}-\hat{7}-\hat{4}-\hat{3}}[/latex]	do-re-ti-do [latex]{\hat{1}-\hat{2}-\hat{7}}
Aprile	Opening	do-ti-re-do [latex]{\hat{1}-\hat{7}-\hat{2}-\hat{1}}[/latex]	do-re-ti-do [latex]{\hat{1}-\hat{2}-\hat{7}}
Jupiter	Opening	do-re-fa-mi [latex]{\hat{1}-\hat{2}-\hat{4}-\hat{3}}[/latex]	do-ti-sol-do [latex]{\hat{1}-\hat{7}-\hat{5}}
Pastorella	Opening	mi-re-fa-mi [latex]{\hat{3}-\hat{2}-\hat{4}-\hat{3}}[/latex]	do-sol-sol-do [latex]{\hat{1}-\hat{5}-\hat{5}}
Prinner	Answer Process Transition	la-sol-fa-mi [latex]{\hat{6}-\hat{5}-\hat{4}-\hat{3}}[/latex]	fa-mi-re-do [latex]{\hat{4}-\hat{3}-\hat{2}}
Modulating Prinner	Answer Process Transition	mi-re-do-ti [latex]{\hat{3}-\hat{2}-\hat{1}-\hat{7}}[/latex]	do-ti-la-sol [latex]{\hat{8}-\hat{7}-\hat{6}}
Fonte	Answer Process Transition	sol-fa-fa-mi [latex]{\hat{5}-\hat{4}-\hat{4}-\hat{3}}[/latex]	di-re-ti-do [latex]{\uparrow\hat{1}-\hat{h}}
Monte	Answer Process Transition	do-te-la-re-do-ti [latex]{\hat{1}-\downarrow\hat{7}-\hat{6}-\hat{2}-\hat{1}-\hat{7}}[/latex]	mi-fa-fi-sol [latex]{\hat{3}-\hat{4}-\uparrow\hat{a}}
Ponte	Answer Process Transition	sol-ti-re [latex]{\hat{5}-\hat{7}-\hat{2}}[/latex]	sol [latex]{\hat{5}}[/latex]
Fenaroli	Pre-Cadential	fa-mi-ti-do [latex]{\hat{4}-\hat{3}-\hat{7}-\hat{1}}[/latex]	ti-do-re-mi [latex]{\hat{7}-\hat{1}-\hat{2}}
Indugio	Pre-Cadential	re-fa-la-do-ti [latex]{\hat{2}-\hat{4}-\hat{6}-\hat{1}-\hat{7}}[/latex]	fa-fa-fa-fi-sol [latex]{\hat{4}-\hat{4}-\hat{4}}
Deceptive Cadence	Pre-Cadential	do-re-re-do [latex]{\hat{1}-\hat{2}-\hat{2}-\hat{1}}[/latex]	mi-fa-sol-la [latex]{\hat{3}-\hat{4}-\hat{5}}
Evaded Cadence	Pre-Cadential	do-re-re-do [latex]{\hat{1}-\hat{2}-\hat{2}-\hat{1}}[/latex]	mi-fa-sol-sol-do [latex]{\hat{3}-\hat{4}-\hat{5}}
Passo Indietro	Pre-Cadential	ti-do [latex]{\hat{7}-\hat{1}}[/latex]	fa-mi [latex]{\hat{4}-\hat{3}}[/latex]

Name	When		
Comma	Pre-Cadential	$\textit{fa-mi}$ [latex]{\hat{4}\hat{3}}[/latex]	$\textit{ti-do}$ [latex]{\hat{7}\hat{1}}[/latex]
Converging Cadence	Pre-Cadential	$\textit{mi-re-do-ti}$ [latex]{\hat{3}\hat{2}\hat{1}\hat{7}}[/latex]	$\textit{mi-fa-fi-sol}$ [latex]{\hat{3}\hat{4}\text{upar}}
Cadenza Semplice	Cadence	$\textit{do-re-re-do}$ [latex]{\hat{1}\hat{2}\hat{2}\hat{1}}[/latex]	$\textit{mi-fa-sol-do}$ [latex]{\hat{3}\hat{4}\hat{5}}
Cadenza Composta	Cadence	$\textit{do-re-mi-re-do}$ [latex]{\hat{1}\hat{2}\hat{3}\hat{2}\hat{1}}[/latex]	$\textit{mi-fa-sol-sol-do}$ [latex]{\hat{3}\hat{4}\hat{5}}
Cadenza Doppia	Cadence	$\textit{fa-mi-re-do}$ [latex]{\hat{4}\hat{3}\hat{2}\hat{1}}[/latex]	$\textit{sol-do}$ [latex]{\hat{5}\hat{1}}[/latex]
Quiescenza	Post-Cadential	$\textit{te-la-ti-do}$ [latex]{\downarrow\hat{7}\hat{6}\hat{7}\hat{1}}[/latex]	$\textit{do}$ [latex]{\hat{1}}[/latex]

Itemized List

Opening Gambits

Romanesca

Stage	1	2	3	4
Meter	S	W	S	W
Melody	$\textit{do}$ $\hat{1}$	$\textit{sol}$ $\hat{5}$	$\textit{do}$ $\hat{1}$	$\textit{do}$ $\hat{1}$
Bass	$\textit{do}$ $\hat{1}$	$\textit{ti}$ $\hat{7}$	$\textit{la}$ $\hat{6}$	$\textit{mi}$ $\hat{3}$
Figures	5	6	5	6
Roman numerals	I	V	vi	I

Do-Re-Mi

Stage	1	2	3
Meter	S	W	S
Melody	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$	<i>mi</i> $\hat{3}$
Bass	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	5	6	5
Roman numerals	I	V	I

Many of the schemas involve two steps that can be considered schemas on their own. These often take the form of question-answer pairs.

Here, we have the Do-Re opening part as the opening question:

Stage	1	2
Meter	S	W
Melody	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$
Bass	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$
Figures	5	6
Roman numerals	I	V

That Do-Re is answered by the Re-Mi:

Stage	1	2
Meter	W	S
Melody	<i>re</i> $\hat{2}$	<i>mi</i> $\hat{3}$
Bass	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	6	5
Roman numerals	V	I

The Do–Re–Mi may also appear in a four-stage version by putting those constituent parts back together. This basically involves doubling up the central stage of the three-stage version.

Sol–Fa–Mi

Stage	1	2	3	4
Meter	W	S	W	S
Melody	<i>sol</i> $\hat{5}$	<i>fa</i> $\hat{4}$	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	5	5	6/5	5
Roman numerals	I	ii	V	I

Again, this comprises two parts.

Opening part (Sol–Fa):

Stage	1	2
Meter	W	S
Melody	<i>sol</i> $\hat{5}$	<i>fa</i> $\hat{4}$
Bass	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$
Figures	5	5
Roman numerals	I	ii

Answering part (Fa–Mi):

Stage	1	2
Meter	W	S
Melody	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	6	5
Roman numerals	V	I

This schema may also appear with the harmony slightly altered, as follows:

Stage	1	2	3	4
Meter	W	S	W	S
Melody	<i>sol</i> $\hat{5}$	<i>fa</i> $\hat{4}$	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	5	6	6/5	5
Roman numerals	I	vii	V	I

Meyer

Stage	1	2	3	4
Meter	W	S	W	S
Melody	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	5	6/ 4/3	6/5	5
Roman numerals	I	V	V	I

Opening part:

Stage	1	2
Meter	W	S
Melody	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$
Bass	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$
Figures	5	6,4,3
Roman numerals	I	V

Closing part:

Stage	1	2
Meter	W	S
Melody	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	6,5	5
Roman numerals	V	I

Aprile

Stage	1	2	3	4
Meter	S	W	S	W
Melody	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$
Bass	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	5	6,4,3	6,5	5
Roman numerals	I	V	V	I

Jupiter

Stage	1	2	3	4
Meter	S	W	S	W
Melody	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$	<i>sol</i> $\hat{5}$	<i>do</i> $\hat{1}$
Figures	5	6	5	5
Roman numerals	I	V	V	I

Pastorella

Stage	1	2	3	4
Meter	S	W	S	W
Melody	<i>mi</i> $\hat{3}$	<i>re</i> $\hat{2}$	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>do</i> $\hat{1}$	<i>sol</i> $\hat{5}$	<i>sol</i> $\hat{5}$	<i>do</i> $\hat{1}$
Figures	5	5	7	5
Roman numerals	I	V	V	I

Answer/Process/Transition

Prinner and Modulating Prinner

Stage	1	2	3	4
Meter	S	W	S	W
Melody	<i>la</i> $\hat{6}$	<i>sol</i> $\hat{5}$	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$
Figures	5	6	7-6	I
Roman numerals	IV	I	vii	I

A slight variant on this inserts a root-position dominant before the final stage:

Stage	1	2	3	4	5
Meter	S	W	S	W	S
Melody	<i>la</i> $\hat{6}$	<i>sol</i> $\hat{5}$	<i>fa</i> $\hat{4}$	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$	<i>re</i> $\hat{2}$	<i>sol</i> $\hat{5}$	<i>do</i> $\hat{1}$
Figures	5	6	7–6	7	5
Roman numerals	IV	I	vii	V	I

The Prinner can also be used to modulate from the tonic to the dominant. This variant is called the Modulating Prinner:

Stage	1	2	3	4
Meter	S	W	S	W
Melody	<i>mi</i> $\hat{3}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$
Bass	<i>do</i> $\hat{8}$	<i>ti</i> $\hat{7}$	<i>la</i> $\hat{6}$	<i>sol</i> $\hat{5}$
Figures	5	6	7- $\sharp$ 6	5
Roman numerals	I	V	vii/V	V

Again, this can come with an additional root-position dominant:

Stage	1	2	3	4	5
Meter	S	W	S	W	S
Melody	<i>mi</i> $\hat{3}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$
Bass	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$	<i>la</i> $\hat{6}$	<i>re</i> $\hat{2}$	<i>sol</i> $\hat{5}$
Figures	5	6	7- $\sharp$ 6	7/ $\sharp$	5
Roman numerals	I	V	vii/V	V/V	V

Fonte

Stage	1	2	3	4
Meter	W	S	W	S
Melody	<i>sol</i> $\hat{5}$	<i>fa</i> $\hat{4}$	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>di</i> $\uparrow \hat{1}$	<i>re</i> $\hat{2}$	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	6/5	5	6/5	5
Roman numerals	V/ii	ii	V	I

The Fonte has a strong relation to the Meyer and indeed to the cycle of fifths. This effectively tonicizes the A minor key (e.g., the supertonic minor) and then a major key a tone below (the overall tonic). The modular part is just one of those tonicizations:

Stage	1	2
Meter	W	S
Melody	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	6/5	5/3
Roman numerals	V	I

Monte

Stage	1	2	3	4
Meter	W	S	W	S
Melody	<i>do-te</i> $\hat{1} - \downarrow \hat{7}$	<i>la</i> $\hat{6}$	<i>re-do</i> $\hat{2} - \hat{1}$	<i>ti</i> $\hat{7}$
Bass	<i>mi</i> $\hat{3}$	<i>fa</i> $\hat{4}$	<i>fi</i> $\uparrow \hat{4}$	<i>sol</i> $\hat{5}$
Figures	6/5	5	6/5	5
Roman numerals	V/IV	V	V/V	V

Like the Fonte, the Monte also goes through two tonicizations with a sequential treatment of a modular half:

Stage	1	2
Meter	W	S
Melody	<i>sol-fa</i> $\hat{5} - \hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	6/5	5
Roman numerals	V	I

Ponte

Stage	1	2	3
Meter	S	W	S
Melody	<i>sol</i> $\hat{5}$	<i>ti</i> $\hat{7}$	<i>re</i> $\hat{2}$
Bass	<i>sol</i> $\hat{5}$	<i>sol</i> $\hat{5}$	<i>sol</i> $\hat{5}$
Figures	5	7	7
Roman numerals	V	V	V

Pre-Cadential / Incomplete Cadences

Fenaroli

Stage	1	2	3	4
Meter	S	W	S	W
Melody	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Bass	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$	<i>mi</i> $\hat{3}$
Figures	6/5	5	6/5	6
Roman numerals	V	I	V	I

Indugio

Stage	1	2	3	4	5
Meter	S	W	S	W	S
Melody	<i>re</i> $\hat{2}$	<i>fa</i> $\hat{4}$	<i>la</i> $\hat{6}$	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$
Bass	<i>fa</i> $\hat{4}$	<i>fa</i> $\hat{4}$	<i>fa</i> $\hat{4}$	<i>fi</i> $\uparrow \hat{4}$	<i>sol</i> $\hat{5}$
Figures	6/5	6/5	6/5	6/5	5
Roman numerals	IV	IV	IV	V/V	V

Deceptive Cadence

Stage	1	2	3	4
Meter	W	S	W	S
Melody	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$
Bass	<i>mi</i> $\hat{3}$	<i>fa</i> $\hat{4}$	<i>sol</i> $\hat{5}$	<i>la</i> $\hat{6}$
Figures	6	6/5	5	5
Roman numerals	I	ii	V	vi

Evaded Cadence

Stage	1	2	3	4
Meter	W	S	W	S
Melody	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$
Bass	<i>mi</i> $\hat{3}$	<i>fa</i> $\hat{4}$	<i>sol</i> $\hat{5}$	<i>mi</i> $\hat{3}$
Figures	6	6/5	5	6
Roman numerals	I	ii	V	I

Passo Indietro

Stage	1	2
Meter	S	W
Melody	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Bass	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Figures	6/ 4/2	6
Roman numerals	V	I

The Passo Indietro is essentially the first two stages of a Prinner. Literally a “stepping back,” the Passo Indietro often precedes a significant cadence.

Comma

Stage	1	2
Meter	W	S
Melody	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$
Bass	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Figures	6/5	5
Roman numerals	V	I

Converging Cadence

Stage	1	2	3	4
Meter	W	S	W	S
Melody	<i>mi</i> $\hat{3}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$	<i>ti</i> $\hat{7}$
Bass	<i>mi</i> $\hat{3}$	<i>fa</i> $\hat{4}$	<i>fi</i> $\uparrow \hat{4}$	<i>sol</i> $\hat{5}$
Figures	6	6/5	6/5	5
Roman numerals	I	ii	V/V	V

This cadence is also known as the *fa-fi-sol* half cadence after the definitive bass line: $\hat{4} - \uparrow \hat{4} - \hat{5}$. Note the correspondence between this schema and the Indugio.

Cadences and Post-Cadential

Cadenza Semplice

Stage	1	2	3	4
Meter	W	S	W	S
Melody	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$
Bass	<i>mi</i> $\hat{3}$	<i>fa</i> $\hat{4}$	<i>sol</i> $\hat{5}$	<i>do</i> $\hat{1}$
Figures	6	6/5	5	5
Roman numerals	I	ii	V	I

Cadenza Composta

Stage	1	2	3	4	5
Meter	W	S	S	W	S
Melody	<i>do</i> $\hat{1}$	<i>re</i> $\hat{2}$	<i>mi</i> $\hat{3}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$
Bass	<i>mi</i> $\hat{3}$	<i>fa</i> $\hat{4}$	<i>sol</i> $\hat{5}$	<i>sol</i> $\hat{5}$	<i>do</i> $\hat{1}$
Figures	6	6/5	6/4	7	5
Roman numerals	I	ii	Cad.	V	I

Cadenza Doppia

Stage	1	2	3	4	5
Meter	S	W	S	W	S
Melody	<i>fa</i> $\hat{4}$	<i>mi</i> $\hat{3}$	<i>re</i> $\hat{2}$	<i>re</i> $\hat{2}$	<i>do</i> $\hat{1}$
Bass	<i>sol</i> $\hat{5}$	<i>sol</i> $\hat{5}$	<i>sol</i> $\hat{5}$	<i>sol</i> $\hat{5}$	<i>do</i> $\hat{1}$
Figures	5	6/4	4	3	5
Roman numerals	V	V	V	V	I

Quiescenza

Stage	1	2	3	4
Meter	W	S	W	S
Melody	<i>te</i> ↓ $\hat{7}$	<i>la</i> $\hat{6}$	<i>ti</i> $\hat{7}$	<i>do</i> $\hat{1}$
Bass	<i>do</i> $\hat{1}$	<i>do</i> $\hat{1}$	<i>do</i> $\hat{1}$	<i>do</i> $\hat{1}$
Figures	$\flat 7$	6/4	$\frac{7}{4/2}$	5
Roman numerals	V/ IV	V	V	I

The Quiescenza is a post-cadential schema.

GALANT SCHEMAS – THE RULE OF THE OCTAVE AND HARMONIZING THE SCALE WITH SEQUENCES

Mark Gotham

KEY TAKEAWAYS

This chapter discusses harmonizations of the scale using the so-called “rule of the octave” and other sequential configurations. There are many files provided to view or download:

1. The Rule of the Octave

- Building the Rule, approaching the “Rule” by incrementally nuancing a succession of parallel $\frac{6}{3}$ s: [.mscz](#), [.mxl](#), [.pdf](#)
- Part by Part, taking a closer look at the component parts of the “Rule”: [.mscz](#), [.mxl](#), [.pdf](#)

2. Harmonizing the scale with sequences

- Open score (one voice per part): [.mscz](#), [.mxl](#), [.pdf](#)
- Short (piano) score: [.mscz](#), [.mxl](#), [.pdf](#)

The Rule of the Octave

The “Rule of the Octave” is an important part of the schema/partimento tradition. You might like to think of it as a kind of cheat sheet for harmonizing bass lines: there’s one chord for each scale degree, and you can go a long way by just matching up those bass notes with their corresponding chord.

There are many, subtly different versions of the Rule of the Octave harmonization. The version used here is closely based on that of Fedele Fenaroli (Naples, 1775), with just a couple of modifications to preserve

a consistent number of voices throughout (four voices, including the bass) and to avoid any suggestion of parallels.

Approaching the “Rule” from parallel $\frac{6}{3}$ s

File downloads: [.mscz](#), [.mxl](#), [.pdf](#)

Let’s begin by building up our version of the Rule of the Octave from simple principles, starting with parallel $\frac{6}{3}$ (first inversion) chords. You could also think of this as a matter of moving from a flat to a rich harmonic hierarchy, or else as a “Regolo recipe”: how to make or understand the rule in four easy steps.

1. We begin with a simple harmonization of the bass scale using parallel $\frac{6}{3}$ chords only. There’s nothing grammatically incorrect about this, but neither does it have much of a sense of hierarchy or variety. In short, it’s not very interesting.
2. Next we put in strategic $\frac{5}{3}$ s on the first and last chords to give a sense of closure on the tonic.
3. Then we also add a $\frac{5}{3}$ on the dominant chords of both ascending and descending forms to further nuance the hierarchy (these are important chords too).
4. Finally, we precede each of the tonic and dominant chords (including those in inversion) with seventh chords. In one case, this also involves a chromatic alteration for a stronger sense of tonicizing the dominant. Why do you think we might only make that change this one time, and not anywhere else in the progression?



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=858>

[Rule of the Octave from \$\frac{6}{3}\$](#) by [FourScoreAndMore](#)

Examining the Rule part by part

File downloads: [.mscz](#), [.mxl](#), [.pdf](#)

Having arrived at the Rule, this second file deconstructs it again so you can practice and engage with it in parts, with any number of voices, and in any position (i.e., any inversion of the right-hand harmonization).

Keep practicing each component part separately and in a range of keys to build fluency with and abstraction of the Rule. (Note: you can transpose scores in MuseScore with the Notes menu: Notes/Transpose.)

We begin by combining the bass scale with each of the three upper-voice parts in turn, centered respectively on the:

- tonic (first system of each page: ascending on p. 1; descending on p. 2)
- mediant (second system)
- dominant (third system)

These systems are annotated with the interval between the upper and lower parts.

We then combine those upper parts into three-note right-hand chords to generate the Rule.

Here the three versions (“positions” in Fenaroli’s language) are given by the inversion of the chord. Again, the top voice is centered successively on the:

- tonic (fourth system)
- mediant (fifth system)
- dominant (sixth system)



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[Rule of the Octave Part by Part](#) by [FourScoreAndMore](#)

Harmonizing the Scale with Sequences

File Downloads and online:

- Open score (one voice per part): [.mscz](#), [.mxl](#), [.pdf](#), [link to view the score online](#)
- Short (piano) score: [.mscz](#), [.mxl](#), [.pdf](#), [link to view the score online](#)

Note: The open and short-score versions of this material are otherwise identical, so these introductory comments apply equally to both.

As we've seen above, the Rule of the Octave can be thought of as in terms of a sequential harmonization of bass scales (parallel $\frac{6}{3}$ chords). This section looks at some other sequential harmonizations of the bass scale here. Basically, this involves patterns of one or more harmonies which repeat sequentially in the direction of the scale. Some of these work in the same way for both ascending and descending forms; others require some modification.

We begin just as we did before, with a simple harmonization of the scale using parallel $\frac{6}{3}$ chords only. The following systems proceed to patterns of:

5–6 patterns

- Ascending: In the ascending form, we alternate between the fifth and sixth above each note of the bass line scale.
- Descending: In the descending form, we could do the same note-by-note alternation as the ascending form, or else alternate between the fifth and sixth on separate notes (as in this file).

7–6 patterns: chains of suspensions

- Ascending: 7–6 suspensions involve a descending upper part, so in the ascending form of this pattern, we need to add in a leap up the octave to restart the pattern, so the repeating pattern is more like 7–6–8.
- Descending: Here the descending sequence matches the descending scale, so no modification is necessary. We essentially go back to the parallel $\frac{6}{3}$ chords we started with, and just delay or offset the top line.

Cycles of fifths

The cycle of fifths is based on a progression of root motion descending by fifths. Hiding in this pattern is another (usually descending) scalar progression between alternate bass notes. This arises because instead of literally going down two fifths, we usually go down a fifth and up a fourth, which is the equivalent progression, just keeping it in the same register / octave. At the end of one such “down a fifth, up a fourth,” we end up a step lower than where we started, and so we also have a stepwise progression

that can be scalar (if it is diatonic—i.e., not modulating).

We set this out in some of the main forms:

- Descending 1: with triads only
 - Descending 2: with sevenths and suspensions (cf. 7–6 descending)
 - Descending 3: “zigzag” circle-of-fifths (note the outer-voice canon)
- Finally, we set out one version of this in the ascending direction:
- Ascending 1: with 4–3 suspensions

2–3: more chains of suspensions

So far, we’ve used 7–6 and 4–3 suspensions, so that leaves us one more important type: the 2–3 suspension (which is the inversion of 7–6).

- Ascending: Just like the 7–6 suspensions above, for the ascending scale, we need to restart each pattern, so it ends up being 2–3–1 with the upper part, or 9–8–10 with the bass.
- Descending: Again, no restart is needed for the descending form. The 2–3 pattern sets up a series of $\frac{4}{2}$ to $\frac{6}{2}$ progressions like the important $V_2^4-I^6$ progression, except that we’ve kept it diatonic here (i.e., without tonicizing each key).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=858>

[Scale Sequences Short](#) by [FourScoreAndMore](#)

Assignments

The partimenti approach really calls for hands-on practice.

1. Begin by playing through these examples from the files provided, preferably in a range of different keys. (Note: As mentioned above, you can transpose scores in MuseScore with the Notes menu:

Notes/Transpose).

2. See if you can memorize the patterns. Test yourself by:
 - writing them out on paper (start with a blank scale)
 - playing them from memory
3. Both with the music and (when you're ready) from memory, try embellishing these basic patterns.

III. FORM

FORM CHAPTERS

- Foundational Concepts for Phrase-level Forms
- The Phrase, Archetypes, and Unique Forms
- Hybrid Phrase-level Forms
- Expansion and Contraction at the Phrase Level
- Binary Form
- Ternary Form
- Formal Sections in General
- Sonata Form
- Rondo

This section introduces students to the basics of form in Western classical music. It begins by examining phrase-level form, primarily using terms from William Caplin (1998), before moving to composition-level form.

Prerequisites

While this section assumes some familiarity with the topics covered in [Diatonic Harmony, Tonicization, and Modulation](#), it is not essential to have completed a thorough study of that section in order to use this section. It would be easy to mix study of phrase-level forms in section III with the diatonic portion of section IV. It may be best to leave composition-level form until after tonicization and modulation have been studied.

Organization

The first chapter introduces some [basic concepts necessary to study phrases](#), including formal hierarchy, motivic analysis, and the idea level.

The next chapter properly introduces [the phrase, periods and sentences](#). After that, [hybrid forms](#) are introduced, followed by [expansion and contraction](#). It is possible to skip hybrid forms and study only expansion and contraction.

The group of chapters on large-scale form begins with a framing chapter on [formal sections in general](#). This is followed by chapters on common forms such as [binary](#), [ternary](#), [sonata](#), and [rondo](#).

Further Reading

Caplin, William E. 1998. *Classical Form: A Theory of Formal Functions for the Instrumental Music of Haydn, Mozart, and Beethoven*. New York: Oxford University Press.

FOUNDATIONAL CONCEPTS FOR PHRASE-LEVEL FORMS

John Peterson

KEY TAKEAWAYS

This chapter describes the hierarchy of musical form, motives, and segmentation analysis.

- Musical form can be understood as a hierarchical grouping of units.
- The smallest of these groupings is a motive, which is a regularly recurring unit of music that's typically smaller than an idea. In an analysis, we circle and label motives that recur and are transformed across a work. Avoid identifying large melodies or portions of melodies as motives—motives are short!
- A segmentation analysis is a way to show the grouping units of a passage or whole piece. To do a segmentation analysis, we begin by identifying phrase endings, which are often marked by cadences. Then, we divide phrases into smaller units using square brackets above the score to show the idea level.

CHAPTER PLAYLIST

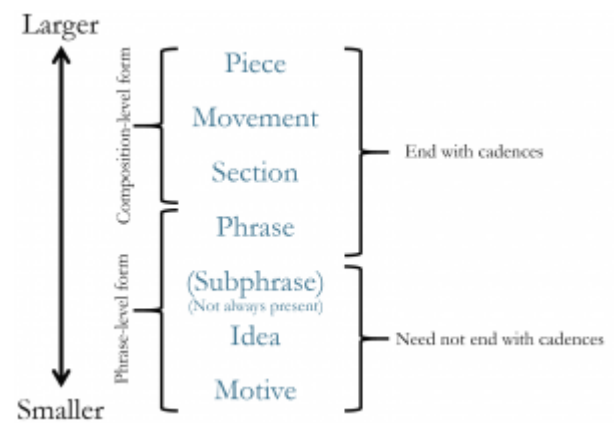
Hierarchy

One way to understand musical form is as a hierarchical grouping of units. **Example 1** shows that a piece contains movements, movements contain sections, sections contain themes, themes contain phrases, and so on.

Although the diagram in **Example 1** looks quite simple, the relationships between the levels are a little more complicated in reality. For instance, sometimes two levels are collapsed into one: a single phrase may comprise an entire section of a work, so it may not always be worthwhile to distinguish between each level.

It's best to think of **Example 1** as a guide and not as something that strictly defines formal levels.

This chapter, along with the three that follow it, are focused on phrase-level form, or the various ways in which a phrase may be constructed of motives, ideas, and sometimes subphrases (which will be discussed in [later chapters](#)).



Example 1. Hierarchy of form in classical music.

Motives

A motive is like a little snippet of a melody. It's a regularly recurring unit of music that's typically smaller than an idea (the focus of [the next section of this chapter](#)). Each video in **Examples 2–4** discusses a motive from a different work. They all contain the same basic information, so you might choose to watch the one that interests you the most, or you might watch all three.



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Example 2. Motivic analysis of [John Williams, “Journey to the Island” \(1:20–1:46\)](#) and [Main Theme from Jurassic Park \(0:48–1:06\)](#).



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Example 3. Motivic analysis: [Ludwig van Beethoven, Symphony 5, I \(0:00–0:27\)](#).



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Example 4. Motivic analysis: [Lin-Manuel Miranda, “Aaron Burr, Sir” from Hamilton \(0:12–0:16\)](#).

While a motive does not necessarily have to repeat, those that do are usually the most interesting ones to talk about, so we tend to focus on motives that recur throughout a passage.

There are many kinds of motives (e.g., rhythmic, pitch, contour, timbre), but the word “motive” by itself most often refers to a pitch-based motive. A motive that’s primarily recognizable from its rhythmic design, for example, would be spoken of as a “rhythmic motive.”

As a motive recurs throughout a work, it tends to change. Some common transformations are:

- Enlargement: making the durations of a motive longer than the original
- Contraction: making the durations of a motive shorter than the original
- Inversion: changing the direction of the motive (e.g., instead of going up, it goes down)
- Displacement: changing the metric position of the motive relative to its original statement
- Retrograde: stating the motive backward in comparison to the initial statement
- Intervallic manipulation: changing the size of the intervals that comprise the motive (e.g., mi2 becomes ma2)
- Embellishment: adding embellishing tones to the underlying basic shape of the motive

Often when people are first asked to identify motives in a work, they tend to choose something too large, like an entire theme, for instance. **Example 5** shows a common mistake in a motivic analysis of the opening of Ludwig van Beethoven’s Fifth Symphony: identifying a passage that is too long to be considered a motive. For a more useful approach, see the video in **Example 3**.

Example 5. *Beethoven, Symphony 5, I, mm. 1–13 (0:00–0:17).* The boxed measures indicate something that is too long to be considered a motive.

Practice It! 1: Motivic Analysis

This **Practice It!** will guide you through a motivic analysis of the opening of John Williams’s “Duel of the Fates.” To begin, [listen to the opening \(0:15–0:26\)](#), then start the quiz.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://viva.pressbooks.pub/openmusictheory/?p=1195#h5p-17>

The Idea Level, the Phrase, and Segmentation Analysis

A phrase is a relatively complete thought that exhibits trajectory toward a goal, arriving at a sense of closure. While phrases are examined in more detail in [the following chapter](#), here are two important points:

1. “Relatively complete” means that the phrase has a sense of beginning, middle, and end.
2. In much tonal music, closure is most often signaled by a cadence (though other ways of achieving closure will be examined in [the following chapter](#)). In performance, knowing that phrases end with closure can help us to shape passages with a sense of trajectory toward their goal.¹

When we analyze a phrase, we often begin with a segmentation analysis, which uses square brackets above the staff to identify the phrase’s component parts.

The smallest level of a segmentation analysis is called the idea level. (If needed, see [Example 1](#) for a reminder of where the idea level fits in the hierarchy of form.) Ideas are short grouping units that contain the motivic material for the work. They are often two measures long, but they may be longer or shorter. Ideas may group together to create subphrases or phrases, something that is discussed in more detail in [the next chapter](#).

To perform a segmentation analysis, do the following:

1. Identify potential points of closure.
 - Consider that phrases need a sense of beginning, middle, and end, so be careful that you’re not thinking too small to determine where a phrase ends.
 - In tonal music, very often cadences tell us where the ends of phrases are.
2. Divide each phrase into smaller units. (To identify these units, consider: if you were to coach someone to prepare this phrase, how would you divide it so they could practice it in smaller chunks?)
3. Use square brackets above the staff to indicate those small units.
4. Verify and label any cadences that are present.

The videos in [Examples 6](#) and [7](#) each demonstrate a segmentation analysis. They contain similar explanations, so you may watch both or choose the one that most interests you.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=1195#oembed-4>

1. Sometimes people confuse the terms "phrase" and "phrasing." Usually when people say "phrasing," they are referring to the way a passage might be shaped (where to push and pull time, where and how to change dynamic levels, etc.), and they may or may not be referring to an actual phrase (a complete thought that ends with a cadence).

Example 6. A segmentation analysis of Donizetti, “Me voglio fà ‘na casa” (0:00–0:43).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=1195#oembed-5>

Example 7. A segmentation analysis of Clara Schumann, Piano Trio Op. 17, I (0:00–0:32).

Assignments

1. Coming soon!

Media Attributions

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Not_a_Motive

Footnotes

THE PHRASE, ARCHETYPES, AND UNIQUE FORMS

John Peterson

KEY TAKEAWAYS

This chapter introduces the phrase, the sentence, the period, the repeated phrase, compound forms, and unique phrase-level forms.

- A phrase is a relatively complete thought that exhibits trajectory toward a goal. In tonal classical music, that goal is almost always one of the traditional cadence types, but in other kinds of music, that goal may be something else.
 - A sentence is a special kind of phrase that contains a presentation and a continuation.
- Sometimes phrases are combined to form larger forms. Two such combinations of phrases are:
 - The period: a phrase-level form consisting of an antecedent and a consequent.
 - The repeated phrase: two phrases where the second is a written-out repeat of the first.
- Sometimes two sentences are arranged in an antecedent-consequent relationship to create a compound period.
- Although the forms discussed in this chapter are all quite common, it's equally common for a composer to write a unique phrase-level form that isn't in dialogue with the ones discussed here.

CHAPTER PLAYLIST

The Phrase

A phrase is a relatively complete thought that exhibits trajectory toward a goal, arriving at a sense of closure. In tonal classical music, the goal of a phrase is almost always one of the kinds of cadences described in the [Introduction to Harmony, Cadences, and Phrase](#)



Example 1. A segmentation analysis of a phrase of common length in Schubert, "Du bist die Ruh" (0:21–0:32).



Example 2. A segmentation analysis of a phrase of unique length in Fanny Hensel, "Abendbild" (0:00–0:40).

[Endings chapter](#): perfect authentic cadences (PACs), imperfect authentic cadences (IACs), and half cadences (HCs).¹

A phrase can be any length, but phrases of 4, 8, or 16 measures are particularly common. **Example 1** shows a segmentation analysis for a phrase of 4 measures (a common length), while **Example 2** shows a segmentation analysis for a phrase of 13 measures (an unusual length).

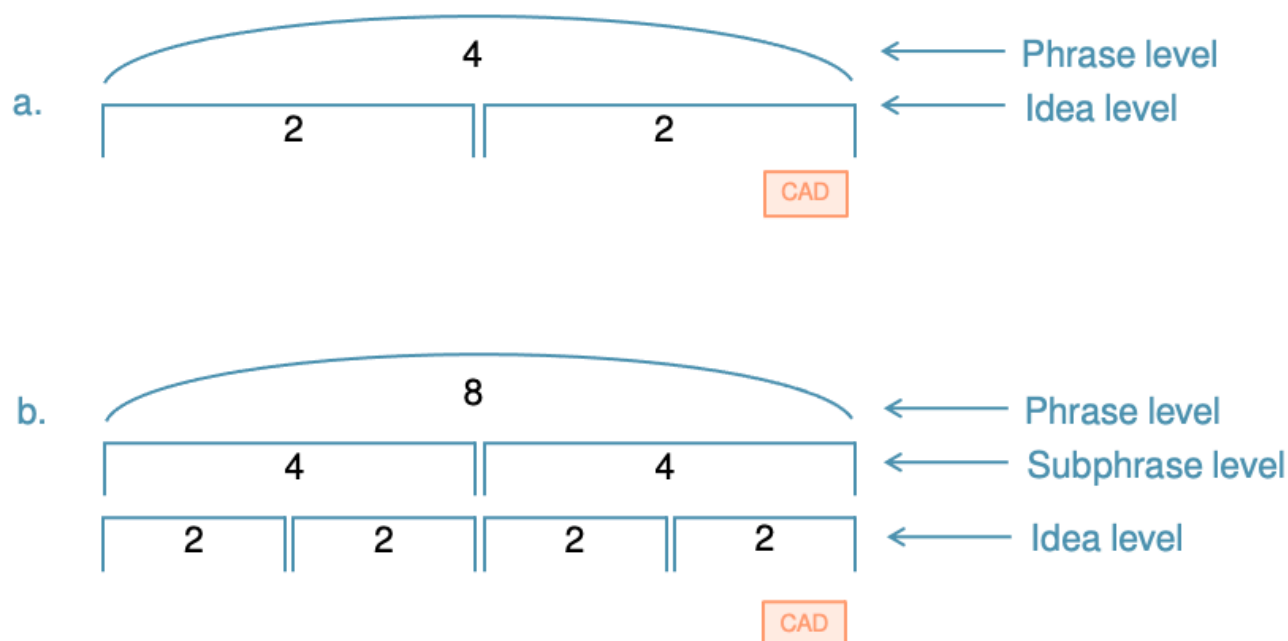
Phrases can comprise either ideas or both subphrases and ideas. The diagrams in **Example 3** depict both

1. In other kinds of music, such as post-tonal music or popular music, closure may be signaled by other kinds of devices.

of these scenarios.

When we diagram phrases, we follow two general principles:

1. Square brackets are used for ideas and subphrases (essentially anything that doesn't have to end with a cadence).
2. Arcs are used for anything at the phrase level or above (essentially anything that must end with a cadence).²



Example 3. A phrase divided into (a) ideas only, and (b) subphrases and ideas.

Because closure is so important for phrase identification, it's crucial to correctly identify cadences. Not every pause or V–I motion is a cadence! **Example 4** discusses a passage with multiple locations someone might mistakenly label as cadences.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://viva.pressbooks.pub/openmusictheory/?p=1811#h5p-6>

2. See the discussion of formal hierarchy in [Foundational Concepts for Phrase-Level Forms](#) for a reminder of what is above the phrase level.

Example 4. A passage with multiple locations someone might mistakenly label as cadences in Haydn's Piano Trio in F Major, Hob. XV:6, I (0:00–0:24).

Two Categories: Archetypes vs. Unique Forms

Below, we'll explore two main ways that phrase-level forms might be organized:

1. They might play with what we'll call an archetype. These are special ways of organizing phrases, and you'll read about two kinds: sentences and periods.
2. They might not relate to an archetype at all, in which case we'll say they're unique forms, meaning they are not organized as sentences or periods.

Note that this doesn't mean that archetypes are more common than unique forms. Phrase-level forms belonging to both categories appear frequently in common-practice music. Moreover, these categories might best be viewed as two ends of a spectrum (**Example 5**) in which a phrase-level form can be understood as “closer” to one category or the other without clearly belonging to either one.

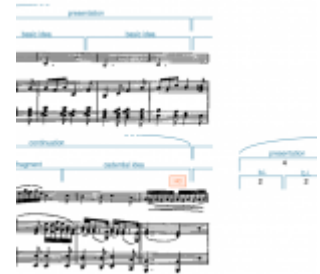


Example 5. A spectrum of phrase-level formal categories.

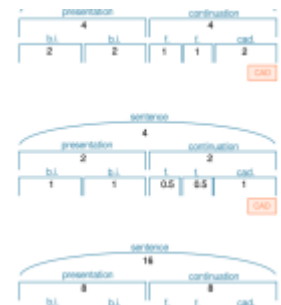
Archetype 1: The Sentence (A Special Kind of Phrase)

The Basics

Example 6 shows one common way to construct a phrase, called a sentence. A sentence consists of two subphrases: the presentation and the continuation. The presentation is often four measures long, and it consists of a basic idea (b.i.) and its repetition. The continuation is often the same length as the presentation, creating a sense of proportional balance. It's characterized by four traits that are discussed below.

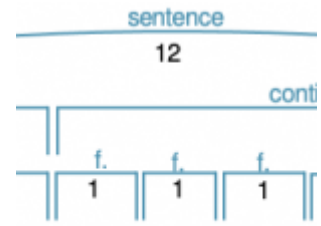


EXAMPLE 6. A sentence at the beginning of *Louise Farrenc, Cello Sonata, II* (0:00–0:28).



Example 7. Common sentence lengths.

Although it's common for the presentation and continuation to be the same length (several common lengths are shown in **Example 7**), just as often, the continuation is longer than the presentation (**Example 8**). However, it's not common for the continuation to be shorter than the presentation.



More Detail: The Presentation

The presentation is a subphrase comprised of a basic idea (b.i.) and its repetition (as in the first half of **Example 6**).

Basic ideas are often two measures long, but one-measure or four-measure basic ideas also occur with some frequency.

The repetition of the basic idea is often varied, which can sometimes make it challenging to determine whether one is dealing with repetition or with a completely different idea. One of the characteristics that usually helps to clarify is **contour**: if the two ideas share the same contour, often we hear the second as a varied repetition of the first. If the two ideas have different contours, then we're more likely to hear the second section as contrasting with the first, something that will return in our discussion of the period later in this chapter.

Some common transformations of the basic idea are:

- Rhythmic or melodic embellishment
- Transposition
- Change of harmonization
- Change of interval quality or size (or both)

Presentations typically begin on the tonic harmony, and they may do one of several things:

- Prolong tonic via a progression such as $I - V - V - I$ or $I - ii_2^4 - V_5^6 - I$
- Move from tonic to dominant: $I - - V - -$
- Move from tonic to a non-dominant harmony, most often a strong pre-dominant such as $ii^{(6)}$

More Detail: The Continuation

The continuation is a subphrase that typically feels less stable than the presentation.

It's characterized by four traits:

Example 8. A hypothetical sentence with a continuation that's longer than the presentation.

- Fragmentation (f.): making unit sizes shorter than the previously established unit sizes (e.g., if the basic ideas are each two measures long, fragments may be one measure long).
 - Note that *fragmentation refers only to the length of the units*. It does not refer to their melodic content, which may or may not be related to the basic ideas.
- Increased rhythmic activity: the use of faster durations than in previous units.
- Sequences: units are repeated and transposed.
- Increased harmonic rhythm: chord changes occur more often than before. For example, if the basic ideas are each two measures long and each is harmonized with a single chord, the continuation might contain chord changes every measure.

A continuation subphrase is easier to identify if it includes more of the traits listed above, but very often, only some of these traits are present. Perhaps the most obvious one is fragmentation, which usually signals continuation even in the absence of the other traits, but not all continuations exhibit fragmentation.

Continuations may therefore take one of two typical forms: with fragmentation (as in [Example 6](#)) and without fragmentation (as in [Examples 9](#) and [10](#)). In [Example 9](#), the continuation doesn't divide into a smaller idea level. The term unit (u.) denotes a grouping that simply expresses the traits of the next higher grouping to which it belongs; in [Example 10](#), it indicates that the two-measure idea expresses continuation (perhaps through increased harmonic rhythm, for example).

Example 9. A sentence without fragmentation in *Beethoven, Polonaise for Military Band* (0:00–0:06).

Continuations may therefore take one of two typical forms:

- **Example 6** above showed a typical continuation with fragmentation.
- **Examples 8 and 9** show continuations without fragmentation.
 - In **Example 9**, the continuation doesn't divide into a smaller idea level.
 - The term “unit” (u.) is used in **Example 10** to denote a grouping that simply expresses the traits of the next higher grouping to which it belongs. Here, unit would mean that the two-measure idea expresses continuation through its increased harmonic rhythm.



Example 10. A sentence whose continuation doesn't exhibit fragmentation in *Beethoven, Piano Sonata no. 4, Op. 7, II* (0:00–0:45).

Since continuations are unstable at their beginnings, it's hard to generalize about how they might begin harmonically. In terms of their endings, however, continuations always drive toward a cadence, and in classical music, that cadence can be any of the three common kinds (perfect authentic, half, or imperfect authentic cadence).

Summary: The Archetypal Sentence and Its Variants

Sentences come in many forms: the clearest, most obvious sentences are closer to the idealized archetype, and phrases that are less clear may be highly varied while still exhibiting some traits of the sentence (we call such phrases sentential). The archetypal sentence consists of:

- 4 or 8 measures
- A presentation
- A continuation whose length balances that of the presentation
- Fragmentation in the continuation

To be clear, many sentences do not have all of these traits. At a minimum, to be sentential, a phrase needs a presentation and a continuation.

Archetype 2: The Period (A Combination of Two Phrases)

The Basics

In addition to the sentence, another common phrase-level form is the period (**Example 11**). Unlike the sentence, which is a single phrase, the period comprises two phrases, each consisting of a basic idea (b.i.) followed by a contrasting idea (c.i.) (see [below](#) on how the treatment of these ideas differs in each phrase). The first phrase, called the antecedent, is often four measures long, and it ends with a weaker cadence, most often a half cadence (HC). The second phrase is called the consequent. It ends with a stronger cadence than the antecedent, most often a perfect authentic cadence (PAC). It may be the same length as or longer than the antecedent; it's rare for it to be shorter.



Example 11. A period in *Mozart's Clarinet Concerto, III* (0:00–0:11).

More Detail: The Antecedent

Antecedents are sometimes characterized as “asking a question” to which the consequent “provides the answer.” Another way to think of it is that the antecedent makes an incomplete statement and the consequent completes it. Both of these descriptions stem from the fact that the antecedent always ends with a weaker cadence than the consequent.

Antecedents typically start on tonic harmony, and they most often end on a half cadence. While it's certainly possible for the antecedent to modulate, it's more common for it to be entirely in the tonic key.

More Detail: The Consequent

Like the antecedent, the consequent also comprises a basic idea and a contrasting idea. Most consequents begin with a basic idea that is similar or identical to that of the antecedent, but it may also be different.³ If

3. Some analysts use the term “parallel period” to describe a period in which the consequent begins the same way as the antecedent, and “contrasting period” to describe a period in which the consequent begins differently than the antecedent. Since contrasting periods are so rare, however, this book simply uses “period” to refer to a parallel period, specifying the type only in the rare instance of a contrasting period.

the two basic ideas are different, it might be useful to label the antecedent's basic idea as “b.i.¹” and the consequent's as “b.i.².”

The consequent's contrasting idea is almost always different from the antecedent's due to the fact that it must end with a stronger cadence than the antecedent. The degree of difference varies widely: sometimes the consequent's c.i. begins like the antecedent's and only changes near the very end; other times, the c.i. is entirely different.

Consequents most often begin on tonic harmony and end with a PAC.

Periods may either stay in a single key or modulate (i.e., change keys). If the period modulates, the change of key usually happens during the consequent.

The Repeated Phrase (Another Way to Combine Two Phrases)

Another relatively common phrase-level form—one that sometimes gets confused with the period—is the repeated phrase, which consists of a phrase followed by a written-out repeat (**Example 12**).

A phrase between two repeat signs would typically not be considered a repeated phrase—this term refers to a phrase with a written-out repeat that adds additional measures to the piece. The repetition is often varied (for example, the melody may be embellished during the repeat), which explains why a composer may choose to write out the phrase a second time.

In a repeated phrase, the first phrase can end with any kind of cadence, and the second phrase must therefore end with the same one. This distinguishes a repeated phrase from a period, in which the consequent ends with a stronger cadence than the antecedent.



Example 12. A repeated phrase in Schubert's "*Du bist die Ruh*" (0:22–0:44).

Compound Phrase-Level Forms (Combining Archetypes)

Since the sentence is a single phrase, and since the period is composed of two phrases, it's possible for a period to be made of two sentences, as in **Example 13**. When one form contains another kind of form in this way, we call the result a compound form.

How is **Example 13** like a period? The first phrase (the antecedent) ends with a half cadence, and the second phrase (the consequent) ends with a stronger cadence: a perfect authentic cadence. This weak-to-strong cadence pattern makes this example retain that sense of “question and answer” or “incomplete thought to completed thought” that is so characteristic of the period.

How does **Example 13** use sentences? The antecedent and the consequent are each a sentence: in each phrase, the first four measures are the presentation and the last four measure are the continuation.



Example 13. A compound period in Christian Petzold's *Minuet in G Major* (0:00–0:25).



Example 14. A unique phrase-level form in Fanny Hensel's "Abendbild" (0:00–0:40).

Unique Phrase-Level Forms

The phrase-level forms we've looked at in this chapter are all quite common, but just as common are phrases that are unique—that aren't in dialogue with these archetypes in any obvious way.

When we analyze such passages, we can still perform a segmentation analysis. We can choose to apply labels flexibly, but we can also feel free to abandon labels where they don't seem to support our interpretation. In **Example 2**, we showed a segmentation analysis of a phrase of unique length, and we now show how one might apply select labels to those segments in **Example 14**.

Assignments

1. Analyzing sentences (.pdf, .docx). Asks students to compare excerpts to the archetypal sentence, provide form diagrams, and optionally, provide harmonic analysis for any given excerpt.

Worksheet playlist

2. Analyzing archetypes and unique forms ([.pdf](#), [.docx](#)). Asks students to identify excerpts that are archetypes (periods, sentences, compound periods) or unique forms, and to diagram those that are archetypes. Optionally, students can harmonically analyze the excerpts. [Worksheet playlist](#)
3. Composing melody-only sentences ([.pdf](#), [.mscx](#)). Students compose four-measure sentences from a given basic idea (melody only).
4. Composing fully realized sentences ([.pdf](#), [.mscx](#)). Students select from a bank of basic ideas to compose an 8-measure sentence with full texture (accompaniment and melody).

Media Attributions

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Hensel, "Abendbild" © John Peterson and Megan Lavengood

Example_004

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Footnotes

HYBRID PHRASE-LEVEL FORMS

John Peterson

KEY TAKEAWAYS

- A hybrid form combines the beginning of one archetype with the ending from another.
 - Possible beginnings are antecedents, presentations, or compound basic ideas.
 - Possible endings are consequents, continuations, or cadential endings.
- Although any beginning could be combined with any ending, some pairings are more common than others (see [Example 7](#)).

CHAPTER PLAYLIST

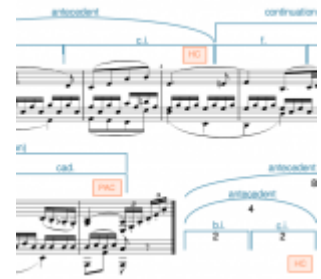
What's a hybrid form?

In [The Phrase, Archetypes and Unique Forms](#), we looked at two phrase-level formal archetypes: the sentence and the period.

We found that these forms divide into two parts. A sentence divides into two subphrases: a presentation and a continuation. A period divides into two phrases: an antecedent and a consequent.

A hybrid form occurs when the beginning of one archetype is paired with the ending from another archetype. In **Example 1**, an antecedent is followed by a continuation.

- How do we know the first part is an antecedent rather than a presentation?
 - It ends with a weaker cadence, whereas presentations don't end with cadences.
 - It has a basic idea followed by a contrasting idea, whereas presentations have a basic idea followed by a repetition of the basic idea.
- How do we know the second part is a continuation rather than a consequent?
 - Rather than beginning as consequents do with a basic idea, it begins with fragmentation, which is characteristic of continuations.
 - It begins with a feeling of instability created by the dominant that continues after the half cadence, rather than the stability that's typical of a consequent's beginning.



Example 1. An antecedent + continuation in Beethoven, *Piano Sonata Op. 13, II, mm. 1–8* (0:00–0:32).

So far, we know two beginnings (presentation and antecedent) and two endings (continuation and consequent), but there's actually one more possible beginning (compound basic idea) and one more possible ending (cadential). Below, we'll outline these new beginnings and endings and provide ways to help distinguish between them.

Beginnings

New: The Compound Basic Idea (c.b.i.)

A compound basic idea (c.b.i.) is an antecedent without a cadence, as seen in **Example 2**.¹

- How is **Example 2** like an antecedent?
 - It contains a basic idea followed by a contrasting idea.
- How is **Example 2** different from an antecedent?
 - It doesn't end with a cadence. Notice how the bass sits on G across mm. 3–4: although the melody comes to a point of rest, the lack of harmonic motion in the bass evades the half cadence (HC) that might have appeared there.



Example 2. A compound basic idea in Haydn's Piano Sonata in C, Hob. XVI:35, I, mm. 1–8 (0:00–0:05).

Summary: The Three Beginning Types

The three beginnings that appear in hybrid phrase-level forms are antecedent, compound basic idea, and presentation. **Example 3** provides a summary of the characteristics that differentiate each of these beginnings.

Beginning	Ends with cadence?	First idea	Second idea
antecedent	Yes	b.i.	c.i.
compound basic idea	No	b.i.	c.i.
presentation	No	b.i.	b.i.

Example 3. Characteristics that differentiate beginnings.

1. What is "compound" about the compound basic idea? It often functions as the basic idea of a large sentence, one that is sixteen measures in length, where the presentation is eight measures long and comprises two c.b.i. units. It's "compound" in the sense that these large basic ideas are themselves composed of two units: a b.i. and a c.i.

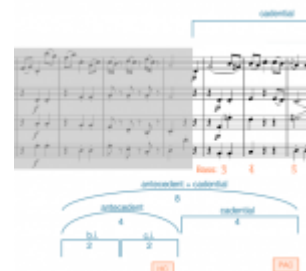
Endings

New: Cadential (cad.)

A cadential (cad.) ending harmonizes a particular bass pattern (demonstrated in **Example 4**).²

The core bass pattern is *mi-fa-sol-do* ($\hat{3} - \hat{4} - \hat{5} - \hat{1}$).³ The common harmonization of each of these notes is:

- *mi* ($\hat{3}$): I^6
- *fa* ($\hat{4}$): ii^6 or IV
- *sol* ($\hat{5}$): $V^{(7)}$ (often elaborated with cadential $\frac{6}{4}$)
- *do* ($\hat{1}$): I



Example 4. A cadential ending in Haydn, String Quartet Op. 64, No. 4, II, mm. 1–8 (0:05–0:10).

This core *mi-fa-sol-do* ($\hat{3} - \hat{4} - \hat{5} - \hat{1}$) bass line may be embellished. A common embellishment is to tonicize the dominant by adding *fi* before *sol* ($(\uparrow \hat{4} - \hat{5})$), making the bass line *mi-fa-fi-sol-do* ($\hat{3} - \hat{4} - \uparrow \hat{4} - \hat{5} - \hat{1}$).

The clearest cadential endings are four measures long with one bass note per measure.

Summary: The Three Ending Types

The three endings that appear in hybrid phrase-level forms are consequent, continuation, and cadential.

Example 5 provides a summary of the characteristics that differentiate each of these endings.

2. What is the difference between a cadential *idea* and cadential *ending*? The cadential idea comes at the end of a continuation, and essentially, the cadential ending is like the cadential idea being expanded to four measures and replacing the continuation. That means that "cadential" can occur at two formal levels: the idea level and the subphrase level.

3. This can also occur in minor, of course, as *me-fa-sol-do* [$\downarrow \hat{3} - \hat{4} - \hat{5} - \hat{1}$].

Ending	Cadence	Bass	Ideas
Consequent	PAC/IAC. Not HC.	Varies	b.i. + c.i.
Continuation	HC, IAC, or PAC.	Varies	vary, but often divided 1+1+2 or 2+2
Cadential	PAC/IAC. Not HC.	Mi-fa-sol-do [$\hat{3}-\hat{4}-\hat{5}-\hat{1}$]/[latex] or an elaboration of that line.	Either 2+2 or indivisible. Never features fragmentation.

Example 5. Characteristics that differentiate endings.

Hybrid Possibilities and Examples

The three possible beginnings and three possible endings are shown in **Example 6**. While any beginning on the left could be paired with any ending on the right, **Example 7** shows that there are some pairings that are more common than others.

Below, we provide examples for all hybrids in the “slightly less common” and “occasional” categories (**Examples 8–12**). We already provided examples of the period and sentence in [The Phrase](#), [Archetypes](#), and [Unique Forms](#).

The examples we provide in this chapter are all eight-measure archetypes, but as we show in the next chapter, these forms *can* be any length.

Beginnings	Endings
Antecedent	Consequent
Compound basic idea (c.b.i.)	Continuation
Presentation	Cadential

Example 6. Possible beginnings and endings. Any beginning on the left can theoretically pair with any ending on the right.

Form	Degree of commonality
pres.+cont. (sentence) ant.+cons. (period)	very common
c.b.i.+cons. c.b.i.+cont. ant.+cont.	slightly less common
c.b.i.+cad. ant.+cad.	occasional
pres.+cad. pres.+cons.	rare or non-existent

Example 7. Pairings of beginnings and endings sorted by degree of commonality.

Example 8. An antecedent + continuation in Beethoven, Piano Sonata Op. 13, II, mm. 1–8 (0:00–0:31).

Example 9. A compound basic idea + continuation in Haydn, Piano Sonata Hob. XVI:35, I, mm. 1–8 (0:00–0:10).

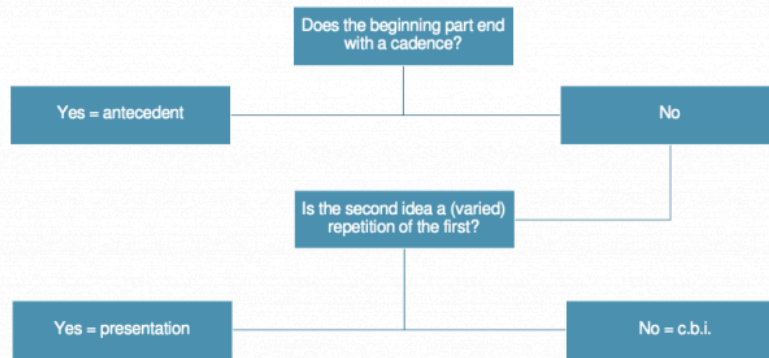
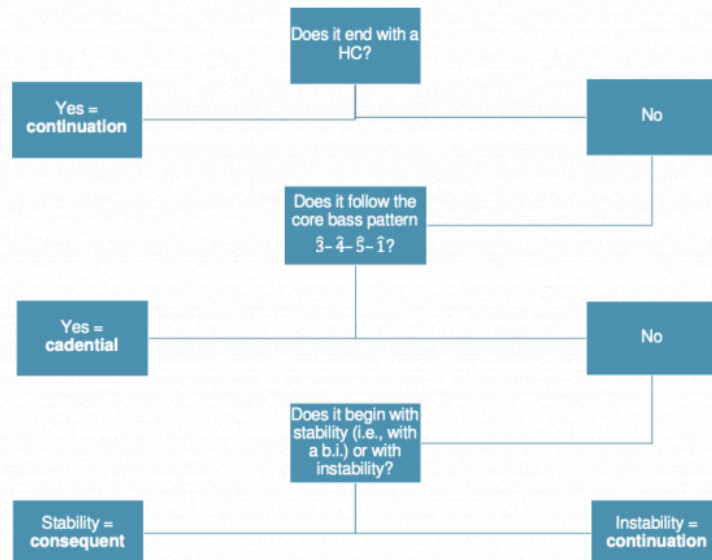
Example 10. An antecedent + cadential in Haydn, *String Quartet Op. 64, No. 4, II*, mm. 1–8 (0:00–0:10).

Example 11. A compound basic idea + cadential in Haydn, *Symphony 95, III*, mm. 1–8 (0:00–0:10).

Example 12. A compound basic idea + consequent in Haydn, *Symphony 97, III*, mm. 1–8 (0:00–0:11).

Listening to Phrase-level Forms

With so many possibilities, it might seem overwhelming to try to sort through the various possibilities. **Example 13** offers a suggested listening strategy that can help determine what kind of beginning and ending you're hearing.

Beginnings**Endings**

Example 13. Suggested process for listening to phrase-level forms: (a) what to listen for in beginnings, and (b) what to listen for in endings.

Further Reading

- Caplin, William Earl. 2013. *Analyzing Classical Form: An Approach for the Classroom*. New York: Oxford University Press.

Assignments

1. Analyzing hybrid forms ([.pdf](#), [.docx](#)). Provides excerpts and asks students to indicate which term best describes the first and second half of each. Optional harmonic analysis included.

Worksheet playlist

2. Analyzing forms with multiple possibilities ([.pdf](#), [.docx](#)). Asks students to identify preferred and plausible alternative interpretations for several excerpts. Also includes band music. [Worksheet playlist](#)
3. Composing phrase-level forms ([.pdf](#), [.docx](#)). Asks students to compose a phrase-level form given a description. Provides a basic idea bank to give students a start.

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Example_004a_cadential © John Peterson and Megan Lavengood is licensed under a [CC BY-SA \(Attribution ShareAlike\)](#) license

Example_013a_Listening_Diagram_Caplin © John Peterson and Megan Lavengood is licensed under a [CC BY-SA \(Attribution ShareAlike\)](#) license

Footnotes

EXPANSION AND CONTRACTION AT THE PHRASE LEVEL

John Peterson

KEY TAKEAWAYS

- Expansions make a phrase last longer than expected. They can be internal (between the beginning and ending of the phrase) or external (before the beginning or after the end).
 - Internal expansion techniques include repetition, stretching, one-more-time technique, and alternative path.
 - External expansions fall into two categories:
 - Prefixes occur before the beginning, such as an introduction.
 - Suffixes occur after the cadence, such as post-cadential extensions, codettas, and codas.
- Contractions make a phrase shorter than expected.

CHAPTER PLAYLIST

The terms expansion and contraction refer to ways composers play with the expected length of a phrase.

What does “expected length” mean?

- When a phrase invokes one of the archetypes without following it exactly, we can often identify how long a closer representation of that archetype would have been.
- Sometimes the cadential motion of the phrase allows us to anticipate where a cadence might occur, but the phrase evades the expected cadence.

- Sometimes a piece states two versions of a phrase—one unexpanded and the other expanded—giving us a model to which we can compare the expanded version.

Expansion refers to the process of making a phrase longer than we expect. This lengthening might occur within the phrase (“internal expansion”) or outside of the phrase (“external expansion”). Contraction refers to the process of making a phrase shorter than we expect, and it always occurs within a phrase.

In this chapter, we offer an overview of several techniques for phrase expansion and contraction. This isn’t an exhaustive list, but it covers several of the more common techniques. The terminology concerning expansion and contraction techniques can quickly become overwhelming. What’s most important is to be able to recognize when a phrase is longer or shorter than expected and to be able to describe what’s creating the difference in length.

Internal Expansions

The four techniques we discuss below—repetition, stretching, one-more-time, and alternative path—all occur *within* a phrase: after the phrase’s beginning, but before its cadence. Often, composers use these techniques in combination; in fact, it’s relatively rare to find a phrase that’s expanded using only one technique.

Repetition

Sometimes when a composer repeats material, the repetition creates extra length.

Example 1 shows an exact repetition of a motive *within a unit* that creates extra length: a four-measure antecedent is followed by an expanded five-measure consequent. The extra length results from a repeated motive within a unit.



Example 1. Internal expansion via exact repetition in Robert Sheldon’s *Bright Lights!* (0:49–1:03).

Example 2 shows a varied repetition in which *a whole unit* is repeated to add extra length: a four-measure compound basic idea (c.b.i.) is followed by a five-measure continuation. The continuation begins with a sequence that expands it from the expected four measures to five.

Not all repetitions create expansion! Be careful to differentiate expansion-creating repetitions, which are unexpected, from more predictable repetitions, such as when the basic idea is repeated in a presentation.

Stretching

Sometimes composers will lengthen a harmony or melody by increasing its duration so that it lasts longer than expected. When that happens, we say that the unit that contains the harmony or melody has been stretched. In

Example 3, a four-measure presentation is followed by a five-measure continuation. The continuation's cadential idea is stretched when a I^6 chord and the cadential dominant (embellished by a Ger^6 and a cadential $\frac{6}{4}$) each last for a full measure as opposed to both occurring within a single measure.

One-More-Time Technique (o.m.t.)

Coined by Janet Schmalfeldt (1989), the one-more-time technique involves three steps: 1) the music tries to cadence, 2) the attempted cadence is evaded, and 3) the music retries the cadence. The re-tried cadence often uses the same material, such that it feels like the music is “backing up,” but it may also retry the cadence with different cadential material.



Example 2. Internal expansion via varied repetition in Mozart's Horn Concerto, K. 447, I, mm. 1–9 (0:00–0:18).



Example 3. Internal expansion via stretching in Schubert's Piano Sonata D. 459, I, mm. 1–9 (0:00–0:17).

In **Example 4**, a cadence is proposed in m. 10, but it's evaded ($\text{cad}_4^6 - \text{V}_2^4 - \text{I}^6$). A one-more-time repetition of the cadential idea ensues. The one-more-time unit is stretched: notice that it takes two measures (compared to one originally) for the melody to descend $\text{C}-\text{Bb}-\text{A}-\text{G}$, and it takes a full measure (compared to a half measure originally) for the cadential cad_4^6 to resolve to V^7 .



Example 4. Internal expansion via the one-more-time technique in Mendelssohn, *Op. 8, no. 5, "Pilgerspruch"* (0:00–0:37).

An alternative path occurs when unexpected new material either temporarily or permanently causes a phrase to deviate from its expected trajectory toward a cadence. A temporary deviation is called a detour. Detours return to previous material from within the phrase before the phrase achieves a cadence. A permanent deviation is called a reroute. Reroutes achieve cadences without returning to previous material from within the phrase.

Example 5 shows a detour: the sentence's continuation is repeated. We realize the repetition is getting "off track" when the motive in the cadential idea (m. 19) is repeated (m. 20), which did not happen in the analogous place before (m. 15). A highly contrasting two-measure passage emerges (mm. 21–22) that leads to a return of material (mm. 23–26) similar to the cadential idea in mm. 19–20, now stretched.



Example 5. Internal expansion via alternative path (detour) in Mendelssohn, *Hebrides Overture*, mm. 9–26 (0:20–0:58).

Example 6 shows a reroute: a four-measure antecedent is followed by a six-measure expanded consequent. The consequent begins with the same basic idea as the antecedent, but its contrasting idea moves in a markedly different direction, one that doesn't lead to a cadence. A new cadential idea is needed to bring the phrase to a perfect authentic cadence (PAC).

Although one-more-time technique and alternative paths both involve cadences, they are very different techniques, as explained below:

One-more-time technique	Alternative path
• Passage has tried and failed to achieve a cadence • Feels as though the phrase backs up to try the failed cadence again	• Passage has not yet tried to cadence • Feels as though the phrase has gone off course



Example 6. Internal expansion via alternative path (reroute) in *Maria Theresia von Paradis, Sicilienne*, mm. 1–10 (0:00–0:42).

External Expansions

When composers add length outside of a phrase, they may add measures before the beginning (prefixes) or after the cadence (suffixes). In diagrams, we indicate external expansions using dashed arcs or brackets.

The Prefix

A prefix occurs before the beginning of a phrase, usually taking the form of an introduction. A prefix can be small, but it may also be large, such as when a composer begins a symphony with a slow introduction. **Example 7** shows a small prefix. As is very common with songs, this *mélodie* opens with an instrumental introduction before the singer enters—that is, before the phrase beginning. Note also that this phrase includes a variant on the typical core bass cadential pattern. Instead of *mi-fa-sol-do* ($\hat{3} - \hat{4} - \hat{5} - \hat{1}$), Chaminade writes *di-re-sol-do* ($\uparrow \hat{1} - \hat{2} - \hat{5} - \hat{1}$) (mm. 8–11).



Example 7. External expansion via small prefix in *Cécile Chaminade, "L'amour captif,"* mm. 1–10 (0:00–0:13).

The Suffix

A suffix occurs after a phrase has cadenced. The terms in **Example 8** are flexibly used to describe different types of suffix. While **Example 8** provides guidelines for their use,

what one person calls a post-cadential extension, another might choose to call a codetta. It's more important to recognize that a given suffix adds length outside the bounds of a phrase than to worry about which term is most appropriate.

Term	Avg. Length	Characteristics	Typical Location	Example
Post-cadential extension (p.c.e.)	Short (1-2 mm.)	• Insubstantial: little or no melodic material • Often repeats the chords of the cadence (e.g. V–I) or the final tonic • Atypical to state an entire phrase	After the end of a phrase within a section	Example 9
Codetta	Medium (4-8 mm.)	• Often features short motivic material that gets repeated • May cycle through an entire cadential progression • May or may not state an entire phrase	After the end of a section within a piece or movement	Example 10
Coda	Long (8+ mm.)	• Substantial: may feature a new theme or reprise of a previous theme • Often contains multiple phrases	After the end of a piece or movement	Example 11

Example 8. *Characteristics that differentiate common suffix types.*

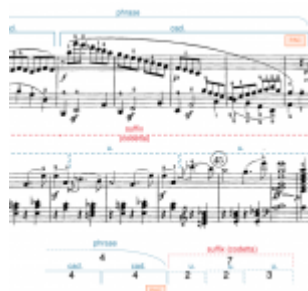
Example 9 shows the end of a lengthy period. After the perfect authentic cadence that ends the consequent, a two-measure post-cadential extension prolongs the final tonic via arpeggiation.¹

In **Example 10**, a lengthy phrase ends the exposition of the piano sonata with a PAC in A $\flat$ major at m. 41. The cadence is followed by a codetta: notice that it features a repeated two-measure unit harmonized with the cadential bass line *fi-sol-do* ($\uparrow \hat{4} - \hat{5} - \hat{1}$).

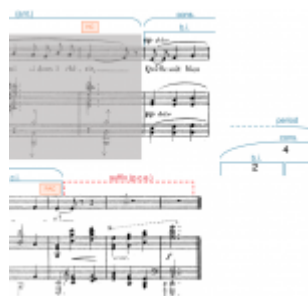
Example 11 features the longest kind of suffix: a coda. After the introduction returns (4:52) and then is varied (5:03), an elided PAC ends the piece proper (5:32). The coda (also at 5:32) presents an energetic

1. The recording linked is the only commercial recording of the piece. We hope more people will record this beautiful work.

celebration of the piece's closure, featuring a fast version of a previously-heard theme with several phrases.



Example 9. External expansion via suffix (post-cadential extension) in Cécile Chaminade, "Les presents" (2:31–2:57).



Example 10. External expansion via suffix (codetta) in Beethoven, Piano Sonata Op. 2, no. 1, mm. 36–48 (0:45–0:58).

Timestamp Event

4:52	Introduction returns in varied form
5:03	A second variation on the introduction begins
5:32	Coda begins; its material is drawn from the second theme (from 2:00)

Example 11. External expansion via suffix (coda) in *Shostakovich, Festive Overture*.

Contraction

Contractions occur less frequently than expansions. A contraction occurs when a phrase is shorter than we might expect it to be.

In **Example 12**, a four-measure compound basic idea is followed by a three-measure continuation. Given the length of the compound basic idea, we might have expected the continuation to be four measures long to create proportional balance. As you listen, notice how the cadence feels abrupt, a feeling that usually accompanies contraction.



Example 12.
Contraction in Stéphan Elmas, *Piano Concerto No. 1, III*, mm. 15–21 (32:21–32:28).

Further Reading

- Jarvis, Brian, and John Peterson. 2019. “Alternative Paths, Phrase Expansion, and the Music of Felix Mendelssohn.” *Music Theory Spectrum* 41, no. 2 (Fall): 187–217.
- Schmalfeldt, Janet. 1992. “Cadential Processes: The Evaded Cadence and the ‘One More Time’ Technique.” *Journal of Musicological Research* 12 (1–2): 1–52.

Assignments

1. Analyzing expansion techniques ([.pdf](#), [.docx](#)). Asks students to name, segment, and label the form of excerpts and identify the location of any expansion technique(s). Optional harmonic analysis included. [Worksheet playlist](#)
2. Analyzing multiple expansion techniques ([.pdf](#), [.docx](#)). More complicated examples than in worksheet 1. Each excerpt is significantly expanded. [Worksheet playlist](#)
3. Recomposing to remove expansions ([.pdf](#), [.docx](#)). Asks students to recompose excerpts from worksheet 1 to remove the expanded portion of the archetypal form. [Worksheet playlist](#)

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Footnotes

FORMAL SECTIONS IN GENERAL

Brian Jarvis

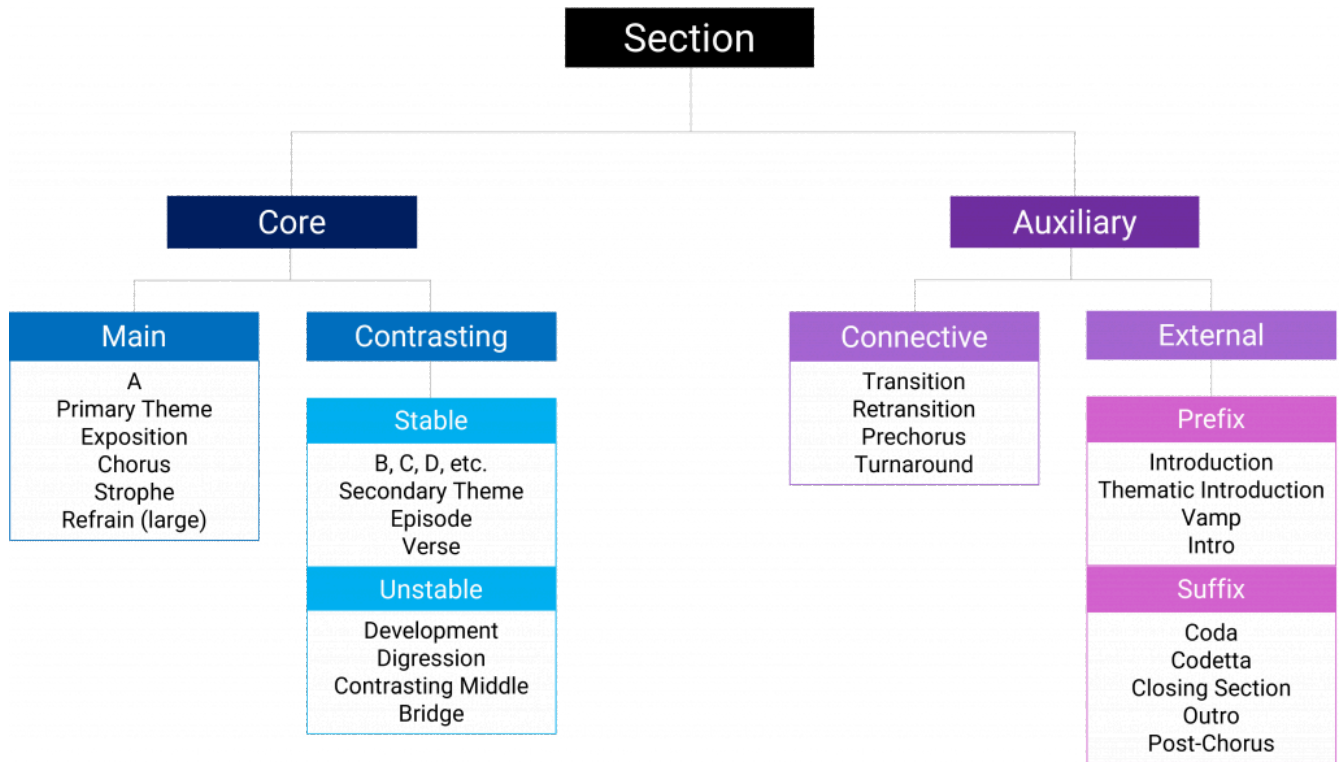
KEY TAKEAWAYS

- Analyzing musical form involves determining the identity and function of musical spans.
- Musical sections are either core or auxiliary.
- Core sections are either main or contrasting.
- Auxiliary sections are either external or connective.

Overview of Formal Sections in General

Understanding the form of a musical work typically involves breaking it down into spans of time, based on how each span is similar to and/or contrasts with other spans. These spans are then classified based on the identity of their musical material and how the section “functions” in the context of the piece. The two largest categories of formal function are core sections and auxiliary sections.¹ **Example 1** below summarizes the hierarchical relationship between some of the most common section types. At the broadest level, musical sections are either core or auxiliary. Core sections are either main or contrasting, and auxiliary sections are either external or connective.

1. This particular dichotomy was introduced by Jay Summach (2012).



Example 1. Core versus auxiliary formal sections.

Core Sections

The core sections identified in [Example 1](#) typically introduce and repeat a work’s primary musical content. You can think of them as the sections you might sing for someone if they asked you how the work “goes.” You can also think of core sections as containing the work’s themes, though the term “theme” can be used in a broad or specific sense. Core sections also tend to repeat, which is another reason they will often make a stronger impression on your memory.

Main Sections

Main sections are typically the first section that presents primary musical content; they are usually repeated later in the work and are characterized by a relative sense of stability.

Terminology

The terms for main sections change depending upon the conventions of the genre and form (if it is a form with a name). When thinking about form in general, the main section should be called **A**, but within a known form, it may go by many names, including but not limited to:

- primary theme ([sonata](#))
- refrain ([rondo](#) or verse-refrain)
- exposition ([sonata](#))
- theme from a set of variations
- chorus ([verse-chorus](#))
- dance chorus ([verse-chorus](#))
- strophe ([AABA and strophic](#))

Contrasting Sections

Contrasting sections are hard to generalize, since they can vary in affect and stability. In some cases, the section is perfectly stable, and it contrasts mainly because it comes second instead of first; in other cases, a contrasting section may be the most unstable section of the work.

Unstable contrasting sections may share many musical features with connective auxiliary sections (defined below). The distinction lies in whether or not it is considered a core section: contrasting sections sound like a primary place in the work, whereas connective sections sound like a place between two core sections. In cases where the line between the two is blurry, a decision can be made based on the conventions of the overall form of the piece, or multiple formal descriptors (e.g., becoming) can be used to create an accurate and unforced classification.

Stability

Formal stability is the sense of tension vs. calmness in a portion of music. A relative sense of stability in a work is a common means of delineating form, and it is an important dramatic concern for creating momentum and engaging a listener's expectations about what might happen, given their familiarity with how other pieces in a given genre/style behave.

Common features for each might include some combination of the following, among others:

- **Stability:** relatively less change, consistent or decreasing dynamic level, tonic expansions, regular hypermeter, no modulation, diatonic melody, and diatonic harmony
- **Instability:** relatively more change, increasing dynamic level, extreme registers, increased chromaticism (tonicization), increased rhythmic activity, modulation, sustained dominant, sequences (especially chromatic ones), irregular hypermeter, and irregular phrase lengths

Because it's statistically common for works to start with a stable section, an unstable contrasting section would likely sound unusual at the beginning of a work.

Terminology

In terms of form in general, the first contrasting section is labeled **B**, and each subsequent new section receives the next letter of the alphabet (**C**, **D**, **E**, etc.). Within a known form, contrasting sections go by many names, including but not limited to:

- Stable
 - secondary theme ([sonata](#))
 - episode ([rondo](#), [fugue](#))
 - Note: episodes are just as often unstable
 - verse ([verse-chorus](#))
- Unstable
 - development ([sonata](#))
 - episode ([rondo](#), [fugue](#))
 - digression ([binary](#))
 - contrasting middle ([binary](#))
 - bridge ([multiple popular song forms](#))
 - Note: “bridge” in this context is referring only to popular-form terminology

Auxiliary Formal Sections

In addition to the core sections of a work, other sections may introduce, follow, or come between these core sections. These sections are called auxiliary sections, and there are two general categories: external and connective.

External Auxiliary Sections

External auxiliary sections either introduce a piece/section (prefix) or follow the generic conclusion of the piece or section (suffix). Prefixes and suffixes come in small and large varieties.

Prefix

A prefix (Rothstein 1989) refers to music that comes before the generic start of a phrase or piece and tends to express a formal sense of “before the beginning.” A prefix can be described as either small or large depending on whether or not it contains a complete phrase. Large prefixes contain at least one phrase, while small prefixes don’t have complete phrases and are typically far less noticeable. Small prefixes are often nothing more than the accompaniment for a section starting before the melody begins, and they may precede any phrase in a work.

The most common type of large prefix is called an introduction. Introductions are often in a slower tempo than the rest of the work and often contain their own thematic material. Small prefixes can be found in works of most genres and eras, but large prefixes are less ubiquitous and tend to show up more often in particular genres, like the opening of a symphony. However, other genres like the piano sonata (Beethoven’s “Das Lebewohl,” Op. 81a), string quartet (Mozart’s “Dissonance” quartet), and dance forms like ragtime (Joplin, “The Entertainer”) can contain them as well.

Below are some examples:

- Small Prefix:
 - [Chopin’s Polonaise in C minor, Op. 40, no. 2](#) – First two measures
 - [Kiesza’s “Dearly Beloved”](#) – Opening
- Large Prefix:
 - [Introduction of the 1st movement of Mozart’s “Dissonance” string quartet in C major \(K. 465\)](#) – The whole movement is about 10 minutes long, and its slow introduction (large prefix) lasts for nearly two minutes until the sonata form proper starts. There is a stark tempo change from slow to fast at 1:59 that makes the boundary clear.
 - [Joplin’s “The Entertainer”](#) – First four measures
 - [Madonna’s “Vogue”](#) – This large prefix has many subsections (0:00, 0:34, 0:50), but the song proper doesn’t start until she begins singing at 1:07.

Suffix

A suffix (Rothstein 1989) refers to music that comes after the close of a phrase or piece and tends to express a formal sense of “after the end.” The distinction between large and small again concerns whether or not it contains a complete phrase. Small suffixes can be found after the close of any phrase, but the affect is quite different depending on the type of cadence they follow. After an authentic cadence, they typically project a sense of stability and closure, but after half cadences, they tend to prepare for the

entrance of the upcoming section and therefore project a sense of instability. Though possible after any phrase, large suffixes typically appear in two specific locations: (1) at the very end of a piece in the form of a coda, and (2) as the closing section of a sonata form's exposition and recapitulation (see [Sonata Form](#)). In most cases, a suffix contains musical material that is different from the phrase it follows, though that material may be derived from an earlier phrase.

Below are some examples:

- Small Suffix:
 - [Dove Shack's "Summertime in the LBC"](#) – After the final chorus, a small suffix (in the form of a simple accompaniment) ends the song as it fades out from 3:41 until the end.
 - [Bizet, Habanera from *Carmen*](#) – The B section ends just after the singer sustains a high note and cadences with the orchestra immediately after (cadence is at 2:01). After this cadence, the orchestra just repeats an accompanimental pattern a few times. The music from 2:01-2:06 is the small suffix.
- Large Suffix:
 - [Puccini, "O Mio Babbino Caro" from *Gianni Schicchi*](#) – Ending: You can hear the formal ending of the aria at 1:48 with the line "O Dio, vorrei morir!" at which time the aria could have ended satisfactorily. However, an elision occurs with the strings, which play the main melody (a.k.a. ritornello) after the soloist finishes her line. Notice that the music from 1:48 to the end projects a sense of stability, as suffixes tend to do when they follow an authentic cadence.
 - [End of the 1st movement of Mozart's "Dissonance" string quartet in C major \(K. 465\)](#) – This movement ends with a coda at 9:58 (large suffix at the very end of a piece). Notice that it starts after the material from the closing section of the recapitulation comes to an end. You can compare the very end of the exposition (6:12) to the very end of the recapitulation (9:28) to hear how this large suffix is added material that was not in the exposition (even though many of its motives and ideas have been heard before).
 - [Brahms's Intermezzo in A major, op. 118, no. 2](#) – This work is in ternary form. The A section ends at 1:28 and is followed by a suffix from then until before the B section starts at 1:57.

Connective Auxiliary Sections

Transition

Generally, a transition is a section of music that functions to connect two core sections. Transitions usually help to lead away from the piece's main section toward a contrasting section. In particular, a transition

comes between two sections where the upcoming section is not the initiation of a large-scale return (i.e., between **A** and **B**, not between **B** and **A**). Often a modulation is introduced to help prepare a section in a new key, though it is not required. A transition also plays a role in the balance of stability and instability in a work. Core sections of a work are very often stable thematic statements (relatively), but transitions typically introduce instability (and a gain in energy), which will likely be countered by the stability of the section that follows.

Like suffixes and prefixes, transitions and retransitions (discussed further below) come in “large” and “small” varieties. A transition can be described as either small or large depending on whether or not it contains a complete phrase. Large transitions contain at least one phrase, while small transitions don’t have complete phrases and are typically far less noticeable.

Near their end, transitions (and retransitions) often drive toward attaining the dominant chord of the upcoming key. Often, a suffix will begin once the dominant has been attained in a situation sometimes called “standing on the dominant” (William Caplin) or “dominant lock” (James Hepokoski and Warren Darcy).

A transition may have a clear stopping point before the next section starts, or there may be a single melodic line that fills the space between it and the upcoming section (caesura fill), or the transition may end at the onset of the new section with an elision. In more vague cases, the end of the transition and the start of the new section may be hard to pinpoint, but it is still clear that it must have happened during a particular span of time.

Transitions are commonly found in [sonata forms](#) between the primary and secondary themes and in [rondo forms](#) between the A section (refrain) and a contrasting section (episode). Small transitions are often found in ternary forms to connect the **A** and **B** sections.

Below are some examples:

- Large Transition:
 - [Mozart’s piano sonata in B \$\flat\$ major, K. 333, 1st](#) – This work is in sonata form. The transition between the primary theme and the secondary theme occurs between 0:20 and 0:42.

Retransition

A retransition is very similar to a transition, but its location and function are different. Retransitions come between two sections where the upcoming section is the initiation of a large-scale return (i.e., between **B** and **A**, not between **A** and **B**). In most cases, retransitions help to prepare the return of the piece’s

main section: the return of the A section in [ternary](#) or [rondo](#) form, or the restatement of the primary theme at the onset of the recapitulation in sonata form. A retransition often drives toward attaining the dominant chord of the home key and will often prolong the dominant once attained, usually in the form of a suffix. Retransitions may have a clear half-cadential ending (possibly followed by a suffix), or they may have an elided ending that coincides with the initiation of the following section.

Below are some examples:

- Small Retransition:
 - [Chopin's Polonaise in C minor, Op. 40, no. 2](#) – This work is in compound ternary form. In the first, large A section of the overall ABA form, there is a small retransition between B and A from 2:35 to 2:39. It is only one measure long.
 - [Handel's aria "Lascia ch'io pianga" from *Rinaldo*](#) – This work is in five-part rondo form (ABACA). There is a very short, small retransition between the B and A sections from 1:41 to 1:44.
- Large Retransition:
 - [Mozart's piano sonata in B \$\flat\$ major, K. 333, 1st](#) – This work is in sonata form. The retransition between the development and the recapitulation occurs between 4:29 and 4:45.
 - [Brahms's Intermezzo in A major, Op. 118, no. 2](#) – This work is in ternary form. There is a retransition between the B section and the final A section from 3:08 to 3:19.

Further Reading

- Rothstein, William. 1989. *Phrase Rhythm in Tonal Music*. New York: Schirmer.
- Summach, Jason. 2012. "Form in Top-20 Rock Music, 1955–89." PhD diss., Yale University.

Media Attributions

hierarchy_of_form_jarvis_02

Footnotes

BINARY FORM

Brian Jarvis

KEY TAKEAWAYS

- Binary forms contain two reprises.
- Binary forms can either be simple or rounded.
- Simple and rounded binary forms may both feature a balanced aspect.

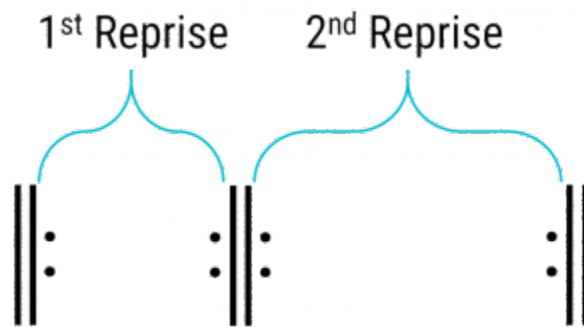
CHAPTER PLAYLIST

In the context of musical form, the term “binary” refers to a formal type that has two main parts. These parts are often called reprises because each is typically repeated. Binary forms are common in 17th-, 18th-, and 19th-century repertoire, and they were used heavily in dance music.

There are two types of binary form: rounded and simple. Both forms have the possibility of featuring a balanced aspect as well (note: balanced binary is often described as its own type of binary form, but that approach is not taken here).

Binary form is typically one of the shorter forms, and because of that, it is often embedded within larger, compound forms like compound ternary form.

Repeat Structure and Types of Binary Form



Example 1. Abstract diagram of the repeat structure in binary form.

In 17th– and 18th-century classical music, each reprise of the binary form is typically repeated, as in **Example 1**. The listener will hear the following structure:

- Reprise 1
- Reprise 1
- Reprise 2
- Reprise 2

In 17th– and 18th-century music, it is very common to find the repeat signs written in the score.

Decorative improvisation on the repeat was expected without being specified in the score. But in the 19th century, it became more common for composers to write out the repeat instead of using repeat signs. This may be done to indicate specific decorations on the repeat, to include changes in some musical domain (like instrumentation or register), and/or to expand the music beyond the length of its first statement.

While having two—usually repeated—reprises is common to all binary forms, there are two relatively distinct sub-types that capture the form’s larger melodic organization: rounded and simple, shown in **Example 2**. Formal organization is represented with uppercase letters and prime symbols.

The first section of a binary form piece is represented with the letter **A**. In both subtypes of binary form, **A** is the main section and presents the main melodic material (see [Formal Sections in General](#)).

B sections (the contrasting sections) vary depending on the type of binary form (**Example 2**). Both forms can also feature a balanced aspect (represented with an **x** in parentheses), as discussed further [below](#).

Rounded Binary	$\parallel\text{:A}\text{:}\parallel\text{:B}\text{:A}^{(x)}\text{:}\parallel$
Simple Binary • 2 nd reprise contrasts with A	$\parallel\text{:A}\text{:}\parallel\text{:B}\text{:}\parallel$
Simple Binary • 2 nd reprise continues A's material	$\parallel\text{:A}\text{:}\parallel\text{:A}'\text{:}\parallel$
Same forms with Balanced aspect • The (x) represents material from the tail end of the first reprise	
Rounded Binary (balanced) • 2 nd reprise contrasts with A	$\parallel\text{:A}\text{:}(x)\text{:}\parallel\text{:B}\text{:A}^{(x)}\text{:}(x)\text{:}\parallel$
Simple Binary (balanced) • 2 nd reprise contrasts with A	$\parallel\text{:A}\text{:}(x)\text{:}\parallel\text{:B}\text{:}(x)\text{:}\parallel$
Simple Binary (balanced) • 2 nd reprise continues A's material	$\parallel\text{:A}\text{:}(x)\text{:}\parallel\text{:A}'\text{:}(x)\text{:}\parallel$

Example 2. Abstract diagram of each binary form.

Rounded Binary Form



Example 3. Abstract diagram of rounded binary form.

In rounded binary, the beginning of **A** returns in the home key somewhere in the middle of the second reprise. It is not necessary for all of **A** to return (though often it does)—only the beginning. While the returning material may be exactly the same, it's also common to see slight variations, like change of octave, accompanimental pattern, and/or melodic embellishments. If there is variation, you should still be able to experience the feeling of return when the **A** material comes back. If unsure, you can expect the harmonic analysis to remain essentially the same, the chord changes will likely be in the same metric locations, and the scale degrees of the melody will also be in the same order and in the same metric locations; just make sure to account for the possibility of slight variation in the domains listed above.

In rounded binary form, the second reprise starts with a **B** section. Typically, the **B** section is less stable than the **A** section and may involve common destabilizing features like sequences, chromaticism, and dominant pedals. In some binary forms, however, the **B** section is quite stable but simply presents different thematic material than **A** (see, for example, the **B** section of the Trio from the third movement of Mozart's String Quartet in G major, K. 80).

Rounded Binary Example

The Menuetto from the third movement of Mozart's Symphony no. 25 in G minor (**Example 4**) is a clear instance of a rounded binary form typical of the mid- to late 18th century. After a relatively stable thematic statement during the first reprise (mm. 1–12, **A**), the second reprise (mm. 13–36) can easily be divided into two distinct parts, **B** (mm. 13–20) and **A'** (mm. 21–36). The impression of a division is the result of the return of **A** material at m. 21 and the half cadence that precedes it at m. 20.

In the 18th century, half cadences before the return of **A** in rounded binary forms are quite common. In the 19th century, however, composers may also elide or otherwise obscure this boundary, as Chopin does between mm. 16 and 17 in the rounded binary form found in mm. 1–24 of his polonaise in A major, Op. 40, no. 1.



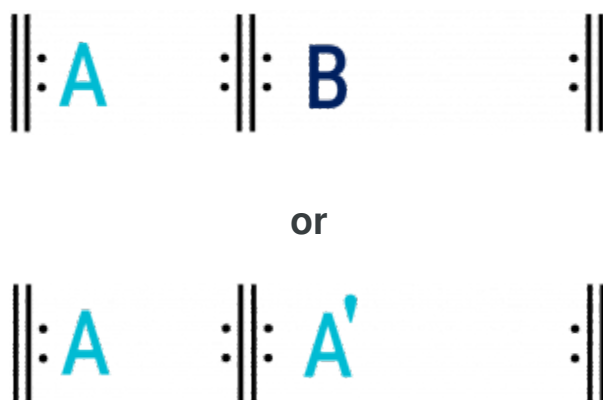
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Example 4. Mozart, Symphony no. 25 in G minor, 3^d movement, Menuetto.

Simple Binary Form

In simple binary, there is no substantial *return* of opening material in the second reprise. Instead, the material in the second reprise takes one of two possible manifestations:

1. **A'** (note the prime symbol): The second reprise, though not a repeat of the first reprise, continues with the same sorts of ideas. As the **A** material is always present, there is no “return” to the opening material.
2. **B**: The second reprise contains relatively new material throughout.



Example 5. Abstract diagrams of simple binary form.

Simple Binary Example

The Bourrée from Bach’s Lute Suite in E minor, BWV 996 ([Example 6](#)) is a good example of a simple binary form where the second reprise would be labeled **A'**. The musical material in the second reprise simply continues the ideas from the first reprise throughout. Notice how there is no clear return of the first reprise’s opening material in the middle of the second reprise, and therefore, this is not an example of rounded binary.



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Example 6. J. S. Bach, *Bourrée* from *Lute Suite in E minor*, BWV 996.

Balancing a Binary Form

“Balanced” is a term used to describe a binary form (either simple or rounded) in which the tail end of the first reprise returns at the tail end of the second reprise. That return will be in the piece’s home key, even if it was in another key in the first reprise. In **Example 7**, the (x) represents the music at the tail end of the first reprise (A section) and its return at the tail end of the second reprise.

In order to be considered a return, there needs to be a crux point—a particular moment where the restatement begins at the tail end of the second reprise. This restatement is the point at which there is a direct bar-for-bar mapping of measures between the tail ends of both reprises. Importantly, this excludes rounded binary examples where the entire first reprise is repeated verbatim in the second reprise, because there is no crux point at the tail end of the second reprise.



or



or



Example 7. Abstract diagrams of each binary form with balanced aspect.

Simple Binary (Balanced) Example

In longer simple binary forms, the balancing material can be quite substantial. In Domenico Scarlatti's Sonata in A major, K. 322 (**Example 8**), the material that returns is nearly 24 measures long—over half the length of the first reprise—and is easily recognizable by ear. In the Scarlatti work, (x) starts in the middle of m. 21 and ends at the end of the first reprise, m. 44. That material returns in the second reprise in the middle of m. 59 and continues to the end of the work, with a few new melodic decorations along the way (compare m. 26 and m. 63, for example). Importantly, note that (x) in the second reprise has been transposed back to the home key. In other words, when it was stated initially in the first reprise, (x) was in the key of E minor/E major, so it needed to be transposed back to the key of A in order for the work to start and end in the same key.



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Example 8. Domenico Scarlatti, Sonata in A major, K. 322. [Click to download a PDF score.](#)

Harmonic Expectations

Cadences

Each part of the binary form commonly ends with standard cadence types (perfect authentic, imperfect authentic, or half), especially in 18th-century classical music. But stylistic preferences of the 19th century alter cadential expectations for the first part in particular: composers sometimes opted for lower levels of closure, ending with tonic-prolongational progressions instead of standard cadence types (examples: Schumann, Papillon, 1 [m. 8] & 7 [m. 8], Kinderszenen, no. 9 [m. 8]).

Harmonically Open or Closed

As with other forms, the first reprise of a binary form can be described as harmonically open or closed. The second reprise can be described this way as well, but because binary forms are expected to be monotonal, it usually is implied instead.

Keys

If the first reprise of a binary form is open, it may contain a modulation.

Regardless of the harmonic situation at the end of the first reprise, you should expect the second reprise to end with an authentic cadence in the original key. There may be additional cadences before the end, but the PAC at the end of the second reprise is essentially an obligatory convention in common-practice-period tonal music. If a piece starts and ends in different keys, it exhibits progressive tonality rather than monotonicity.

Beginning, Middle, End – Stability Expectations

As with most aspects of form, binary form moves between relative stability and relative instability throughout the form which serves to give the work a linear drive due to the expectation that a work will start stable, become unstable, and ultimately end with a sense of relative stability. In binary form, you can expect that:

- The first reprise is relatively stable.
- The beginning of the second reprise is relatively unstable. This is so common that some theorists refer to the second reprise as a “digression” or “departure,”¹ sometimes forgoing the letter **B** altogether to focus on the function of the music.
- The end of the second reprise returns to stability. The return of **A** material in the second reprise of a rounded binary form is also commonly expected to be a point of relative stability.

Assignments

1. Binary Form Analysis Assignment (.pdf, .docx).
 - Audio Example 1 – [Franz Schubert, Écossaise, D. 529, No. 3](#) (Starts at 1:07)
 - Audio Example 2 – [Franz Joseph Haydn, Piano Sonata no. 37, III, theme](#)
 - Audio Example 3 – [Johann Sebastian Bach, Sarabande from Violin Partita no. 1, BWV 1002](#)
 - Audio Example 4 – [Franz Schubert \(1797-1828\), Piano Sonata in E major, D. 157, II \(mm. 1–16\)](#)
 - Audio Example 5 – [Franz Schubert \(1797-1828\), Symphony no. 2 in B \$\flat\$ major, D. 125, II](#)
2. Guided Composition (.pdf, .docx, .mscx).

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Mozart_Symphony_No_25_3rd_Minuetto_Only

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Bach_Bourree_BWV_996_Score

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Footnotes

TERNARY FORM

Brian Jarvis

KEY TAKEAWAYS

- Ternary forms have an ABA formal structure.
- A may immediately repeat and B may immediately repeat, but A and B do not repeat together, and neither do B and A.
- Repeat signs are common but not required.
- The B section typically contains contrasting material a new key, and it may be relatively unstable.
- Auxiliary section are possible before, between, and after each section.

CHAPTER PLAYLIST

Ternary form is a musical form consisting of three distinct sections with an **ABA** pattern of large-scale repetition: an opening section (**A**), a contrasting section in the middle (**B**), and then a return to the material from the opening section (**A**). (Though it might seem logical to call **ABC** ternary form as well, it is more often considered through-composed because each section contains different music.)

As shown in **Example 1**, each section in ternary form may immediately repeat, either with repeat signs (most commonly) or written out. However, **A** and **B** do not repeat together, and neither do **B** and **A**.

◇ A ◇ ◇ B ◇ ◇ A' ◇

Example 1. Abstract diagram of ternary form with common repeat structure.

Structure of Individual Sections (Simple vs.

Compound)

While the contents of each section can vary greatly concerning phrase and form, each section commonly comprises multiple phrases, and very often those phrases combine together into a complete form (very often a binary form). A ternary form is considered to be compound (or composite) if one or more of its sections comprises a complete musical form. If a section does not contain a complete form, it can be called simple. In many compound ternary forms (like minuet & trio or scherzo & trio in particular), all sections contain complete forms (often rounded binary form). In compound ternary forms of the 19th century, however, the last **A** section is often shortened and is simple, not compound.



Example 2. Abstract diagram of a compound ternary form where all sections contain their own complete form.



Example 3. Hypothetical example of a compound ternary form where all sections contain their own complete forms.



Example 4. Diagram of a ternary form where only the first section of the form comprises its own complete form. See Chopin's *Mazurka in A minor, Op. 17, no. 4* for an example of this.

Contrasting Characteristics of B

The second section of a ternary form, usually referred to as the **B** section, is expected to provide contrast with the **A** section that preceded it. This contrast may come from a variety of musical domains including key, mode, texture, time signature, rhythmic ideas, melodic ideas, range, instrumentation, register, and so on. The length of **B**, however, is expected to be generally proportional to that of **A**.

Stability of Each Section

In some genres (like the minuet & trio), the **A** and **B** sections exhibit a relatively similar level of stability, usually because they start and end in the same key and contain phrases that are tight-knit. In other genres (arias in particular), the **B** section is often less stable than **A**. **B**'s instability is largely due to starting and ending in different keys and having a generally looser phrase-structural organization than **A**.

Keys and Harmony

Closed and Open Harmonic Endings

As with other forms, each section can be described in terms of being harmonically open or closed.

Modulation *within* a Section

Modulation is possible within each section in ternary form, but it is very rare in the **A** section and should be considered atypical when found there. Modulation in the **B** section is much more likely to be found in an aria than in dance forms like the minuet and trio.

Auxiliary Sections

Like other forms, ternary form can contain auxiliary sections. Small transitions, small retransitions, small prefixes, and small and large suffixes are common. See the chapter on [Formal Sections in General](#) for more information on auxiliary sections.

Example Analyses



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Example 1. Frederic Chopin, Polonaise in A major, Op. 40, no. 1 – [Click to See Score \(PDF\)](#)



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Example 2. George Frideric Handel, “Waft Her Angels” from *Jephtha* – [Click to See Score \(PDF\)](#) – [Audio](#)

Assignments

1. Bernhard Crusell – Clarinet Quartet, Op. 7, III, Menuetto (.pdf, .docx). Access [score](#) and [audio](#).
2. Josephine Lang – Traumbild, Op. 28, no. 1 (.pdf, .docx). Access [score](#) and [audio](#).

SONATA FORM

Brian Jarvis

KEY TAKEAWAYS

- Sonata form is a complex manifestation of a harmonically open, rounded binary form that is also balanced.
- The first reprise is called the exposition, and the second reprise contains the development and recapitulation.
- The exposition has two core sections in different keys called the primary theme and secondary theme.
- The primary and secondary themes are separated by a transition.
- The secondary theme is typically followed by a large suffix called the closing section.
- The development and recapitulation may have a retransition between them.
- The recapitulation's secondary theme should be in the overall tonic key.
- The sonata form proper may be preceded by an introduction or followed by a coda.

CHAPTER PLAYLIST

At the largest level, the form is as follows in **Example 1**, and each of those large levels is further subdivided, as shown in **Example 2**.



Example 1. Sonata form at the largest level.

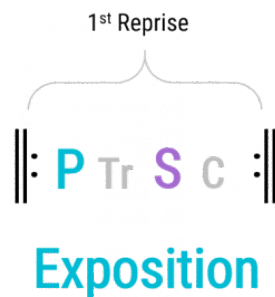


Example 2. Standard formal layout of a complete sonata form.

Exposition

Due to its popularity and intricacy, sonata form has developed its own set of terms to help capture its multiple formal components, but these components share properties with other formal sections (see [Formal Sections in General](#)). The sonata form's first reprise is called the “exposition,” because it *exposes* the main thematic material of the work. The exposition can be further broken down into four sections with specific names:

- Primary Theme (P): the main section, in the tonic key; concludes with a cadence in the tonic key
- Transition (TR): the connective section; concludes with the medial caesura
- Secondary Theme (S): the contrasting section, in a non-tonic key (typically V for major-mode pieces and III for minor-mode pieces); concludes with the essential expositional cadence
- Closing Area (C): a large suffix in the non-tonic key.



Example 3. Standard formal layout of a sonata exposition.

On the whole, the exposition is a relatively stable part of the form. **P**, **S**, and **C** are all typically very stable areas; only **TR** is unstable.

In the exposition, expect the secondary theme to start and end in a non-tonic key. In major-key sonatas,

this tends to be the dominant (V), and in minor-key sonatas, this is usually the mediant (III) or the minor dominant (v). These keys are very common in the 18th and 19th centuries, but other options also occur in the 19th century.

Dependent and Independent Transitions

The exposition's transition between **P** and **S** takes one of two forms, depending on whether the transition's melodic/motivic material clearly derives from **P**: if it does, the transition is dependent, and if it doesn't, the transition is independent. An independent transition is usually easier to locate because it sounds like something new instead of a continuation of **P**. Dependent transitions might begin like a restatement of **P** but veer off in another direction after getting started, and they typically build energy and feel relatively unstable. A dependent transition typically involves the process of becoming because it initially sounds like **P** is ongoing, but as it continues, its transitional function emerges without clear delineation between the two. Another type of dependent transition can occur when **P**'s suffix doesn't come to a clear end and instead evolves into a transition through the process of becoming. However, becoming is such a common aspect of dependent transitions in sonata form that most analysts don't bother labeling it as such.

Development

The development is a large, unstable section. Like other unstable sections (e.g., **B** in [rounded binary form](#) and **C** in [sonata rondo](#)), the development typically favors sequential passages, chromaticism and modulation, and partial (rather than complete) thematic statements. As the name implies, the development may “develop” material from the exposition, but this is not a requirement, as the development may also introduce its own material.

Developments often explore multiple key areas through [modulation or extended tonicizations](#). The sequential passages in developments often involve models that are quite long, often four to eight measures. For example, in the development of the first movement of Mozart's Piano Sonata in A minor, K. 310, [discussed in the analysis example below](#), a four-measure sequential model is used. Sequences make up such a substantial portion of Classic-era sonata developments that William Caplin suggests focusing on them when determining their overall structure. He thinks of each sequential passage, from its model to its eventual half cadence, as a “core”; suggests the possibility of multiple cores (usually only two); and describes the music between the beginning of the development to the first core as the “pre-core.”

Because developments explore non-tonic keys, they typically end with a retransition (either small or large) that helps to prepare the return of the primary theme in the tonic at the start of the recapitulation. The development often ends with a medial-caesura effect that marks a clear dividing line between the

development and recapitulation. But this boundary can be less clear as well and even involve an elision, and in some cases, P starts over a dominant pedal, making it hard to hear as a clear point of initiation.

Recapitulation

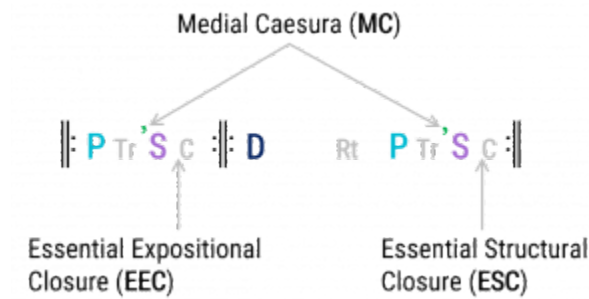
The recapitulation involves the restatement of material from the exposition, but with the necessary adjustments so that the secondary theme and closing sections are now in the tonic. In order for this key change to take place, this restatement usually has to be recomposed somewhere between the primary theme and the start of the secondary theme (creating a crux). The changes often take place during the transition, but it can also happen during the primary theme. If the exposition's transition ended with a half cadence in the original key (e.g., [Mozart, Symphony no. 25, i](#)), then the recapitulation can actually be restated in full without changes, and the secondary theme can simply start in the tonic key with no other required changes. But often, composers decide to make changes during this restatement.

Similarity to Binary Form

Sonata form can be understood as a complex manifestation of a harmonically open, rounded binary form that is also balanced. In both forms, the opening of the first reprise returns in the middle of the second reprise (A' in binary form; the recapitulation in sonata form), after a contrasting section (B in binary form; the development in sonata form).

Sonata recapitulations also feature a balanced aspect because they restate the ending of the first reprise at the end of the second reprise, this time transposed to the tonic key, necessitating a crux. However, the return of material in sonata form is more consistent than in binary forms that are balanced. In sonata forms in particular, you should expect that all of **S** and **C** will be included in the balanced return.

Additional Sonata Terminology: MC, EEC, ESC



Example 5. Location of Medial Caesura (MC), Essential Expositional Closure (EEC), and Essential Structural Closure (ESC).

Medial Caesura (MC)

The medial caesura is a term introduced by James Hepokoski and Warren Darcy that refers to a common phenomenon in late 18th-century sonatas where a mid-expositional break (caesura) occurs between the end of the transition and the beginning of the secondary theme. While Mozart is an exemplary champion of this technique, it is also used by earlier, later, and contemporaneous composers.

As Mark Richards explains, a “medial caesura complex” has three stages:

1. Harmonic preparation: Occurs at the end of the transition and is most commonly a half cadence (often followed by a suffix, particularly a dominant pedal). This can be in either the home key or the upcoming key of S.
2. Textural gap: A literal space (caesura) between the end of the transition and the beginning of S. The caesura may be preceded by a series of “hammer blows”—repeated emphatic chords. In many cases, only rests occur during this gap, but just as often, the gap is filled with a single voice that helps to bridge the gap between the two sections (caesura fill).
3. Acceptance by S. A convincing feeling of starting a new section (S) will confirm that the medial caesura occurred. If the textural gap instead led back to material from the transition and it felt as though the secondary theme never really started, then a true medial caesura would not have occurred because the third stage was missing.

Both the exposition and recapitulation can contain a medial caesura, though they may be different because the transition is often recomposed in the recapitulation.

Essential Expositional Closure (EEC) and Essential Structural Closure (ESC)

Hepokoski and Darcy's parallel concepts of Essential Expositional Closure (EEC) and Essential Structural Closure (ESC) refer to the first satisfactory perfect authentic cadence (PAC) in **S** that moves on to non-**S** material—this moment is called the EEC in the exposition and the ESC in the recapitulation. In both situations, this moment determines the end of **S** and therefore the onset of **C**. The harmonic goal of the exposition is to establish a new key and produce a PAC in that key, and the EEC marks that occasion. The music after the EEC, the closing section (**C**), was not necessary for reaching this goal and is therefore an auxiliary section of the exposition, a suffix. The same situation occurs in the recapitulation. The harmonic goal of the recapitulation is that the material from the second half of the exposition is restated in the overall tonic key and that a PAC occurs to confirm that key (ESC).

External Auxiliary Sections: Introduction and Closing Area

Introduction

It is common for sonata forms (especially the first movement of symphonic works) to have a large prefix known as an introduction, or slow introduction. Introductions often contain musical material not found in the rest of the work (in the 18th century in particular). The tempo is usually significantly slower than the tempo of the sonata form proper. In many cases, the distinction between the end of the introduction and the beginning of the sonata form is quite clear, because the tempo changes abruptly when the sonata form proper begins.

Closing area

Sonata forms usually contain a large suffix after the end of the second reprise called a “closing area,” “coda,” or “tail.” As is normal for a suffix, closing sections are a stable aspect of the form, but particularly long codas might contain unstable portions. Codas may also revisit material from the rest of the work.

Sonata Form Analysis Example



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EXAMPLE 6. Mozart, *Piano Sonata in A minor, K 310*, 1st movement. [Click to see PDF score.](#)

The first movement of Mozart's sonata in A minor, K. 310 (1778) is a relatively clear example of a late 18th-century sonata form. As indicated by the repeat signs at mm. 49–50 and m. 133, the form has two reprises—just like a [binary form](#). As is customary in sonata form, this movement is rounded and features a balanced aspect.

Determining the location of a sonata form's two core sections (**P** and **S**) is an efficient approach for starting a formal analysis of the first reprise. The primary theme (**P**) begins in m. 1 in the key of A minor (i), and the secondary theme (**S**) begins in m. 23 in the key of C major (III). It's expected that **S** will start somewhere around the middle of the first reprise, and that is indeed what we find: this first reprise is 49 measures, half of which is 24.5, so **S** starting in m. 23 puts it quite close to the middle.

Determining the location of the **Tr** between **P** and **S** is a more subtle task. The end of **Tr** is easy to identify—it's right before **S**—but its beginning requires a more detailed investigation. In this case, the transition is dependent, so at first it actually just sounds like **P** is continuing. **Tr** starts in m. 9 with a repetition of **P**'s basic idea, but it starts to change soon after that, in m. 12. At that point, a harmonically unstable passage begins as it modulates to the relative key of C major (III). The tonic of the new key is most clearly established with the elided half cadence at m. 16, which also marks the beginning of the transition's suffix.

Dominant lock persists from that moment until the MC at m. 22. In the sonata-form movements of this era, clear MCs are very common, and this movement's MC represents a relatively straightforward instance. This MC is a III:HC—a half cadence in the key of III. There is no literal silence at this moment because caesura fill covers the space, with three eighth notes that lead to the initiation of **S** at measure 23.

There is, however, a clear gap in texture in m. 22, as the transition finishes and **S** starts in the following measure. Notice also that the transition's suffix is actually implying that the key is *C minor*, not *C major*, due to the presence of $E\flat$ s. The implication of a minor key here adds an aspect of drama to the end of the transition, and consequently an element of surprise, as **S** ends up being in the major mode when its preparation suggested otherwise. (Mozart doesn't employ this technique very often, but it's actually pretty common in Beethoven's music.)

Remember that the harmonic goal at the end of the exposition is the EEC: the first PAC in **S** that moves on to non-**S** material. In this movement, and in many of his works, Mozart seems to be playing a sort of game with the exact location of this all-important moment. There is a clear attempt at a PAC in m. 35, but Mozart does two things that prevent it from functioning as the EEC. The first is that he withholds the local tonic in the melody, even though the trill in the previous measure suggests that the next note would have been *C*. Instead, the melody rests on the downbeat, and a stream of sixteenth notes start an octave higher. The second issue is that those sixteenth notes in m. 35 seem very strongly related to **S**'s melodic/motivic content, which gives the impression that **S** is ongoing instead of being finished. For these reasons, the potential cadence point has been evaded. Mozart then continues this game by setting up another attempt at the cadence in m. 40—this time, it's the bass voice that's omitted at the cadence, and again **S**-based material continues afterward. The actual EEC only arrives in m. 45, and it elides with the onset of **C**. **C** lasts until the end of the exposition in m. 49.

The boundary between the development and recapitulation can be identified within the second reprise (mm. 50–133) by locating the return of exposition material in the tonic key. This occurs at m. 80. The development is the most unstable portion of the work, due to the variety of chromatic harmonies and sequences. It starts by presenting the opening of **P** in the mediant but quickly veers off into harmonic uncertainty: the apparent V^7 in m. 57 is [reinterpreted as an augmented sixth chord](#) in *E minor*, which initiates a large-scale descending fifths sequence when it resolves in m. 58. The sequential model is very long, four measures in this case, and its copies are stated at m. 62 and m. 66. The sequence's last chord (A^7 , m. 69) resolves to *D minor* in m. 70 and initiates a modulating retransition that leads back to the tonic key of *A minor*. The HC at m. 74 confirms we are back in *A minor*. Like in the exposition, this HC elides with the onset of a suffix with dominant lock, though this occurrence has more variety in its bass line. The effect of reaching and maintaining the dominant during this passage, however, is still quite audible. This development has a clear distinction between the end of the development and the start of the recapitulation due to the medial-caesura effect that occurs in m. 79 (notice also the chromatic line connecting the two parts that functions as caesura fill).

As expected, the recapitulation restates most of the material from the exposition, and those materials are presented in the same order. In the exposition, **S** and **C** were in *III*, and the transition prepared that key by modulating and ending with a half cadence in that key. For the ESC to occur in *A minor*, **S** and **C** can

simply be transposed from C major to A minor (making sure to account for the difference in mode), but the transition will need to be rewritten to accommodate this change. As it did in the exposition, the transition of the recapitulation begins after nine measures of **P**, in m. 88. This transition is still dependent upon **P**, but it is quite different from the exposition's version. Notice, however, that they start to become the same again at the half cadence that ends the transition and begins its suffix (compare mm. 16–22 and mm. 97–103)—this is the crux. Mozart expands **S** in m. 126 by delaying the ESC with a few fully diminished seventh chords that lead back to the dominant (m. 128), which delay the ESC until m. 129. The closing section does not include recomposition, but is simply transposed to the overall tonic key of A minor, and no coda follows.

Further Reading

- Caplin, William Earl. 1998. *Classical Form: A Theory of Formal Functions for the Instrumental Music of Haydn, Mozart, and Beethoven*. New York: Oxford University Press.
- Hepokoski, James A., and Warren Darcy. 2006. *Elements of Sonata Theory: Norms, Types, and Deformations in the Late Eighteenth-Century Sonata*. Oxford; New York: Oxford University Press.

Assignments

1. Maria Hester Park, Sonata, Op. 7, I Allegro Spirito ([.pdf](#), [.docx](#)). Access [score](#) and [audio](#).

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RONDO

Brian Jarvis

KEY TAKEAWAYS

- Rondo is a form featuring a main section (referred to as either **A** or refrain) that returns throughout a work and is juxtaposed with contrasting sections (referred to as **B**, **C**, etc., or as episodes).
- Common formal layouts include **ABACA** (five-part) and **ABACABA** (seven-part, likely sonata rondo).

CHAPTER PLAYLIST

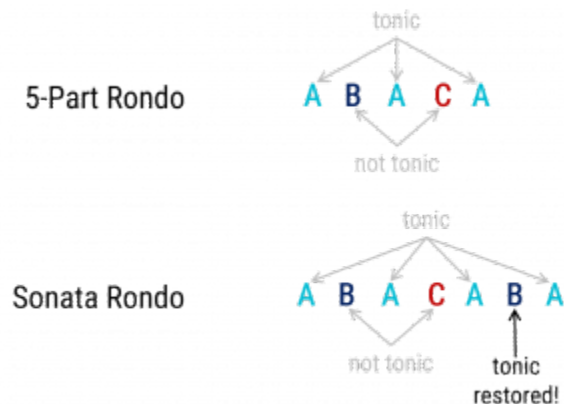
Conceptually, rondo is quite simple: the form consists of a recurring main section that alternates with contrasting sections. As with other forms, rondo can include a variety of auxiliary sections. In rondo form, it is tradition to call the repeating main section the refrain (or **A**), and the contrasting sections are referred to as episodes (and/or by letters: **B**, **C**, etc.).

The refrain material is essentially the same throughout the course of a movement (allowing for some embellishment or abbreviation) and is always heard in the tonic key. Episodes contrast with refrains tonally, and usually thematically as well. A given episode may occur multiple times in the movement or only once.

The most common manifestations of rondo form are either five-part rondo (**ABACA**) or sonata rondo (**ABACABA**), summarized in [Example 1](#). There are two main differences between them:

1. In sonata rondo, the **C** section is often akin to a sonata form's development section, whereas in a five-part rondo, the **C** section is likely to be a relatively stable thematic statement like any other episode.
2. In sonata rondo, the first **ABA** (i.e., **ABACABA**) constitutes the equivalent of a complete sonata

exposition (without the repeat, and it ends in the tonic), and the second **ABA** (i.e., **ABACABA**) functions as the recapitulation, where the **B** section is now transposed to the tonic key.



Example 1. General outline of five-part rondo and sonata-rondo forms.

Refrains, Episodes, and Auxiliary Sections in Rondo Form

Refrains are constructed as a combination of one or more phrases and could even be an entire binary form. You can expect that they will have a clear ending punctuated with a perfect authentic cadence (PAC) and will be relatively stable thematic statements. Episodes may be structured like that as well (though with contrasting keys and melodic/motivic material), or they can include destabilizing features like modulation, chromatic harmony, and phrase expansion. Episodes may end with a clear PAC, or they may have ambiguous endings, even lacking a cadence and merging into a retransition section instead through the process of becoming.

Like other forms, rondo form can have [auxiliary sections](#). The most common are retransitions that generate anticipation for the refrain's return. Codas are also quite common, but introductions are not.

Analytical Challenges with Episodes: Transition $\Rightarrow$ Episode or Episode $\Rightarrow$ Retransition

Like the other forms, rondos may include any combination of auxiliary sections, though retransitions that dramatize the return of the refrain are particularly common. Since episodes are often relatively looser than their refrain counterparts, two sections may blend together through the process of becoming ($\Rightarrow$). In particular, a transition may *become* an episode without any clear delineation of the two formal sections.

Similarly, the episode itself may not reach a clear cadential conclusion (i.e., a PAC in the key of the episode) and instead may *become* a retransition that prepares for the statement of another refrain. However, it is unlikely to find both of these situations occurring within a single episode. One of the important distinctions between the end of a connective section (transition/retransition) and a stable thematic statement (refrains and episodes) is that connective sections tend to emphasize their arrival on the dominant, while stable thematic statements tend to emphasize the arrival at a PAC.

Five-Part Rondo Example

Example 2. Maria Hester Park, *Piano Sonata in C major, Op. 7, 3rd movement* – [Audio \(YouTube\)](#) – [Click to See Score \(PDF\)](#)

The final movement from Maria Hester Park's *Sonata in C major, Op. 7*, from 1796 is a relatively clear example of a five-part rondo form. The **A** section (refrain) lasts from mm. 1–26 and consists of multiple phrases. The **B** section (episode 1) does not start right away at m. 27; it is instead separated from **A** by a transition (mm. 27–44) that modulates to the key of the dominant in m. 38 during a passage of chromaticism involving modal mixture. *Unlike* most transitions, this transition actually ends on the upcoming local tonic of G major (mm. 42–44) instead of the local dominant. **B**'s primary thematic material lasts from mm. 45–54, and its ending is elided with a suffix that eventually becomes a retransition (around m. 71) that harmonically prepares for the return of **A** in m. 73. This second statement of **A** lasts from mm. 73–98 and is a complete repeat of the first statement of **A**. **C** (episode 2) starts in m. 99, immediately after the second statement of **A**, and is in a contrasting key, the submediant (A minor). The **C** section (mm. 99–132) is longer than the **B** section. Its ending elides with the start of a suffix that becomes a retransition (around m. 135). The third and final statement of **A** starts in m. 141 and is again a complete repeat of the initial statement of **A**.

Sonata Rondo Example



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Example 3. Ludwig van Beethoven, *Piano Sonata in C minor, Op. 13, 3rd movement* – [Click to See Score \(PDF\)](#)

The A Sections (Refrains)

The last movement from Beethoven's Op. 13 piano sonata (subtitled *Grande Sonate pathétique*) is an example of a sonata-rondo form. The form is fairly complex, and while most of the sections are quite clear, the **B** section in particular has a few challenges. The form also includes a good amount of becoming. When approaching the form of any rondo, an efficient strategy for determining the form is to find the location of the **A** sections. Remember that restatements of **A** need to be in the tonic key and that they may contain slight variations like omitted repeats, melodic embellishments, and/or new accompaniments. In this particular form, the **A** sections can be found starting in mm. 1, 62, 121, and 171.

In order to understand the differences between the **A** sections, a more detailed look at the structure of the initial **A** section is required. The initial **A** section ends in m. 17, and there are two phrase-expansion techniques used to generate that length. The first is the one-more-time technique that starts in m. 9 (mm. 9–12 are a varied repetition of mm. 5–8). The second expansion technique is the suffix that starts in m. 12. This suffix starts with an elision and ends in m. 17. So, what could have been an 8-measure theme is now 17 measures because of these two expansion techniques.

With that more detailed analysis in mind, we now have a model we can use to compare the other **A** sections. While the second **A** section is a repeat of the first, the third and fourth **A** sections have been altered. The third **A** section is the shortest, lasting only 8 measures. It achieves this brevity by removing both of the expansion techniques used in the **A** section's initial statement. Instead of having the one-more-time technique in its ninth measure, new, unstable music enters that is derived from the **A** section but is used as the start of a transition away from the **A** section's material. The fourth and last **A** section ends at measure 182, making it 12 measures long. In this version, the one-more-time repetition is still included, but **A**'s original suffix has been replaced by a new, much longer suffix that functions as the work's coda (mm. 183–210).

The B sections (Episodes 1 & 3)

This movement's episodes vary in key and melodic/motivic material, and they contain multiple auxiliary sections including transitions, retransitions, and suffixes. The first episode, **B**, is the most complex, and it is stated twice throughout the work. As is expected for sonata-rondo form, the first statement of **B** is in a contrasting key (the mediant) and its restatement in the "recapitulation" is in the tonic key of C—though instead of being in the minor mode to match the global key, it is in the parallel major key of C major (I).

While it's very clear that the initial **B** section occurs somewhere between the first two **A** sections (mm. 18–62), the initiation of **B** is obscured by a number of features, resulting in an ambiguous starting point. There are four possible candidates for the beginning of **B**: mm. 25, 33, 37, and 44. There is certainly a transition starting in m. 18 due to the harmonic/melodic sequence and harmonic instability, but m. 25's

relatively stable presentation of melodic material is obscured by the lack of separation between the rhythmic activity leading into it and the fact that this melodic/motivic material is not new—it's derived from the **A** section's suffix (see m. 12)—obscuring a possible initiation function. The next candidate, m. 33, is marked because of the dominant arrival and because it introduces new melodic material involving a triplet figure. However, this candidate for the start of **B** is also obscured by lack of rhythmic separation between mm. 32 & 33 and the fact that m. 33 starts on a dominant harmony instead of the tonic (III). M. 37 is a similarly unclear starting point because it continues the melodic/motivic material introduced in m. 33 instead of introducing its own material, even though it is the first statement of that material in the local tonic of E $\flat$ major. The last candidate is m. 44. Of all the options, this is the clearest starting point because of the textural gap that preceded it. However, it is very uncommon for episodes to start after a PAC has been sounded in the local key, which is the case here (see m. 43). Typically a suffix would begin after a PAC occurs in the local key of an episode. This is all to say that, after careful consideration, no clear starting point of **B** can be determined, and yet it seems very clear that the presence of an episode in a contrasting key occurs. In order to avoid making a dubious factual statement about exactly where **B** starts, I think the best way to capture the reality of this passage is to invoke the concept of becoming. So, while it's clear that a transition begins in m. 18, the **B** section has no clear beginning; instead, the transition “becomes” the **B** section somewhere between mm. 25 and 44 but in no precise location.

The space between **B** and the second statement of **A** is a little clearer. The PAC in III at m. 51 marks the end of **B** and the simultaneous start of a suffix. As is common in many forms, this suffix turns into a connective section (in this case a retransition) without a clear division between the two sections, again achieving this fluidity through the process of becoming. The dominant arrival in the global key at m. 58 is a common marker of being in a retransition.

When the **B** section returns in the recapitulation, it is approached with a newly composed transition (m. 129). The return of **B**'s material starts around mm. 134–135 (compare with mm. 25–26). Similar to the exposition's **B** section, the exact location of the initiation of **B** in the recapitulation is also obscured. In the recapitulation, **B**'s original suffix (m. 51) is omitted; instead, the melodic/motivic material first stated in m. 44 is recomposed in the recapitulation so that it now blends into a new retransition through the process of becoming before it leads to the final statement of **A** in m. 171.

The C Section (Episode 2)

In this movement, the **C** section is much easier to identify than the **B** sections were. It features a very clear beginning in m. 79 (notice also the clear separation of the end of **A** in the previous measure) and begins in the contrasting key of the submediant (A $\flat$ major). The internal form of this section could be considered a rounded binary form in which the returning **A** section is not complete and instead becomes a retransition. The internal **A** section features a modulating period (mm. 79–86) with a written-out repeat

to accommodate some textural changes (mm. 87–94). The internal **B** section is short (mm. 95–98), and the return of the internal **A** (m. 99) introduces a new texture, but the consequent phrase does not close; instead, it becomes a retransition around m. 104 that reaches a strong dominant arrival (m. 107), featuring a dramatic preparation for the return of **A** at m. 121. Though many sonata-rondo forms contain a **C** section akin to a sonata form's development section, this movement does not, and **C** is instead a clear statement of an episode in a contrasting key that leads to a retransition.

Assignments

1. Joseph Bologne, String Quartet, Op. 1, no. 4, ii, Rondeau ([.pdf](#), [.docx](#)). Access [score](#) and [audio](#).

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IV. DIATONIC HARMONY, TONICIZATION, AND MODULATION

This section introduces students to how Western classical composers use harmony to create a sense of trajectory in a phrase of music. It begins with basic diatonic harmony and ends with tonicization and modulation to closely related keys.

Prerequisites

This section assumes a familiarity with the topics covered in [Fundamentals](#). It's helpful, but not necessary, for students to have studied some counterpoint as well, particularly the [introductory chapter of that section](#).

Organization

The chapters are organized around two principles: (1) the phrase model and (2) bass-line patterns. The section starts by examining phrase endings since these are relatively formulaic, then moves to beginnings, and finally takes on middles.

DIATONIC HARMONY, TONICIZATION, AND MODULATION CHAPTERS

- Introduction to Harmony, Cadences, and Phrase Endings
- Strengthening Endings with V7
- Strengthening Endings with Strong Predominants
- Embellishing Tones
- Strengthening Endings with Cadential 6/4
- Prolonging Tonic at Phrase Beginnings with V6 and Inverted V7s
- Performing Harmonic Analysis Using the Phrase Model
- Prolongation at Phrase Beginnings using the

Leading-tone Chord

- 6/4 Chords as Forms of Prolongation
- Plagal Motion as a Form of Prolongation
- La (Scale Degree 6) in the Bass at Beginnings, Middles, and Endings
- Mi (Scale Degree 3) in the Bass at Beginnings
- Predominant Seventh Chords
- Tonicization
- Extended Tonicization and Modulation to Closely Related Keys

The first chapter introduces [the phrase model](#), defines phrase, and discusses how composers create phrase endings via cadences. It only uses I and V chords.

In the next four chapters, students learn to [strengthen cadences using \$V^7\$](#) (root position only) and [strong predominants \(IV and \$ii^{\(6\)}\$ \)](#), and [the cadential \$\frac{6}{4}\$](#) . It's important that students learn about [embellishing tones](#) before reading the cadential $\frac{6}{4}$ chapter.

The next six chapters complete the study of diatonic harmony, focusing first on how to expand the tonic at the beginning of the phrase, then on how to create length in the middle of a phrase.

The section ends with [tonicization](#) and [modulation](#). The tonicization chapter can be done in two parts: (1) tonicizations of V only; (2) tonicizations of chords other than V.

INTRODUCTION TO HARMONY, CADENCES, AND PHRASE ENDINGS

John Peterson

KEY TAKEAWAYS

- This chapter provides an introduction to the harmony section of *Open Music Theory*, then begins a discussion of how to create a sense of ending in a phrase. We focus exclusively on using I and V for now.
- Two larger concepts inform the way we present harmony here: harmonic function and the phrase model.
- Endings are often marked by cadences, of which there are two primary types: authentic cadences and half cadences.
 - Authentic cadences involve the progression V–I. They are perfect when both harmonies are in root position and *do* ($\hat{1}$) is in the soprano over tonic. If either of these conditions is not met, the authentic cadence is imperfect.
 - Half cadences involve the progression x–V, where “x” is any of a variety of harmonies.

CHAPTER PLAYLIST

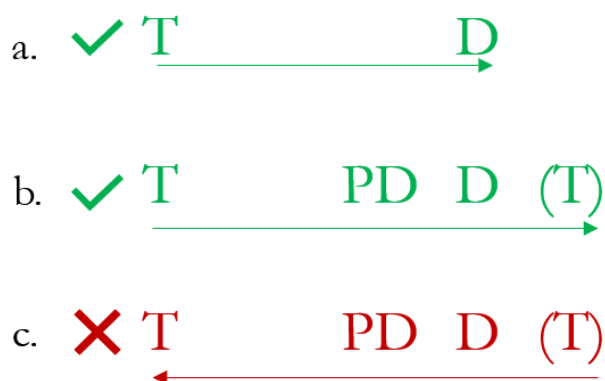
Introduction to Harmony

In this section, we'll focus on how composers of common-practice Western classical music use harmony in a phrase. Harmony is one important component (among others) of creating a phrase's sense of forward motion toward a goal. As we study harmony, it's important to keep two larger related concepts in mind: harmonic function and the phrase model.

Harmonic function refers to three categories of chords:

1. Tonic (T): Chords that sound stable, providing a sense of home or center. In Western classical music, the only chord that belongs to this category is I (in minor: i).
2. Predominant (PD): Chords that transition away from tonic function toward dominant function. This category can be split into two groups:
 - a. Strong predominants signal that a dominant function chord is imminent: IV and ii (in minor: iv and ii^o).
 - b. Weak predominants transition away from tonic, typically moving to a stronger predominant: iii and vi (in minor: VII, III, and VI).
3. Dominant (D): Chords that provide a sense of urgency to resolve toward the tonic chord: V and vii^o (the same in minor).

The phrase model refers to the typical order and flow of harmonic functions in a phrase. The principle of the phrase model is that a phrase needs at least tonic function and dominant function harmonies in order to exhibit a sense of trajectory. More often, phrases also include a predominant harmony to heighten the sense of trajectory toward closure. Phrases almost always progress from left to right in the phrase model, not from right to left, although we'll discuss some exceptions later. This is summarized in **Example 1**.



Example 1. The phrase model: (a) the minimum functions needed to create forward motion, (b) more common functional layout for a phrase (the final tonic is optional), (c) harmonic functions do not progress right to left.

Introduction to Cadences

One way to create a sense of closure at the end of a phrase is through cadences—melodic and harmonic patterns that create goals, kind of like punctuation marks in literary sentences. They're important not only because they can help you determine phrase endings, but also because they help establish a key. As a result, listening for potential cadence points is typically a good first step in analysis.

Example 2 shows two phrases and the two main categories of cadence: (1) inconclusive and (2) conclusive. The first phrase ends in m. 4 with a half cadence (HC) that sounds inconclusive. The second phrase begins in m. 5 and ends in m. 8 with an authentic cadence that sounds conclusive. The label PAC marks this as a particular kind of authentic cadence called a perfect authentic cadence, discussed below.



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Example 2. Two cadences in Joseph Boulogne, Chevalier de Saint-George's "Ballet No. 6" from *L'amant anonyme*, Act II (0:00–0:07).

Authentic Cadences (they sound conclusive!)

An authentic cadence occurs when the harmonic progression V–I (or V–i in minor) marks the end of a phrase. There are two kinds of authentic cadence:

- A perfect authentic cadence (PAC) occurs when both of the following conditions are met (**Example 2**, m. 8):
 - *Do* ($\hat{1}$) is in the soprano over the tonic chord
 - Both V and I are in root position
- An imperfect authentic cadence (IAC) occurs if either of the above two conditions isn't met, but V–I is still involved (**Example 3**). For instance, an IAC can occur when:
 - *Mi* (*me* in minor) ($\hat{3}$) is in the soprano over the tonic chord (as in **Example 3**), or
 - V, I, or both harmonies are inverted



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Example 3. An imperfect authentic cadence (IAC) in Fanny Hensel, "Ferne" Op. 9, No. 2 (0:00–0:14).

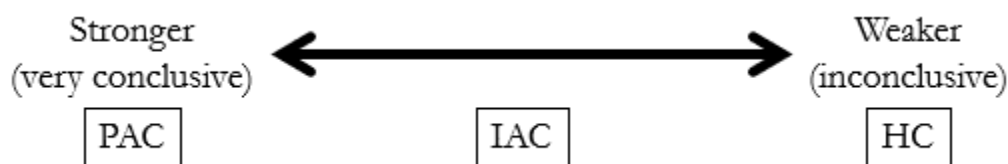
Half Cadences (they sound inconclusive!)

A half cadence (HC) occurs when a phrase ends on V ([Example 2](#), m. 4). A variety of chords can precede V, so we often refer to the harmonic progression that marks HCs as “ $x-V$.”

For now, we’ll restrict our vocabulary to only I and V chords (or i and V in minor) so we can learn some basic techniques of voice-leading.

Cadential Strength and the IAC

PACs are the strongest kind of cadence available to a composer because of the sense of finality they can create, and HCs are the weakest kind of cadence because of their unfinished sound. IACs are special because they occupy the space between HCs and PACs in terms of cadential strength ([Example 4](#)).



Example 4. Spectrum of cadential strength.

Since there are many ways to compose an IAC (a composer can theoretically use various combinations of inverted chords and scale degrees in the melody), a composer can choose to make an IAC more or less strong.

The cadence in [Example 3](#) above is relatively strong: it uses root position $V-i$ with *me* ($\hat{3}$) in the soprano, it comes at the end of a sentence in the lyrics, it uses a half note, it’s followed by a rest, and the music that follows sounds like a new phrase.

The potential IAC in [Example 5](#) is comparably weaker: it uses V^6-I , the moment goes by relatively quickly, and it’s followed by material that could easily be understood as continuing a phrase that’s under way *or* as referencing the beginning of a phrase that has just concluded, something that would strengthen reading m. 5 as an IAC. Performers may disagree on whether [Example 5](#) contains an IAC or not, and they may adjust their playing accordingly.





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Example 5. A potential IAC in *Schubert's Piano Sonata D. 845, III.*

An additional complication is that composers often avoid creating a PAC using progressions that fit the description of an IAC, but that don't mark the end of a phrase. In **Example 6**, m. 8 contains a potential IAC, but when m. 9 begins to repeat the material from m. 5 (compare the bass voice in m. 9 with the soprano in m. 5) it sounds like the passage is trying the run-up to the cadence again to achieve something stronger than the potential IAC at m. 8. We indicate that the cadence in m. 8 is subverted by crossing the label out on the score.



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Example 6. Avoiding a cadence in *Beethoven's Piano Sonata Op. 2, no. 3, I, mm. 1–13.*

With so many possibilities, how can we determine what counts as a true IAC? The next section (“Hearing Cadences”) offers some help.

Hearing Cadences

While there is certainly a degree of intuition involved with hearing cadences, it's also a skill that can be honed over time. We recommend listening for cadences following this process:

- **At first, listen and mark *potential* points of rest, goal, or closure.**
 - It's common for students to initially mark too many cadences. One rule of thumb is that unless an excerpt's tempo is quite slow, it's not common for phrases to be two measures long.
- **Next, check the harmonies involved in these**

SUMMARY: STEPS FOR HEARING CADENCES

- Mark potential cadence points

- Analyze the harmonies involved
- Listen for a sense of beginning *after* each potential cadence point

potential cadence points:

- $x-V$ = potential HC
- $V-I$ = potential AC
- If *do* ($\hat{1}$) is in the soprano over I and both harmonies are in root position, it's a potential PAC.
- If something else like *mi* ($\hat{3}$) or *sol* ($\hat{5}$) is in the soprano over I, it's a potential IAC.
 - If V, I, or both harmonies are inverted, it's a potential IAC.
- If it doesn't involve one of the above two progressions, then it's not a potential cadence. (Note that this doesn't mean it doesn't represent some kind of ending. It just means it's not a cadence.¹⁾)
- **Finally, listen for what happens after each potential cadence point.**
 - Since true cadences mark the *end* of a phrase, it's very common for cadences to be followed by a sense of beginning. This "beginning" may be a repetition of the beginning of the phrase that just ended, or it may be new material that starts a new phrase. Hearing a sense of beginning following a cadence point is a great way to help verify that what you've marked as a potential cadence is indeed a true cadence point.
 - If, instead, you hear repetition of material from the *middle* of the previous phrase, your potential cadence may not be a true cadence. Instead, it likely represents a potential cadence point that has been subverted.

Writing Authentic Cadences (with triads only)

The steps for writing a PAC or IAC are summarized in the box below and illustrated in [Examples 7–10](#).

WRITING A PAC OR IAC

1. Determine the key
2. Write the entire bass: *sol-do* ($\hat{5} - \hat{1}$)

1. Sometimes, for example, the melody suggests an ending, but the harmony doesn't participate. Or, sometimes the harmony suggests an end, but the melody refuses to close. Cadences are special goal points because they represent places where both the melody and harmony agree on a phrase ending.

3. Write the entire soprano:
 - a. PAC: *re-do* or *ti-do* ($\hat{2} - \hat{1}$ or $\hat{7} - \hat{1}$)
 - b. IAC: *re-mi* or *sol-sol* ($\hat{2} - \hat{3}$ or $\hat{5} - \hat{5}$)
4. Fill in the inner voices by asking:
 - a. What notes do I already have in the bass and soprano?
 - b. What notes do I need to complete the chord?
 - c. What note will I double? (Remember, in root position chords, it's common to double the bass.)
5. If you're writing in minor, remember that you need to use the leading-tone, *ti* ($\uparrow \hat{7}$), in your V chord (making it a major triad, not minor) to give it momentum toward the tonic.



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Example 7. Writing a PAC in a major key.



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Example 8. Writing a PAC in a minor key.



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Example 9. Writing an IAC in a major key.



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Example 10. Writing an IAC in a minor key.

Writing Half Cadences (using I and V only)

The steps for writing a HC are summarized in the box below and illustrated in **Examples 11** and **12**.

WRITING A HC:

1. Determine the key
2. Write the entire bass: *do-sol* ($\hat{1} - \hat{5}$) (note: for now, we'll use only I and V chords, although we'll see later that other chords more commonly precede V)
3. Write the entire soprano: *do-ti* or *mi-re* ($\hat{1} - \hat{7}$ or $\hat{3} - \hat{2}$) (note: *sol-sol* [$\hat{5} - \hat{5}$] is possible, but not common)
4. Fill in the inner voices by asking:
 - a. What notes do I already have?
 - b. What notes do I need to complete the chord?
 - c. What note will I double? (Remember, in root position chords, it's common to double the bass.)
5. If you're writing in minor, remember to use the leading-tone, *ti* ($\uparrow \hat{7}$), in your V chord, making it a major triad, not minor.



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Example 11. Writing a HC in a major key.



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Example 12. Writing a HC in a minor key.

Assignments

1. Introduction to harmony, cadences, and phrase endings (.pdf, .docx). Asks students to write and identify cadences using only I (or i) and V chords in major and minor.

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Example_3_Cadence_Strength_Spectrum

Footnotes

STRENGTHENING ENDINGS WITH V7

John Peterson

KEY TAKEAWAYS

- This chapter introduces how composers add a seventh to the dominant to strengthen its pull toward the tonic. There are three ways a V^7 can resolve to tonic:
 - **The default resolution:** where all active notes resolve according to their tendencies.
 - **Incomplete V^7 :** where the fifth is omitted from the V^7 and the V^7 's root is doubled instead to create a complete tonic.
 - **Leading-tone drop:** where the leading tone in a complete V^7 leaps down to *sol* ($\hat{5}$) to create a complete tonic.

The phrase in **Example 1** ends with a perfect authentic cadence (PAC) similar to those we saw and wrote in the [Introduction to Harmony, Cadences, and Endings](#) chapter. Here, however, the V chord contains an extra note, *fa* ($\hat{4}$), that transforms it from a major triad into a dominant seventh chord. Since the seventh adds dissonance (and therefore instability) to the chord, it strengthens the pull of the V chord toward I. Compare the sound of the excerpts in **Example 2**.



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Example 1. A PAC involving V^7 in Margaret Casson's *The Cuckoo*



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Example 2. A PAC involving: (a) only triads and (b) a V⁷ chord.

The Default Resolution of V⁷ to I

When the notes of a complete V⁷ chord resolve according to their typical tendencies, we end up with a tonic triad that has three roots and one third—no fifth (**Examples 3a** and **3b**). This is a completely normal, expected, and common resolution of V⁷ to I. It's okay to leave out the fifth here since it doesn't provide essential information about the chord. By contrast, the root and third are essential: the root determines the chord's name, and the third determines its quality.

The resolution in **Example 3c**, where *re* (2̂) goes up to *mi* (3̂), is very uncommon, and such an unusual doubling in the tonic chord (two roots, two thirds) usually leads to voice-leading problems. We suggest avoiding this kind of resolution.



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Example 3. Default resolution of V⁷.

To resolve V⁷ to I using a default resolution:

1. Write the entire bass: *sol* to *do* (5̂–1̂)
2. Write the entire soprano by choosing an active note to place in the soprano over V⁷, then resolving that note according to its tendency. **Example 4** shows the tendencies for active notes in V⁷.
 - a. If you are writing in minor, remember to use *ti* (↑ 7̂), not *te* (↓ 7̂) in V⁷ to make the chord major!
3. Fill in the inner voices by asking “what do I have, what do I need, and what is the tendency of those notes?”

Note in V ⁷	Resolution in I (or i)
<i>fa</i> ([\hat{4}]{/latex})	<i>mi/me</i> ([\hat{3}]{/latex})
<i>re</i> ([\hat{2}]{/latex})	<i>do</i> ([\hat{1}]{/latex})
<i>ti</i> ([\hat{7}]{/latex})	<i>do</i> ([\hat{1}]{/latex})

Example 4. *Tendencies of active notes in V⁷.*

Alternative Resolutions of V⁷ to I

Sometimes a composer may want the tonic chord to be complete rather than the incomplete chord that occurs in the default resolution. Two alternative resolutions of V⁷ make it possible to create a complete I. Note that the steps for writing remain the same as for the default resolution: write the entire bass, write the entire soprano choosing an active note over V⁷, then fill in the inner voices together as a pair by asking “what do I have, what do I need, and where do those notes go?”

Incomplete V⁷

Examples 5a and **5b** show a resolution where the fifth has been omitted from the V⁷, allowing that chord to resolve to a complete I. When we omit the fifth, we need to select a note to double in order to retain our four-voice texture. The only note we can double is the root, since doubling *ti* ($\uparrow \hat{7}$) or *fa* ($\hat{4}$) would create parallel octaves when both voices resolve according to their tendencies (**Examples 5c** and **5d**).



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Example 5. *Alternative resolution of V⁷ involving an incomplete V⁷.*

Leading-Tone Drop

It's also possible to create a complete I from a complete V⁷, but in order to do so, we have to allow a tendency tone to move somewhere other than its expected resolution. **Example 6** shows how this is

possible using a leading-tone drop.¹ Here, *ti* (↑ $\hat{7}$) drops down to *sol* ($\hat{5}$) in an inner voice. This works because: (1) *ti* (↑ $\hat{7}$) is not a dissonant note; (2) *ti* (↑ $\hat{7}$) is in an inner voice, so it's not too noticeable; and (3) *ti* (↑ $\hat{7}$) is the closest note that can move to *sol* ($\hat{5}$) in the tonic without causing parallels.



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Example 6. Alternative resolution of V⁷ involving a leading-tone drop.

Two things are worth emphasizing here:

1. Use the leading-tone drop only in the alto or tenor voice to hide the fact that it's not resolving as expected.
2. The leading tone always leaps down to *sol* ($\hat{5}$), never to *mi* ($\hat{3}$), which is further away than *sol* ($\hat{5}$).

Summary

Example 7 summarizes the three possible ways to resolve V⁷–I. You may notice that we have not discussed how V⁷ works in half cadences (HCs). V⁷ is much less common in a HC since the HC is already unstable, and adding a seventh makes it that much more unstable. Since such a cadence more often appears in Romantic music, Janet Schmalfeldt (2011, 202) has termed HCs involving V⁷ the “19th-century HC.”



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Example 7. A summary of possible resolutions of V⁷.

1. This is a term we first heard from Nancy Rogers at Florida State University. Some people describe this phenomenon as a "frustrated leading tone," but we believe that "leading-tone drop" better describes the technique.

Further Reading

- Schmalfeldt, Janet. 2011. *In the Process of Becoming: Analytic and Philosophical Perspectives on Form in Early Nineteenth-Century Music*. New York: Oxford University Press.

Assignments

1. Strengthening Endings with V⁷ ([.pdf](#), [.docx](#), [spotify playlist](#)). Asks students to write and resolve V⁷ chords and provide analysis of cadences in select passages.

Footnotes

STRENGTHENING ENDINGS WITH STRONG PREDOMINANTS

John Peterson

KEY TAKEAWAYS

This chapter introduces two strong predominants: IV and ii^6 .

- Both harmonize *fa* ($\hat{4}$) in the bass.
- They typically precede a dominant chord and predict that a dominant chord is on its way.
- The most common part-writing error when using strong predominants is parallel octaves or fifths.

CHAPTER PLAYLIST

As we noted in the [Introduction to Harmony, Cadences, and Phrase Endings](#) chapter, most phrase endings are strengthened using a strong predominant (PD) that comes before the V chord ([Example 1](#)). Another way to say this is that it's common for a phrase to end with the bass pattern *fa-sol* ($\hat{4} - \hat{5}$) in a half cadence (HC) or *fa-sol-do* ($\hat{4} - \hat{5} - \hat{1}$) in an authentic cadence (AC). The *fa* ($\hat{4}$) in the bass just before a cadence is the note that typically gets harmonized with a strong predominant ([Example 2](#))—these chords are ii^6 (the more common option) and IV.



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Example 1. Strengthened ending with a strong PD in *Maria Szymanowska, March no. 6 from Six Marches for Piano (0:00-0:16)*.



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Example 2. Placement of strong predominant at a phrase ending.

Writing with ii^6

The strong predominant area adds a degree of challenge to writing because it's where parallel octaves and fifths tend to show up (**Example 3**). You'll want to carefully check your writing around strong predominants for parallels. One thing that can help is to make as many upper voices as possible in contrary motion with the bass. Since the bass will move up from *fa* to *sol* ($\hat{4} - \hat{5}$), that means it's best to move your upper voices down. Below are the steps for writing an authentic cadence. Note that if you want to write a half cadence, you just leave off the I chord at the end.



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Example 3. Parallels in the strong predominant area.

Steps for writing with ii^6

1. Write the entire bass: *fa-sol-do* ($\hat{4} - \hat{5} - \hat{1}$).
2. Write the entire soprano:
 - a. Start with the V chord, and place an active note in the soprano.
 - b. Resolve the active note appropriately over I.
 - c. Approach the active note from above to make contrary motion with the bass, or by common tone.
3. Fill in the inner voices by asking “What do I have? What do I need? How should these voices move to create smooth motion and avoid parallels?”

- a. In ii^6 , since it's a first inversion chord, remember that you may double any note that gives you the smoothest voice leading and that avoids parallels.

This process is illustrated in **Example 4**.



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Example 4. Writing with ii^6 .

Writing with IV

The danger of writing parallels is even greater with IV than with ii^6 because of the root motion by step. Avoid doing something like **Example 5**, where all voices move upward in parallel motion. Just as with ii^6 , if you make your upper voices move in contrary motion to the bass (down) where possible, you'll avoid the problem.



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Example 5. Parallels created by moving all voices in the same direction.

The steps for writing with IV are the same as those for ii^6 : write the entire bass, write the entire soprano starting with V and working outward, then fill in the inner voices (**Example 6**). There's one important difference with respect to doubling: whereas the ii^6 chord's doubling is quite flexible since it's a first-inversion chord, the IV chord almost always sees its bass doubled since it's a root-position chord.



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Example 6. Writing with IV.

Root position ii

The ii chord in root position is much less common than ii⁶ or IV, but it can be used as a strong predominant in major keys. (In minor keys, the iio chord, like any diminished triad, doesn't normally show up in root position.)

While it's possible to write parallels with ii, it's less likely than with IV or ii⁶. **Example 7** shows some common options. Note that it's most common to place *re* or *fa* ($\hat{2}$ or $\hat{4}$), not *la* ($\hat{6}$), in the soprano over ii.



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Example 7. Writing with ii.

Using IV and ii⁽⁶⁾ in combination

Sometimes a composer will choose to use both IV and ii⁽⁶⁾ before the dominant at a phrase ending. In such cases, ii always comes after IV. Although both IV and ii⁽⁶⁾ are strong pre-dominants, ii⁽⁶⁾ shares a special relationship with the V chord that follows: the root of ii is a fifth away from the root of V, similar to how the root of V is a fifth away from the root of I (**Example 8**). This root relationship makes ii a stronger predominant than IV, which is why ii always comes after IV, never before IV, when both are used at a phrase ending.



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Example 8. Comparison of root relationships between ii–V (left) and V–I (right).

Assignments

1. Strengthening Endings with Strong Predominants ([.pdf](#), [.docx](#)). Includes part writing from Roman numerals and figures, analysis of phrase endings, and a discussion question about a number from *Hamilton*.

EMBELLISHING TONES

John Peterson

KEY TAKEAWAYS

- Embellishing tones can be grouped into three categories (summarized in **Example 13**):
 - Involving only stepwise motion: passing tone, neighbor tone
 - Involving a leap: appoggiatura, escape tone
 - Involving static notes: suspension, retardation, pedal, anticipation

CHAPTER PLAYLIST

Overview

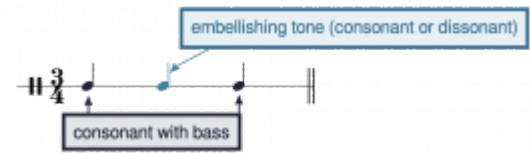
Example 1 reproduces Maria Szymanowska’s March no. 6, which we also saw in [our discussion of strong dominants](#). You might have noticed that some of the notes in the bass in mm. 8–10 don’t fit our harmonic analysis. These notes, which are blue and circled in **Example 1**, are collectively called “embellishing tones” because they embellish notes that belong to the chord. Embellishing tones can be grouped into three categories, which we describe below.



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Example 1. Embellishing tones in *Maria Szymanowska, March no. 6 from Six Marches (0:00-0:16)*.

In nearly all cases, an embellishing tone is the middle note of a three-note gesture in which the first and last notes are consonant with the bass (**Example 2**). The actual embellishing tone itself may be either consonant or dissonant with the bass. In almost all cases, however, the embellishing tone is a note that doesn't belong to the underlying chord.



Example 2. Common three-note layout of most embellishing tones.

Category 1: Embellishing tones that move by step

Example 1 showed the two kinds of embellishing tones that move by step: passing tones (PTs) and neighbor tones (NTs). Passing tones are approached by step and left by step in the *same direction*, either ascending or descending (**Example 3**). Neighbor tones are approached by step and left by step in the *opposite direction*, producing either an upper neighbor or a lower neighbor (**Example 4**).



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Example 3. Passing tones in a two-voice texture, (a) ascending and (b) descending.



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Example 4. (a) Upper neighbor and (b) lower neighbor tones in a two-voice texture.

Category 2: Embellishing tones that involve a leap

Examples 5 and **6** show the two kinds of embellishing tones that involve a leap: appoggiaturas (APPs) and escape tones (ETs). Appoggiaturas are *approached by leap and left by step* in the opposite direction

(**Example 7**). The appoggiatura typically occurs on a stronger part of the beat than its surrounding notes. Escape tones are *approached by step and left by leap* in the opposite direction (**Example 8**). The escape tone typically occurs on a weaker part of the beat than its surrounding notes. It is more common for appoggiaturas and escape tones to be left by motion downward (**Examples 7a** and **8a**) than upward (**7b** and **8b**).



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Example 5. An appoggiatura in Joseph Boulogne, *String Quartet no. 4, I, mm. 5–9* ([0:09-0:19](#)).



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Example 6. An escape tone in Margaret Casson, “The Cuckoo.”



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Example 7. Appoggiaturas in a two-voice texture.



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Example 8. Escape tones in a two-voice texture.

Category 3: Embellishing tones involving static

notes

Examples 9–11 show three of the four kinds of embellishing tones that involve static notes (i.e., notes that don’t move): suspensions (SUS), retardations (RET), and pedal tones (PED). A fourth kind of embellishing tone, the anticipation, deserves special comment below.

Suspensions are approached by a static note and left by step down, while retardations are approached by a static note and left by step up (**Examples 9 and 10**). Both suspensions and retardations are always on a stronger part of the beat than the surrounding notes. (Suspensions are discussed in greater detail in the [chapter on fourth species counterpoint](#).)

Pedal tones are often found in the bass. They consist of a series of static notes below chord changes that do not include the bass. We typically label them using the scale degree number of the pedal note, as in **Example 11**.



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Example 9. Suspensions and a retardation in Joseph Boulogne’s String Quartet no. 4, I, mm. 47–49 (1:30–1:36).



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Example 10. (a) Suspension and (b) retardation in a two-voice texture.



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Example 11. Pedal tone in Josephine Lang’s “Dem Königs-Sohn,” mm. 16–18.

Anticipations

Like the suspension, retardation, and pedal tone, anticipations also involve static notes. But anticipations are a two-note (rather than three-note) gesture, in which a chord tone is heard early as a non-chord tone (**Example 12**). In other words, it “anticipates” its upcoming membership in a chord.



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Example 12. An anticipation in Josephine Lang’s “Erinnerung,” mm. 29–30 (1:54–1:59).

Summary

The table in **Example 13** provides a summary of the embellishing tones covered in this chapter.

Category	Embellishing Tone	Approached by	Left by	Direction	Additional Detail
Involving steps	Passing Tone (PT)	Step	Step	Same	May ascend or descend
	Neighbor Tone (NT)	Step	Step	Opposite	Both upper and lower exist
Involving a leap	Appoggiatura (APP)	Leap	Step	Opposite	Appoggiatura is usually on a strong part of the beat
	Escape Tone (ET)	Step	Leap	Opposite	Escape tone is usually on a weaker part of the beat
Involving static notes	Suspension	Static note	Step	Down	Suspension is always on a stronger part of the beat
	Retardation	Static note	Step	Up	Retardation is always on a stronger part of the beat
	Pedal Tone ([$\hat{x}$] Ped)	Static note	Static note	N/A	
	Anticipation (ANT)	N/A	Static note	N/A	The anticipation is usually on a weaker part of the beat

Example 13. Summary of embellishing tones.

Assignments

1. Embellishing tones ([.pdf](#), [.docx](#)). Asks students to write embellishing tones in a two-voice texture and label embellishing tones in an excerpt.

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STRENGTHENING ENDINGS WITH CADENTIAL 6/4

John Peterson

KEY TAKEAWAYS

- This chapter introduces the cadential $\frac{6}{4}$ ($\text{cad.}\frac{6}{4}$), an embellishment of the dominant that results from the combination of two embellishing tones a sixth and a fourth above the bass note *sol* ($\hat{5}$). We label the $\text{cad.}\frac{6}{4}$ and its resolution to $V^{(7)}$ as one unit: $V \begin{smallmatrix} (8-7) \\ 6-5 \\ 4-3 \end{smallmatrix}$.
- Any chord that normally approaches V can approach $\text{cad.}\frac{6}{4}$. Most commonly, this is one of the strong predominants.
- When resolving $\text{cad.}\frac{6}{4}$, be sure to follow the figures such that the sixth above the bass falls to a fifth above the bass and the fourth above the bass falls to a third above the bass.

CHAPTER PLAYLIST

So far, we've seen that the dominant can be strengthened, particularly at authentic cadences, by the [addition of a seventh](#). We also saw that both half cadences and authentic cadences are commonly strengthened [using a strong predominant](#). In this chapter, we look at another way to strengthen the the dominant's drive toward resolution: the cadential $\frac{6}{4}$ ($\text{cad.}\frac{6}{4}$).

The authentic cadence in **Example 1** involves a V^7 that has been embellished by $\text{cad.}\frac{6}{4}$. We use the word “embellished” intentionally here because the $\text{cad.}\frac{6}{4}$ comprises two embellishing tones that appear over *sol* ($\hat{5}$) in the bass. In **Example 1**, the embellishing tones are a passing tone and a suspension. These embellishing tones happen to always be a sixth and a fourth above the bass, and their appearance often

intensifies the expectation to hear a cadence, hence the name “cad. $\frac{6}{4}$.” Although the cad. $\frac{6}{4}$ often shows up at cadence points, it may show up anywhere in a phrase as an embellishment of $V^{(7)}$.



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Example 1. cad. $\frac{6}{4}$ in Joseph Boulogne’s *String Quartet no. 4, I*, mm. 45–47 ([1:26–1:30](#)).

A note on $\frac{6}{4}$ chords.

$\frac{6}{4}$ chords are special because they involve a dissonance (the fourth) with the bass. Composers therefore treat $\frac{6}{4}$ chords in distinct ways, which fall into four categories. To acknowledge their special usage, each variety of $\frac{6}{4}$ chord has its own label that relates to how the chord functions. Future chapters will introduce the remaining $\frac{6}{4}$ chord types.

Labeling cadential 6/4

You might have noticed that the cad. $\frac{6}{4}$ in **Example 1** involves the notes B $\flat$, G, and E $\flat$, which spells a tonic triad in second inversion in the excerpt’s key. Why are we labeling this chord V_4^6 , then? Besides the fact that cad. $\frac{6}{4}$ arises from the combination of two embellishing tones (and therefore isn’t a standalone triad), here are two additional reasons to use the label V_4^6 over I_4^6 :

1. The chord appears after a strong predominant. If we label it I_4^6 , we’d be implying that a predominant goes to tonic, which is not the sound we hear, given that *sol* ($\hat{5}$) is in the bass.
2. V_4^6 reflects the chord’s sound as an elaboration of V, whereas I_4^6 reflects the chord’s spelling only.¹

1. If you’re not convinced by the sound of the chord argument, try playing the passage in **Example 1**, but stop on the

Writing with cadential 6/4

Spelling cadential 6/4 in four voices

To spell cad._4^6 , do the following (**Example 2**):

1. Write *sol* ($\hat{5}$) in the bass
2. Determine what notes are a sixth and fourth above the bass. Choose one of those notes to place in the soprano. The other will go in an inner voice in step 3.
3. Fill in the inner voices: one voice will double the bass, which is a necessity in cad._4^6 to avoid parallels. The other will take the unused note from step 2.



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Example 2. Spelling cad._4^6 .

Voice leading with cadential 6/4

Resolution

Cadential cad._4^6 can resolve either to a V triad (**Examples 3a, 3c**) or a V^7 chord (**Examples 3b, 3d**). The lines in the label cad._4^6 tell you how the cad._4^6 resolves, indicating “keep this motion in the same voice.” That is, whichever voice has a sixth above the bass should fall to a fifth above the bass, and whichever voice has the fourth above the bass should fall to a third above the bass.

Adding a seventh is just as straightforward: whatever voice is doubling the bass moves down a step to take the seventh of the chord. This motion is reflected by the figures 8-7 (the octave above the bass moves down to a seventh above the bass).

cad._4^6 . Does it sound stable? Probably not. Tonic chords are associated with stability and a sense of “home,” while dominants are associated with a desire to resolve. The cad._4^6 surely sounds more unstable than stable.



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Example 3. Resolving cad._4^6 .

Approaching cadential 6/4

Since the cad._4^6 embellishes the dominant, any harmony that approaches V can also approach cad._4^6 . Most commonly, though, these are the strong predominants IV and ii^6 (Example 4).

Two guidelines apply here:

1. As always when dealing with the predominant area, watch out for parallel octaves between the predominant and cad._4^6 .
2. Motion into (and out of) the cad._4^6 is usually very smooth. Avoid leaping to a member of the cad._4^6 . While composers do occasionally leap to the sixth above the bass, it's comparatively much rarer to leap to the fourth above the bass because it's a dissonance, so that in particular should be avoided.



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Example 4. Approaching cad._4^6 .

Assignments

1. Strengthening Endings with Cadential $\frac{6}{4}$ (.pdf, .docx, .mscz of score). Includes unfigured bass exercises and analysis.

Footnotes

PROLONGING TONIC AT PHRASE BEGINNINGS WITH V6 AND INVERTED V7S

John Peterson

KEY TAKEAWAYS

- Prolongation is a common feature of phrase beginnings in Western classical music.
- The most common way to prolong the tonic is by alternating tonic with V^6 or inverted V^7 chords.

CHAPTER PLAYLIST

Overview

Phrase beginnings in Western classical music typically feature a prolongation of tonic harmony to establish the home key. “Prolongation” just means that the harmony’s influence lasts longer than a single chord. Say, for example, that you bought a serving of ice cream that you wanted to enjoy over an extended period. One way to do it would be to take small bites to extend the length of time you’re eating. While this method would work, you might be eating ice cream soup by the end. Another way to do it would be to eat some, put it in the freezer, do some other activity, then come back and eat some more. You might say, “I’ve been eating ice cream all day,” even though you haven’t literally been eating ice cream every second of the day (as much as you might want to).

Something analogous happens in music. We could prolong the tonic’s importance at the beginning of a phrase by holding or repeating the chord (like taking small bites of the ice cream), as in [Example 1](#),

but more interesting and rewarding is to use other chords between instances of the tonic (like putting the ice cream in the freezer and coming back to it later).



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Example 1. Prolongation by sustaining or repeating a chord.

Example 2 shows one instance of the most common way to prolong tonic at the beginning of a phrase: using inverted V^7 s between tonic triads. The tonic's influence is felt more strongly because (1) it's on stronger beats or hyperbeats than the V^7 , and (2) it appears at least once in root position, whereas the V^7 is in a weaker inversion.



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Example 2. Tonic prolongation in Clara Schumann, Piano Trio, III, mm. 1–2 ([0:00-0:08](#)).

Writing Tonic Prolongations

The tonic prolongations covered in this chapter are the ones most commonly seen in Western classical music, and they all share several traits:

- They are three chords long
- The first and last chords are I or I^6
- The middle chord is V^6 or an inverted V^7
- The V^6 or inverted V^7 resolves using the same principles we learned in [Strengthening Endings with Cadential \$\frac{6}{4}\$](#)

Prolonging with V6/5 and V6

V_5^6 typically prolongs root position I in the progression $I - V_5^6 - I$ (**Example 3**). This is because *ti* ($\hat{7}$) is in the bass, and we know that *ti* ($\hat{7}$) must resolve to *do* ($\hat{1}$). As always, follow the typical writing procedure.



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Example 3. Tonic prolongation involving V_5^6 .

It's also possible to prolong tonic with V^6 rather than V_5^6 , though this is less common (**Example 4**).



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Example 4. Tonic prolongation involving V^6 .

Prolonging with V4/2

V_2^4 usually helps us move from root position to first inversion I in the progression $I - V_2^4 - I^6$ (**Example 5**). This is because V_2^4 has *fa* ($\hat{4}$) in the bass, which must resolve to *mi* ($\hat{3}$) since *fa* ($\hat{4}$) is the chordal seventh. Again, follow the typical writing procedure.



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Example 5. Tonic prolongation involving V_2^4 .

Prolonging with V4/3

Most commonly, V_3^4 helps us move from root position to first inversion I in the progression $I - V_3^4 - I^6$ (**Example 6**). It occasionally prolongs root position tonic in the progression $I - V_3^4 - I$, but this isn't very common (**Example 7**). These options are available because V_3^4 's bass note, *re* ($\hat{2}$), may go either to *do* ($\hat{1}$) or to *mi* ($\hat{3}$). Again, follow the typical writing procedure.



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Example 6. Tonic prolongation involving V_3^4 .



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Example 7. Less common tonic prolongation involving V_3^4 .

Writing with V_3^4 also offers one exception to the rule that the chordal seventh, *fa* ($\hat{4}$), must resolve down (**Example 8**). Here, *fa* moves up to *sol* ($\hat{4} - \hat{5}$). This exception is made possible because the bass creates parallel tenths with the upper voice that takes the line *mi-fa-sol* ($\hat{3} - \hat{4} - \hat{5}$).



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Example 8. Exception to the typical resolution of the chordal seventh.

Combining Progressions

By chaining together several of these tonic prolongation progressions, composers can extend the tonic’s influence for quite a while at the beginning of a phrase, as in **Example 2**. A part-written example is given in **Example 9**.



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Example 9. Extensive tonic prolongation.

Bass Line Summary

A summary of the four tonic-prolongation bass lines discussed in this chapter, along with their associated progressions, is given in **Example 10**.

Bass	Progression
do–ti–do ($\hat{1}$ – $\hat{7}$ – $\hat{1}$)	I – V $\begin{smallmatrix} \text{begin} \\ \text{end} \end{smallmatrix}$
do–re–mi ($\hat{1}$ – $\hat{2}$ – $\hat{3}$)	I – V $\begin{smallmatrix} \text{begin} \\ \text{end} \end{smallmatrix}$ – I^6
do–re–do ($\hat{1}$ – $\hat{2}$ – $\hat{1}$)	I – V $\begin{smallmatrix} \text{begin} \\ \text{end} \end{smallmatrix}$
do–fa–mi ($\hat{1}$ – $\hat{4}$ – $\hat{3}$)	I – V $\begin{smallmatrix} \text{begin} \\ \text{end} \end{smallmatrix}$ – I^6

Example 10. Summary of bass lines and their associated tonic prolongation progressions.

Assignments

1. Prolonging Tonic at Phrase Beginnings with V⁶ and Inverted V⁷ (.pdf, .docx, recording). Asks students to write from Roman numerals and figures and complete a guided analysis. [Download score](#).

PERFORMING HARMONIC ANALYSIS USING THE PHRASE MODEL

John Peterson

KEY TAKEAWAYS

This chapter provides a strategy for harmonic analysis, in which we use the bass line to make an educated guess about what harmonic progression is active in a phrase:

1. Identify phrase endings by listening.
2. Provide a harmonic analysis of each phrase ending's cadence.
3. Identify the strong predominant that leads to the cadence.
4. Back up the the beginning of the phrase and analyze toward the cadence.

Overview

So far, we've mostly been looking at short segments of music, focusing on how composers create a sense of beginning and ending in a phrase. In this chapter, we consider a longer phrase of music that employs some of the harmony we've learned so far, with the goal of learning how to perform a harmonic analysis quickly and how to identify the phrase model at work in our analysis. The video lesson below (**Example 1**) walks through the process and is followed by an outline of the steps (along with some guidance).



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Example 1. Video lesson on harmonic analysis.

Performing a Harmonic Analysis

1. Identify phrase endings.
 - It's often helpful to listen for:
 - A new phrase beginning or a repetition of a previous phrase beginning. This tells you an “old” phrase must have just ended.
 - A sense of goal, often marked by a cadence.
2. Analyze the phrase ending.
 - Listen, and label the cadence if present (it often is).
 - Provide a harmonic analysis of the ending:
 - You know that if there's a half cadence, the phrase ends on V, and if there's an authentic cadence, the phrase ends with V⁽⁷⁾-I. Look for *sol* ($\hat{5}$) in the bass at a HC or *sol-do* ($\hat{5} - \hat{1}$) in the bass at an AC.
 - Be careful to look for (cad. $\frac{6}{4}$), which is often present at a cadence.
3. Look for a strong predominant.
 - Back up from the cadence to look for a strong predominant. Remember that usually *fa* ($\hat{4}$) is in the bass for the strong predominant, though *re* ($\hat{2}$) is also possible.
4. Analyze from the beginning.
 - Use your knowledge of tonic prolongations and take a look at the bass line to make an educated guess about what you think is happening to prolong tonic. Verify your guess to make sure it's accurate by taking stock of the notes in the chord above each bass note.

Identifying the Phrase Model in Harmonic Analysis

To identify how the phrase model operates in a given phrase, we can apply the harmonic function labels we learned in [Introduction to Harmony, Cadences, and Phrase Endings](#). For each phrase, we get one (and only one!) set of the labels **Tb-PD-D-Te**: Tonic beginning, Predominant, Dominant, and Tonic ending. To apply them, do the following:

1. Locate the phrase ending.
 - a. Apply the **D** label to the cadential dominant.
 - b. If the phrase ends with an authentic cadence, apply the **Te** label to the tonic of the cadence. If it ends with a half cadence, you can omit this label.

2. Locate the strong predominant.
 - a. The **PD** label goes on the first strong predominant (reading left to right) that comes immediately before the cadential dominant.
3. Label the opening tonic.
 - a. The **Tb** label goes on the tonic that starts the phrase. Rarely, a phrase may delay this tonic or may omit it altogether. This kind of delay or omission is more common in Romantic music.

Assignments

1. Performing Harmonic Analysis Using the Phrase Model ([.pdf](#), [.docx](#)). Asks students to analyze three short excerpts.

PROLONGATION AT PHRASE BEGINNINGS USING THE LEADING-TONE CHORD

John Peterson

KEY TAKEAWAYS

- Instead of using an inverted V^7 chord to prolong tonic, composers sometimes use vii^{o7} or its inversions.
- Each inversion of vii^{o7} can be used in the same way as a particular inversion of V^7 . The pairings of V^7 and vii^{o7} are based on the bass note each chord harmonizes.
 - vii^{o7} can be used anywhere that V^6_5 or V^6 can be used.
 - vii^{o6}_5 or vii^{o6} can be used in place of V^4_3 .
 - vii^{o4}_3 can be used in place of V^4_2 .

CHAPTER PLAYLIST

Overview

Earlier, we saw how the [tonic can be prolonged](#) using essentially four kinds of progressions, which we categorized according to their basslines (see the [summary section of that chapter](#) for a reminder). In this chapter, we consider an alternative way to harmonize those same tonic-prolongation bass lines using a harmony that can substitute for V^7 : the leading-tone chord. **Example 1** shows a passage from Mozart’s “Agnus Dei” that uses vii^{o7} and its inversions to prolong tonic. Below the actual version, a recomposition shows that the bass line from the actual version can also be harmonized with V^7 and its inversions. As you listen, notice the differences in color between the two versions. You may hear that the actual version is full of a wonderful tension that is less present in the recomposed version.



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Example 1. Using vii^{o7} vs. V^7 in Mozart, “Agnus Dei” from *Requiem* (0:06–0:20).

Before we address how this substitution works, here are three points we need to emphasize:

1. The leading-tone chord as a triad is always used in first inversion vii^{o6} . This is because any other inversion creates a dissonance with the bass that composers tend to avoid.
2. In minor, we need to remember to use *ti* ($\uparrow \hat{7}$), not *te* ($\downarrow \hat{7}$), to build the leading-tone chord. In other words, remember to raise the leading tone.
3. In major, the leading-tone seventh chord’s quality is half diminished if we don’t alter it (e.g. in C major: B-D-F-A). Composers tend to prefer the sound of a fully diminished 7th chord, though, so we nearly always find that in major keys, composers lower the chordal seventh to make the chord fully diminished (e.g., in C major: B-D-F-A $\flat$) (**Example 2**). You can use both, but vii^{o7} is much more common than vii^{o7} , and we’ll see why below.



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Example 2. Comparing qualities of leading-tone seventh chords.

Substituting the leading-tone chord in place of $\text{V}^{(7)}$

Almost all inversions of vii^{o7} (plus vii^{o6}) can substitute for an inversion of V^7 (and V^6) according to which note is in the bass (**Example 3**). What this means is that, for example, vii^{o7} can be used anywhere that V_5^6 or V^6 can be used. Similarly, vii^{o6}_5 or vii^{o6} can be used in place of V_3^4 , and vii^{o4}_3 can be used in place of V_2^4 .

Bass note	V^7	$\mathrm{vii}^{\circ 7}$
ti ($\hat{7}$)	$\mathrm{V}^{\begin{smallmatrix} 6 \\ 5 \end{smallmatrix}}$	$\mathrm{vii}^{\circ 7}$
re ($\hat{2}$)	$\mathrm{V}^{\begin{smallmatrix} 4 \\ 3 \end{smallmatrix}}$	$\mathrm{vii}^{\circ 7} \begin{smallmatrix} 6 \\ 5 \end{smallmatrix}$
fa ($\hat{4}$)	$\mathrm{V}^{\begin{smallmatrix} 4 \\ 2 \end{smallmatrix}}$	$\mathrm{vii}^{\circ 7} \begin{smallmatrix} 4 \\ 3 \end{smallmatrix}$

Example 3. Substituting $\mathrm{vii}^{\circ 7}$ for V^7 according to which note is in the bass.

Luckily, there isn't too much else to learn with respect to part writing. Continue to follow typical part-writing procedures and to resolve active notes in the upper voices according to their tendencies. **Example 4** reviews these tendencies and adds the one new note we haven't seen yet in a dominant-function chord: le/la ($\downarrow \hat{6}/\hat{6}$). **Example 5** shows tonic prolongations involving $\mathrm{vii}^{\circ 7}$ and its inversions, and it compares each to a corresponding prolongation involving V^7 and its inversions.

Active note	Resolution
ti ($\hat{7}$)	do ($\hat{1}$)
re ($\hat{2}$)	do ($\hat{1}$)
fa ($\hat{4}$)	mi ($\hat{3}$)
le/la ($\downarrow \hat{6}/\hat{6}$)	sol ($\hat{5}$)

Example 4. Tendencies of active notes in dominant-function chords.



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Example 5. Writing with $\mathrm{vii}^{\circ 6}$ and $\mathrm{vii}^{\circ 7}$ and its inversions.

$\mathrm{vii}^{\circ 4/2}$

You might have noticed that $\mathrm{vii}^{\circ 4/2}$ doesn't correspond to an inversion of V^7 . That's because it's built on le ($\downarrow \hat{6}$), which isn't in V^7 . $\mathrm{vii}^{\circ 4/2}$ is a very rare harmony because the expected resolution from le down

to *sol* ($\downarrow \hat{6} - \hat{5}$) (see **Example 4**) occurs in the bass. So far, we've seen that *sol* ($\hat{5}$) in the bass typically supports V or V^7 , and that's also the case here: $\text{vii}^{\circ} \frac{4}{2}$ goes to $\text{cad.}^{\frac{6}{4}}$ (**Example 6**). Again, though, $\text{vii}^{\circ} \frac{4}{2}$ is not a very common chord.



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Example 6. Using $\text{vii}^{\circ} \frac{4}{2}$.

Using the leading-tone chord as a half-diminished seventh chord

$\text{vii}^{\circ 7}$ presents voice-leading challenges that are not present with $\text{vii}^{\circ 7}$ because it contains a perfect fifth between *re* ($\hat{2}$) and *la* ($\hat{6}$). This is perhaps another reason that composers favor $\text{vii}^{\circ 7}$ over $\text{vii}^{\circ 7}$: with $\circ 7$, we need to watch out for parallel fifths, as in **Example 7**. An easy way to avoid them is to always make sure that *re* ($\hat{2}$) is above *la* ($\hat{6}$) when you use $\text{vii}^{\circ 7}$ or its inversions. The one time where this advice is impossible is with $\text{vii}^{\circ} \frac{6}{5}$, where *re* ($\hat{2}$) is in the bass. Although it's possible to avoid parallels with $\text{vii}^{\circ} \frac{6}{5}$, we'd recommend just using $\text{vii}^{\circ} \frac{6}{5}$ instead.



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Example 7. Using $\text{vii}^{\circ 7}$ and its inversions.

Assignments

1. Prolongation at Phrase Beginnings using the Leading-tone Chord ([.pdf](#), [.docx](#)). Asks students to write from Roman numerals, complete analysis, and realize figured bass.

6/4 CHORDS AS FORMS OF PROLONGATION

John Peterson

KEY TAKEAWAYS

This chapter introduces three additional $\frac{6}{4}$ chords beyond cadential $\frac{6}{4}$.

- Passing (pass.) $\frac{6}{4}$ involves a passing tone in the bass that has been harmonized by a $\frac{6}{4}$ chord. It typically prolongs tonic or predominant harmonies, and it always occurs between two chords of the same function.
- Neighbor (n.) $\frac{6}{4}$ involves a static bass above which two of the upper voices perform upper neighbor motion. It typically prolongs tonic or dominant harmonies, and the chords on both sides of it are always in root position.
- Arpeggiating (arp.) $\frac{6}{4}$ involves a bass that arpeggiates through the fifth of the chord while the upper voices sustain the chord in some way. It may prolong any harmony, and we don't typically bother recognizing it in analysis.

The table in **Example 6** below summarizes the characteristics of each of the three types of $\frac{6}{4}$ that we advocate labeling in analysis.

CHAPTER PLAYLIST

So far, we've seen that the tonic (T) area is most commonly prolonged using dominant-function chords, especially inverted ∇^7 s. In this chapter, we look at some additional, less common ways to prolong not only tonic chords, but also dominant and predominant chords. Earlier, we saw how $\frac{6}{4}$ chords are treated in special ways because they contain a dissonance with the bass (the fourth). We've already learned about $\text{cad.}\frac{6}{4}$; here, we turn to the three other ways $\frac{6}{4}$ chords can be used: passing $\frac{6}{4}$, neighboring $\frac{6}{4}$, and

arpeggiating pass._4^6 . Note that in analysis, whenever you encounter a pass._4^6 chord, you should stop and identify which kind it is (cadential, passing, neighboring, or arpeggiating) because the kind of pass._4^6 determines the label. For pass._4^6 chords, the Roman numeral by itself isn't a sufficient label—the type also needs to be included.

Passing pass._4^6

The passing (pass.) pass._4^6 is a pass._4^6 chord built on a passing tone in the bass (**Example 1**). It's most commonly found prolonging tonic or predominant harmonies. Importantly, the chords on both sides of the pass._4^6 are always the same function (e.g., $\text{IV}^6 - \text{pass.}_4^6 - \text{ii}^6$), not of different function (e.g., $\text{IV}^6 - \text{pass.}_4^6 - \text{I}$).



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Example 1. pass._4^6 in Beethoven, *Piano Sonata Op. 14, no. 1, I*, mm. 50–57 ([1:28–1:42](#)).

Example 2a demonstrates the steps for writing pass._4^6 to expand tonic, and **Examples 2b** and **2c** show several ways pass._4^6 can prolong the predominant area. Note that each of these progressions can also work backward (e.g., $\text{I}^6 - \text{pass.}_4^6 - \text{I}$ also works).

To write with pass._4^6 :

1. **Write the entire bass.** You should have three notes in stepwise motion where the first and last notes belong to the same functional area (T or PD). The middle note will be your passing tone.
2. **Spell the pass._4^6 .** Just like with cad._4^6 , to spell pass._4^6 , determine what notes are a fourth and sixth above the bass. One voice will double the bass, just like in cad._4^6 .
3. **Write the entire soprano.** The soprano should be a line that moves by step, not the static line.
4. **Fill in inner voices, making them move as little as possible.**

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Example 2. Writing with pass._4^6 .

Neighbor $\frac{6}{4}$

The neighbor (n.) $\frac{6}{4}$ consists of a static bass over top of which two voices have upper-neighbor motion (**Example 3**). Sometimes n._4^6 is called pedal $\frac{6}{4}$, a name that reflects the static pedal in the bass. It's most commonly found prolonging I or V. **Example 4a** demonstrates the steps for writing n._4^6 to prolong tonic, and **Example 4b** shows the voice leading to prolong V.



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Example 3. Neighbor and arpeggiating $\frac{6}{4}$ in Josephine Lang, "Dem Königs-Sohn."

To write with n._4^6 :

1. **Write the entire bass.** The bass will be three of the same note, typically *do–do–do* or *sol–sol–sol* ($\hat{1} - \hat{1} - \hat{1}$ or $\hat{5} - \hat{5} - \hat{5}$)
2. **Spell n._4^6 .** The n._4^6 will be over the middle bass note. As with cad. and pass._4^6 , determine a sixth and fourth above the middle bass note. One voice will double the bass.
3. **Write the entire soprano.** For the soprano, choose either an upper-neighbor line or the static line. Unlike with cad. or pass._4^6 , n._4^6 will more frequently have a static line in the soprano.
4. **Fill in the inner voices, making them move as little as possible.**





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Example 4. Writing with $n.\frac{6}{4}$.

Arpeggiating $\frac{6}{4}$

Arpeggiating (arp.) $\frac{6}{4}$ is typically created when the bass leaps to the fifth of a chord while the upper voices sustain the chord. It's commonly found in, for example, ending bass arpeggiations (**Example 3**) or waltz-style accompaniments (**Example 5**). Unlike the other types, arp. $\frac{6}{4}$ typically doesn't need to be labeled in analysis. **Example 5** identifies it using figures, but it's not necessary to do so—each measure could simply be labeled as I.



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Example 5. Arpeggiating $\frac{6}{4}$ in Sophie de Auguste Weyrauch, *Six Danses No. 3*.

Summary: 6/4 chord types

The table in **Example 6** summarizes the characteristics of the three $\frac{6}{4}$ chord types that should be labeled in analysis. When you come across a $\frac{6}{4}$ chord in analysis, remember to stop and ask yourself what type it is (passing, neighboring, or cadential) and label it appropriately.

6/4 chord	Label	Characteristics
Passing	$\mathrm{pass.^6_4}$	• Passing tone in bass • Outer chords are same function
Neighboring	x^{5-6-5}_{3-4-3}	• Static bass • Upper neighbor motion in two upper voices • Outer chords are the same
Cadential	$\mathrm{V}\begin{smallmatrix}(8-7)\backslash6-5\backslash4-3\end{smallmatrix}$	• <i>Sol</i> $\hat{5}$ in bass • $^6_4$ on stronger beat

Example 6. Summary of $^6_4$ chord types.

Assignments

1. $^6_4$ chords as forms of prolongation ([.pdf](#), [.docx](#)). Asks students to review previous concepts, write from Roman numerals, write from figures, and analyze excerpts.

PLAGAL MOTION AS A FORM OF PROLONGATION

John Peterson

KEY TAKEAWAYS

- Plagal motion from IV to I serves to prolong tonic either after an authentic cadence (AC) or at the beginning of a phrase.
- We place plagal (IV) in parentheses in analysis to differentiate it from the more common use of IV as a predominant.
- In 18th- and 19th-century music, this use of (IV) more commonly occurs as part of a prolongation rather than as part of a cadence, so this part of the book will use the term “plagal motion” rather than “plagal cadence.”
- Writing with plagal motion is not difficult when both harmonies are in root position, but watch for parallels when either harmony is inverted.

CHAPTER PLAYLIST

Earlier we saw that chords that function as predominants, such as ii and IV, are typically used to strengthen a phrase’s motion toward the dominant, often at the end of a phrase. In this chapter, we look at a special situation in which IV functions not as a predominant but rather to prolong I, which produces plagal motion. In analysis, we place plagal (IV) in parentheses to differentiate it from the more common use of IV as a predominant. Plagal motion most commonly serves to prolong tonic in two places: after an authentic cadence (as in **Example 1**) or at the beginning of a phrase in place of the more common tonic prolongations involving dominant-function chords.



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Example 1. Plagal motion after a PAC in Handel, “Hallelujah Chorus,” from *Messiah* (3:02-3:29).

PLAGAL MOTION VERSUS PLAGAL CADENCE

You may sometimes see all (IV)–I motions described as “plagal cadences,” but this part of the book uses the broader term “plagal motion” instead, preserving our definition of cadences as marking the ends of phrases. While true phrase endings involving the progression (IV)–I do exist, in 18th-century classical music, it’s more common to see a (IV)–I tonic prolongation either after a PAC or at the beginning of a phrase. Using “plagal cadence” in all scenarios would inaccurately imply that (IV)–I always ends a phrase, whereas “plagal motion” allows us to describe the more common usage of (IV)–I as prolongational without rejecting the situations in which (IV)–I really does end a phrase.

Writing plagal motion after an authentic cadence

It’s most common to see both I and (IV) in root position when composers use plagal motion after an authentic cadence. The progression isn’t difficult to write, since the danger of parallels is low, provided you follow three pieces of advice (**Example 2**):

1. Make both I and (IV) complete (don’t omit the fifth).
2. Double the bass (as is common in root position chords).
3. Move all upper voices by step or common tone.

It’s most common to have *do* ($\hat{1}$) in the soprano, which makes sense given that plagal motion comes after a PAC where the melody has already completed its journey toward *do* ($\hat{1}$). As always, follow typical writing procedures.



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Example 2. Writing plagal motion with root-position chords.

Writing plagal motion at a phrase beginning

While the root-position version of plagal motion (as in **Example 2**) also occurs at phrase beginnings sometimes, **Example 3** shows that (IV) can also go to I^6 . Here, watch for parallels between (IV) and I^6 : if the alto in **Example 3** went to G (shown in parentheses) instead of $B\flat$, it would create parallel octaves with the bass. Remember that it's more common by far for tonic to be prolonged by an inverted V^7 than by (IV) at a phrase beginning. When you see *fa-mi* ($\hat{4} - \hat{3}$) at the beginning of a phrase, your instinct should still be to use $V_2^4 - I^6$ rather than (IV) – I^6 .



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Example 3. Writing plagal motion with an inverted tonic.

Assignments

1. Plagal Motion as a Form of Prolongation ([.pdf](#), [.docx](#)). Asks students to identify bass lines and analyze an excerpt. [Download audio \(.m4a\)](#).

LA (SCALE DEGREE 6) IN THE BASS AT BEGINNINGS, MIDDLES, AND ENDINGS

John Peterson

KEY TAKEAWAYS

This chapter discusses the various ways in which composers harmonize *la* ($\hat{6}$) in the bass depending on where it's found within a phrase: beginning, middle, or ending.

- At phrase beginnings, *la* ($\hat{6}$) is often used to prolong tonic in two ways:
 - harmonized with IV^6 in the progression $I - IV^6 - V^6 - I$ ([Examples 1 and 3](#))
 - harmonized with plagal (IV^6) in the progression $I - IV^6 - I^6$ ([Examples 2 and 4](#))
- At phrase middles, *la* ($\hat{6}$) is often used:
 - in a deceptive motion ($V^{(7)} - vi$) ([Examples 5 and 7](#))
 - to connect the tonic (T) and strong predominant (PD) areas, harmonized with vi ([Examples 6 and 8](#))
- At phrase endings, *la* ($\hat{6}$) is often used:
 - to create a phrygian half cadence ($iv^6 - V$ in minor) ([Examples 7 and 9](#))
 - as a “stand-in” for the expected strong PD note *fa* ($\hat{4}$) ([Example 10](#))

CHAPTER PLAYLIST

Overview: uses of *la* (scale degree 6)

So far, we've seen every scale degree appear in the bass except for *la* ($\hat{6}$). In this chapter, we see that *la*

($\hat{6}$) is commonly harmonized by two chords: vi or IV^6 . It may show up in beginnings, middles, or endings of phrases, and each location is associated with particular progressions that involve la ($\hat{6}$) in the bass.

At phrase beginnings

When la ($\hat{6}$) appears in the bass at the beginning of a phrase, it typically prolongs tonic in one of two ways: (1) using IV^6 as a predominant in the progression $I - IV^6 - V_5^6 - I$ (**Example 1**), or (2) using plagal (IV^6) in the progression $I - IV^6 - I^6$ (**Example 2**).



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Example 1. Tonic prolongation via $I - IV^6 - V_5^6 - I$ in Josephine Lang, *Arie*.



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Example 2. Tonic prolongation via $I - IV^6 - I^6$ in Josephine Lang, *Lied*.

Using IV^6 as a predominant

Writing $I - IV^6 - V_5^6 - I$ can be tricky, particularly when IV^6 goes to V_5^6 , since there is a danger both of parallels and of a doubled leading tone. No single piece of advice can guarantee that you'll avoid problems. When you write $I - IV^6 - V_5^6 - I$, the soprano lines *do-do-re-do* ($\hat{1} - \hat{1} - \hat{2} - \hat{1}$) and *mi-mi-fa-mi* ($\hat{3} - \hat{3} - \hat{4} - \hat{3}$) will help, but you'll need to check carefully for parallels. Using V_5^6 instead of V^6 will also mitigate some of the danger of parallels (**Example 3**). Note that this progression doesn't work well in minor, where the bass would create an augmented second from *le* to *ti* ($\downarrow \hat{6} - \uparrow \hat{7}$). The rare occurrences of this progression in minor raise *le* to *la* ($\downarrow \hat{6}$ to $\uparrow \hat{6}$) to avoid the augmented second (**Examples 3c and 3d**).



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Example 3. Writing with $I - IV^6 - V_5^6 - I$.

Using plagal (IV^6)

Writing $I - IV^6 - I^6$ is relatively easy (**Example 4**). Here, remember three things:

1. The bass always arpeggiates down.
2. The most common soprano is *mi-fa-sol* ($\hat{3} - \hat{4} - \hat{5}$).
3. The other voices should move by step or common tone.



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Example 4. Writing with plagal (IV^6).

At phrase middles

In the middle of a phrase, *la* ($\hat{6}$) shows up in the bass in one of two ways:

1. To avoid a cadence as part of a deceptive motion (**Example 5**)
2. To connect the tonic area to the strong predominant area by arpeggiating *do-la-fa* ($\hat{1} - \hat{6} - \hat{4}$), harmonized by vi or IV^6 (**Example 6**)





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Example 5. Deceptive motion in Bernhard Henrik Crussell, *Clarinet Quartet Op. 7, II*, mm. 66–72 (5:06–5:38).



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Example 6. *vi* connecting **T** and strong **PD** areas in Bernhard Henrik Crussell, *Clarinet Quartet Op. 7, II*, mm. 1–4 (0:00–0:18).

Deceptive motion

When a V chord sets up the expectation for a cadence, but moves instead to an unexpected, non-tonic harmony, this is called deceptive motion. Deceptive motion most commonly occurs when $V^{(7)}$ moves to *vi* rather than I, with the bass moving *sol–la* ($\hat{5} - \hat{6}$). Less commonly, *la* ($\hat{6}$) may be harmonized with IV^6 rather than *vi* in a deceptive motion. Writing deceptive motion with $V^{(7)}-vi$ carries an inherent danger of parallels that can be avoided by doing the following two things (**Example 7**): (1) resolve *ti–do* ($\hat{7} - \hat{1}$) as you would do normally, and (2) move all upper voices in contrary motion to the bass (downward).



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Example 7. Writing deceptive motion.

Deceptive motion vs. Deceptive cadence

Some people use the term “deceptive cadence” to describe what we refer to as “deceptive motion.” Since the progression $V^{(7)}-vi$ avoids a cadence rather than creating one, we find that the term “deceptive cadence” inaccurately describes the progression’s purpose, so we prefer the more neutral description “deceptive motion.”

vi as a weak predominant

Using vi to connect the tonic and strong predominant areas is quite easy to write (**Example 8**). As long as your upper voices move by step or common tone and you follow typical writing procedures, you should not run into writing issues. Notice that for the phrase model analysis (**T/PD/D**) labels, the **PD** label goes on the first strong **PD** before the cadence, as in **Example 6**.



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Example 8. Writing with $La (\hat{6})$ connecting **T** to strong **PD** area.

At phrase endings

$La (\hat{6})$ may appear at the end of a phrase in one of two ways:

1. As part of a phrygian half cadence (**Example 9**)
2. Harmonized with a predominant chord as part of a push to a cadence



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Example 9. Phrygian half cadence in Franz Schubert, “Die Mainacht,” mm. 1–10 (0:00-0:19).

The phrygian half cadence (PHC)

The phrygian half cadence (PHC) is a special kind of cadential phrase ending that occurs only in minor and involves the progression iv^6-V . It’s called “phrygian” because of the half step that occurs when *le* moves to *sol* ($\downarrow \hat{6} - \hat{5}$) in the bass, a sound that’s similar to when *ra* moves to *do* ($\downarrow \hat{2} - \hat{1}$) in the phrygian mode. The progression carries a danger of parallels and of writing an augmented second between *le* and *ti* ($\downarrow \hat{6} - \uparrow \hat{7}$). These can be avoided if you choose to double *do* ($\hat{1}$) in the iv^6 chord (**Example 10**). Very often, PHCs are approached from *i*, and are accompanied by the soprano *me-fa-sol* ($\hat{3} - \hat{4} - \hat{5}$), as in **Example 10**.



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Example 10. Writing a PHC.

La ($\hat{6}$) harmonized with a predominant at a cadence

It’s possible to see *la* ($\hat{6}$) harmonized with a predominant (usually *vi* or IV^6) at a cadence without the presence of *fa* ($\hat{4}$) in the bass before the cadential dominant (**Example 11**). This is much less common, however, than seeing *fa* ($\hat{4}$) in the bass harmonized with a strong predominant before the cadence.



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Example 11. *La* ($\hat{6}$) as “stand-in” for strong **PD** in Joseph Haydn, *String Quartet Op. 76, no. 2, I, mm. 1–4* ([0:00–0:08](#)).

Assignments

1. *La* ($\hat{6}$) in the bass at beginnings, middles, and endings ([.pdf](#), [.docx](#)). Asks students to analyze bass lines, write from figures and Roman numerals, harmonize an unfigured bass, and analyze an excerpt.

THE MEDIANT HARMONIZING MI (SCALE DEGREE 3) IN THE BASS

John Peterson

KEY TAKEAWAYS

- The iii chord (III in minor) is a weak predominant that typically moves through a strong predominant on the way to a V chord.
- In major, iii usually harmonizes a descending *ti* ($\hat{7}$); similarly, in minor, III usually harmonizes a descending *te* ($\downarrow \hat{7}$).
- iii/III is usually found in root position.
- iii *is not* used as a substitute for I^6 (see the explanation below [Example 1](#)).
- iii *is not* a very common chord.

CHAPTER PLAYLIST

Overview: the iii chord

It's most common for *mi* ($\hat{3}$) in the bass to be harmonized with a I^6 chord. Occasionally, however, composers choose to use iii rather than I^6 ([Example 1](#)). The iii chord is used in one relatively specific situation: after a I chord, harmonizing a descending *ti/te* ($\hat{7} / \downarrow \hat{7}$) in an upper voice. It commonly moves to to a [strong predominant](#), though it can move directly to V in a bass arpeggiation *do–mi–sol* ($\hat{1} - \hat{3} - \hat{5}$) harmonized I–iii–V, and is usually in root position.



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Example 1. The *iii* chord in Koji Kondo's Athletic Theme from Super Mario 3 (4:19–4:24).

It's important to emphasize that *iii* isn't simply a substitute for I^6 in Western classical music. For instance, in an earlier chapter on tonic prolongations, we saw that the bass line *do-re-mi* ($\hat{1} - \hat{2} - \hat{3}$) is commonly harmonized with $I - V_3^4 - I^6$. Composers don't use $I - V_3^4 - iii$ as an alternative. That's because *iii* functions like *vi*, as a weak predominant that most often travels through a strong predominant to get to *V*. The progression $I - V_3^4 - iii$ shows the opposite: *V* getting to *iii*, which isn't stylistically normative. Finally, keep in mind that *iii* does not appear very often in common-practice tonality, so it should be used sparingly.

Writing with *iii*

Example 2 shows the voice leading for the most common use of *iii*: as a weak predominant that moves through a strong predominant on its way to *V*. In the major-mode progressions (**Examples 2a** and **2b**), notice that the leading tone descends to *la* ($\hat{6}$) when *iii* moves to the predominant.

In the minor-mode progressions (**Examples 2c** and **2d**), *te* ($\downarrow \hat{7}$) descends to *le* ($\downarrow \hat{6}$) when *III* moves to a predominant. Notice that *III* involves *te* ($\downarrow \hat{7}$), not *ti* ($\uparrow \hat{7}$). That is, *III* is major, not augmented, which is what would happen if we used *ti* ($\uparrow \hat{7}$).



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Example 2. Writing with *iii* going to a strong predominant.

Example 3 shows that *iii* can also go directly to *V*. Note that this progression doesn't work well in minor, since *III* contains *te* ($\downarrow \hat{7}$) but *V* contains *ti* ($\uparrow \hat{7}$), and the immediate juxtaposition of these two scale degrees is not stylistic for Western classical music.



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***Example 3.** Writing with iii going to V.*

Assignments

1. *Mi* ($\hat{3}$) in the bass at beginnings (.pdf, .docx). Asks students to realize unfigured bass, analyze, and do a transcription with analysis.

PREDOMINANT SEVENTH CHORDS

John Peterson

KEY TAKEAWAYS

- This chapter discusses the predominant seventh chords ii^7 , IV^7 , vi^7 , and iii^7 .
- ii^7 and its inversions are the most common predominant seventh chord, and **Example 2** shows which inversions of ii^7 are more common than others.
- When writing with predominant seventh chords, two general principles apply with respect to the treatment of the chordal seventh:
 - Approach the chordal seventh by step or common tone.
 - Resolve the chordal seventh down by step.

Earlier, we saw how [adding a chordal seventh to the dominant](#) strengthened its drive toward the tonic. In this chapter, we see that something similar can be accomplished by adding a chordal seventh to predominant chords: it can intensify their motion to the dominant (**Example 1**). Adding a seventh to ii chords is common; it also occurs with the other predominant chords (particularly IV and vi), but less frequently. All predominant seventh chords share two general guidelines for the treatment of a chordal seventh:

1. The chordal seventh is usually approached by step or common tone.
2. The chordal seventh resolves down by step.



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Example 1. A predominant seventh chord in Josephine Lang, “Dort hoch auf jenem Berge”

Adding a chordal seventh to ii

Example 2 lists the various inversions of ii^7 from more common to less common. We’ll discuss each in turn.

Degree of commonality	Inversion of ii^7
Most common	ii^6_5
Somewhat common	ii^7
Less common	ii^4_2
Least common	ii^4_3

Example 2. Inversions of ii^7 sorted by relative degree of commonality.

ii^6_5

ii^6_5 often substitutes for ii^6 , meaning that it commonly shows up near the end of a phrase (**Example 1**). Other than the typical part writing procedures and treatment of the chordal seventh, there aren’t any new voice leading concerns when writing with ii^6_5 (**Example 3**).



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Example 3. Writing with ii^6_5 .

ii^7

ii^7 is typically found near the end of a phrase (**Example 1**). In addition to following typical writing procedures and treatment of the chordal seventh, there are two main issues to be aware of when writing with ii^7 :

1. The chord is often preceded by tonic, and it's best to use I^6 rather than I to avoid potential parallels,
2. When ii^7 resolves to V^7 , either ii^7 or V^7 will need to be incomplete to avoid causing a voice-leading problem (**Example 4**).



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Example 4. Writing with ii^7 .

ii_2^4

ii_2^4 typically expands tonic at the beginning of a phrase in the progression $I - ii_2^4 - V_5^6 - I$ (**Example 5**). This progression is easy to write if you follow the typical writing procedure and treatment of the chordal seventh.



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Example 5. Writing with ii_2^4 .

ii_3^4

ii_3^4 is relatively uncommon. When it does show up, it's usually in place of a strong predominant at a phrase ending (**Example 6**). Other than following the typical writing procedure and treatment of the chordal seventh, there isn't anything new to learn about voice leading.



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Example 6. Writing with ii_3^4 .

Other predominant sevenths

The remaining predominant sevenths, IV^7 , vi^7 , and iii^7 are not nearly as common as ii^7 and its inversions. Among them, IV^7 and vi^7 are more common than iii^7 , which makes sense given that iii as a triad isn't very common in the first place. Both IV^7 and vi^7 tend to show up as root-position chords when they're used, and vi^7 only shows up as a harmony connecting the tonic area to the strong predominant area, and not as part of a deceptive motion (in other words, V^7 to vi^7 is not common). **Example 7** shows sample voice leading involving these chords. It follows typical writing procedures and treatment of chordal sevenths.



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Example 7. Writing with IV^7 and vi^7 .

Assignments

1. Predominant Seventh Chords ([.pdf](#), [.docx](#)). Asks students to realize figured bass and analyze.

TONICIZATION

John Peterson and Megan Lavengood

KEY TAKEAWAYS

- Tonicization is the process of making a non-tonic chord sound like a temporary tonic. This is done with chromatic chords called applied chords, or secondary dominant chords ($V^{(7)}$) and secondary leading-tone chords ($vii^{o(7)}$) borrowed from the temporary key.
- Applied chords are notated with a slash. The chord before the slash is the identity of the applied chord within the secondary key, and the chord after the slash is the chord being tonicized. It's read aloud from left to right with the word "of" replacing the slash: V/ii becomes "five of two."
- Applied chords nearly always involve accidentals, and especially accidentals that raise the pitch.
- Another way of thinking about applied chords is to imagine them as altered versions of the diatonic chord with which it shares a root (for example, ii becomes $II\sharp$, which is V/V).

CHAPTER PLAYLIST

Tonicization is the process of making a non-tonic chord temporarily sound like tonic. It's accomplished using secondary dominant or secondary leading-tone chords (sometimes called applied dominant and applied leading-tone chords). First, we'll learn how to tonicize the dominant, and then we'll see tonicizations of non-dominant chords.

Tonicizing V

Analyzing tonicization

Secondary dominant chords ($V^{(7)}/V$)

Example 1 analyzes a passage that temporarily makes V sound like the tonic chord. **Example 2** extracts the two chords from **Example 1** that participate in the tonicization. We have a C^7 chord moving to an F chord, so if we were to analyze these chords without considering the key signature or the context that **Example 1** provides, we'd say the two chords represent the progression $V_5^6 - I$ in F major (**Example 2a**).



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Example 1. Tonicization in Joseph Bologna, *Six Concertante Quartets*, no. 1, II, mm. 1–8.



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Example 2. Reduction of the tonicization in Joseph Bologna, *Six Concertante Quartets*, no. 1, II, mm. 3–4.

If we now reconsider the context that **Example 1** provides, we can see that the F major chord functions as V in the excerpt's home key of $B\flat$ major (**Example 2b**). Indeed, it's the chord that creates the half cadence that ends the first phrase. We know that we haven't changed keys here because, in addition to the half cadence being in $B\flat$ major, the second phrase also begins in $B\flat$ major (it repeats the beginning of the first phrase). The C^7 chord, however, clearly doesn't belong to $B\flat$ major—that's what the $E\sharp$ accidental in the bass tells us. As we determined in **Example 2**, the C^7 chord is V_5^6 of the F major chord. To represent that in the context of **Example 1**, we say that the C^7 chord is " V_5^6 of V," and we write " V_5^6/V ." In other words, the F major chord is V, and the C^7 chord is the V_5^6 of that V chord. We've just labeled our first secondary dominant chord!

Secondary leading-tone chords ($\text{vii}^{\text{o}7}/\text{V}$)

Tonicization can also be accomplished using secondary leading-tone chords, as in **Example 3**.



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Example 3. Tonicization in Josephine Lang, “Du gleichst dem klaren blauen See,” mm. 21–24.



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Example 4. Reduction of the tonicization in Josephine Lang.

Example 4 walks through how to understand the relationship between the two highlighted chords in **Example 3**.

- If we were in G major, we would analyze these chords as $\text{vii}^{\text{o}7}$ –I. Recall that when we learned about the leading-tone seventh chord, we discovered that it’s common to lower the chordal seventh in major to create a fully diminished seventh chord. That’s still true here (notice the $\text{E}\flat$!).
- The passage in **Example 3** is in C major, so we would analyze the G major chord as V, rather than I. That means the $\text{F}\sharp^{\text{o}7}$ chord is $\text{vii}^{\text{o}7}$ of the V chord. We write “ $\text{vii}^{\text{o}7}/\text{V}$ ” and say “seven diminished seven of five.”
- The passage in **Example 3** adds a cad._4^6 to embellish the dominant. That’s why the $\text{vii}^{\text{o}7}/\text{V}$ doesn’t resolve directly to V.
- The cad._4^6 resolves to V^7 rather than the V triad. Now we’ve arrived at the passage in **Example 3**.

Summary: Steps for analyzing tonicization

Note: It's rare but possible in classical music to have a half-diminished seventh chord act as an applied chord. It's even less common in jazz, where it's almost certainly an applied ii^{ø7}.

Chromaticism is an indication that tonicization may be present. Since only $V^{(7)}$ and vii^{o7} (or, rarely, $vii^{\circ 7}$ —see note in sidebar) can create tonicization, one of the most helpful things for determining the label is to ask “what is the quality of the chromatic chord?” The quality determines the label: if the chord is a major triad or dominant seventh chord, it gets the label $V^{(7)}$. If the chord is a diminished triad or diminished seventh chord, it gets the label $vii^{o(7)}$.

When you come across a chromatic note, stop and ask the following questions:

1. Is the chromatic note part of the chord, or is it an embellishing tone?
 - a. Part of the chord: move on to question 2
 - b. Embellishing tone: label appropriately
2. What's the quality of the chord?
 - a. Major triad or dominant seventh chord: secondary V chord; label is $V^{(7)}/x$
 - b. Diminished triad or diminished seventh: secondary vii^o chord; label is vii^{o7}/x
3. To determine x above, ask: In what key is the chromatic chord V or vii^o ? Then, determine what Roman numeral the tonic triad of that key would get in the home key of your passage. That Roman numeral is x .

Writing applied chords

Spelling

The video in **Example 5** walks through the steps for spelling V^7/V , vii^{o7}/V , and $vii^{\circ 7}/V$ in major and minor keys. We recommend you grab a piece of staff paper so you can follow along by pausing the video and trying the exercises yourself. The steps are summarized below:

1. Determine the root of the chord being tonicized
2. Pretend this root is the tonic of a temporary key
3. Spell the top Roman numeral in that key (either V^7 or vii^{o7})



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Example 5. Steps for spelling applied chords.

Resolving

The leading tone of the applied chord is referred to as the secondary leading tone; the chordal seventh is referred to as the secondary seventh. These dissonances resolve just as they normally would in their own key.

One exception is that when the tonicized chord is itself a seventh chord (as in the progression D^7-G^7-C), the secondary leading tone may resolve down by semitone into the seventh of the following chord. In the example progression, this would create a nice chromatic line:

$F\sharp-F\flat-E$ (Example 6).

The video in Example 7 walks through the steps for spelling V^7/V , vii^{o7}/V , and $vii^{\circ 7}/V$ in major and minor keys. Like with the previous video, we recommend pausing to try each exercise on staff paper. The steps are summarized below:

1. Spell the secondary chord
2. Follow the typical writing procedure to part-write, but think in the temporary new key to determine how tendency tones resolve
3. Check accidentals (especially if in minor)

Example 6. If the applied chord is proceeding to another seventh chord, the secondary leading tone may resolve downward, instead of upward like a leading tone normally would, into the seventh of the next chord.



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Example 7. Steps for resolving applied chords.

Tonicizing chords other than V

Overview

Any major or minor triad can be tonicized, not just V. Diminished and augmented triads can't be tonicized, since there are no diminished or augmented keys. This means that every Roman numeral can be tonicized except vii° and ii° .

Analyzing various tonicizations

When chords other than V are tonicized, we follow the same steps for analysis that we learned earlier; the only difference is that there are now more possibilities for which chords can be tonicized. Be on the lookout for chromatic notes: these are signals that tonicization may be present!

As you might imagine, the frequency with which a given chord is tonicized is related to the frequency with which that chord generally appears. For instance, the dominant and strong predominant chords are quite common, so we also see those chords tonicized with some frequency. The vi chord, while less common than ii, IV, and V, also frequently gets tonicized. The iii and VII (minor only) chords are uncommon harmonies, and we tend not to see them tonicized frequently.

Tonicizing strong predominants

Tonicizing strong pre-dominants usually involves chromatic inflection of members of the tonic triad. For example, a tonic triad can easily be turned into a V^7/IV chord by adding *te* ($\downarrow \hat{7}$) to the triad (**Example 8**). Similarly, a tonic triad can be turned into $\text{vii}^{\circ 7}/\text{ii}$ by raising *do* ($\hat{1}$) and adding *te* ($\downarrow \hat{7}$) (**Example 9**).



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Example 8. Tonicizing IV in *Joseph Bologna, String Quartet no. 4, I*, mm. 41–47 (1:18–1:30).



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Example 9. Tonicizing ii in *Maria Szymanowska, Minuet no. 4*, mm. 57–64 (1:48–1:55).

Tonicized deceptive motion

One striking way to use tonicization is to highlight a deceptive motion (**Example 10**). Here, the dominant moves to vii^{o7}/vi before the vi chord arrives, which draws our attention even more to the absence of the expected tonic after the V chord.



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Example 10. Tonicized deceptive motion in Josephine Lang, “Mag da draussen Sehnee,” mm. 1–5.

Adding tonicization to diatonic progressions

The steps for part-writing tonicization remain the same as for tonicizations of V. Now, however, we should expect to see tonicizations of non-dominant major and minor triads. **Example 11** shows a diatonic progression (a) to which several tonicizations have been added (b).



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Example 11. Adding tonicizations to a diatonic progression.

Secondary dominants as altered diatonic chords

Another way of thinking about secondary chords is to imagine them as altered versions of the diatonic chord with which it shares a root.

The most straightforward example is when a *ii* chord is chromatically altered by changing *fa* ($\hat{4}$) to *fi* ($\uparrow \hat{4}$) and then progresses, like usual, to the dominant chord. This alteration of *fa* to *fi* ($\hat{4}$ – $\uparrow \hat{4}$) turns a regular subdominant chord into a chord that has a dominant function *in the key of the dominant*.

Take the chord progression **Dmi⁷–G–C** in C major, which we would label with Roman numerals as **ii⁷–V–I**. If we change *fa* to *fi* ($\hat{4}$ to $\uparrow \hat{4}$, F to F $\sharp$) in the first chord, we get **D⁷–G–C**. In the key of C, we might analyze this progression as **II $\sharp$ ⁷–V–I** (note the uppercase Roman numeral, indicating the change of quality; the sharp sign afterward further clarifies the raised third of the chord). However, we can also note that D major belongs to G major; it is a dominant-functioning chord (V) in the key of G—the key in which the following chord is tonic. In other words, we are borrowing the dominant chord from the key of G and *applying* it to the G-major triad. Thus, we can re-interpret the progression as **V⁷/V–V–I**.

PRACTICE IT!

Add accidentals in the following chords to turn them into secondary dominants. What Roman numeral would you give the new chord?



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<https://viva.pressbooks.pub/openmusictheory/?p=6540#h5p-11>

Example 12 summarizes secondary chords as they relate to diatonic chords with the same root.

Major

V7IV is only applied V7 in major that uses a lowered tone.

C: I(7) V(7)IV ii(7) V(7)V III(7) V(7)vi

vi(7) V(7)li vii°(7) V(7)ii

No Vvi°—you can't tonicize diminished chords.

V7 could be thought of as V7II. No need to write like "II", though.

Minor

V7VI is only applied V7 in minor that uses a lowered tone.

It is not typical to tonicize VIs.

Att: i(7) V(7)iv ii°(b7) V(7)V III(7) V(7)VI iv(7) V(7)VII

VI(7)

No V°!—you can't tonicize diminished chords.

Because V°'s only function is to lead to I, some people prefer to always label V° as V°I.

In minor, the dominant might look like a secondary dominant because of the raised leading tone!

Example 12. A summary of how diatonic triads may be altered chromatically to generate secondary V^7 chords. Click to enlarge.

Assignments

- Applied chords worksheet, available in three slightly different versions:
 - Version A ([.pdf](#), [.mscx](#)). Asks students to identify and write applied V, V^7 , vii^0 , vii^{07} , and vii^{07} chords with Roman numerals and figures.
 - Version B—without $\emptyset 7$ s ([.pdf](#), [.mscz](#)). Asks students to identify and write applied V, V^7 , vii^0 , and vii^{07} chords with Roman numerals and figures.
 - Version C—jazz/pop focus ([.pdf](#), [.mscz](#)). No $\emptyset 7$ s or figured bass; all chords in root position. Students identify and write chord symbols in addition to notation.
- Tonicization Voice Leading and Score Analysis ([.pdf](#), [.docx](#)). Asks students to write from Roman numerals and figured bass, write from a longer figured bass, and analyze a complete piece with discussion questions.

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Private: Altered chords summary © Megan Lavengood

EXTENDED TONICIZATION AND MODULATION TO CLOSELY RELATED KEYS

John Peterson

KEY TAKEAWAYS

- Modulation (sometimes called a “key change”) involves a longer-term change of tonic.
- There are two basic ways a composer can introduce a new key:
 - A direct, abrupt modulation ([Example 1](#))
 - A pivot chord modulation, which is more subtle ([Example 2](#))
- Sometimes, a composer will blur the lines between a tonicization and a modulation. We refer to such cases as “extended tonicizations.”

CHAPTER PLAYLIST

We’ve seen that tonicization involves making a non-tonic chord sound like a temporary tonic. In this chapter, we discuss modulation, which, in contrast to the temporary nature of tonicization, involves a longer-term change of tonic. Sometimes people refer to modulation as a “change of key.”

Analyzing Modulations

There are two basic ways a composer can introduce a new key: they can make the key change abrupt ([Example 1](#)), or they can be more subtle about it ([Example 2](#)). Two pieces of advice are helpful for identifying modulations:

1. Remember that cadences establish keys, so if you can identify cadences before you start your analysis, you'll know where new keys occur.
2. The presence of the same accidentals over and over again in a passage is an indication of potential modulation. If you start seeing a consistent accidental, see if you can identify a cadence that establishes the new key corresponding to the change in accidentals.

Direct modulations (these are abrupt)

Abrupt modulations are often called “direct modulations” because the composer goes directly to the new key. These are also sometimes called “phrase modulations” because they tend to occur at phrase boundaries. To recognize a direct modulation in analysis, simply label the new key, then continue with your harmonic analysis as in **Example 1**.



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Example 1. Direct modulation in Joseph Bologne, *String Quartet no. 4, I, mm. 15–29 (0:27-0:56)*.

Pivot chord modulations (these are subtle)

A composer can use a variety of techniques to make a modulation more subtle, but one of the more common ways to do it is through the use of a pivot chord. A pivot chord is a single chord that is diatonic in (i.e., that belongs to) both the home key and the new key. **Example 2** shows that we analyze a pivot chord using a special symbol where the upper Roman numeral labels the chord in the old key and the lower Roman numeral labels the chord in the new key. In measure 6 of **Example 2**, we would say “iv⁷ becomes ii⁷.” There’s no single method that always works to find a pivot, but one strategy that’s helpful is to analyze in the old key until it stops making sense, then back up a chord and try analyzing that as your pivot. If that chord doesn’t work as a pivot either, try backing up one more chord.





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Example 2. Pivot chord modulation in Josephine Lang, “Der Winter,” mm. 1–12.

Sometimes multiple chords *could* serve as pivots. In such cases, the best chords are ones where the upper and lower Roman numerals are both predominant chords. That’s because V will usually appear shortly after the pivot, and having a predominant in both positions for your pivot chord label suggests that we’re on the way to V in both the old and new keys. Your second best option would be a tonic chord in the old key becoming a predominant in the new key (I becomes IV). Since a tonic chord *can* go directly to V, the analysis here still makes functional sense. Poor pivot chord analyses are usually ones that involve the dominant. An analysis such as “V becomes I,” for example, suggests that the same chord is simultaneously unstable (V) and very stable (I), which isn’t how we’re likely to hear it.

Closely related keys

While a composer may modulate anywhere, some modulations are more common than others because of the number of chords the two keys share. Key signatures within one accidental of one another (e.g., C major and G major) are considered closely related keys, sharing many common chords. To find all of the closely related keys for a given home key, do the following. You may find it useful to reference the circle of fifths (**Example 3**).

1. Create a grid with three columns and two rows.
2. Place the home key in the center of the upper row.
3. Add a sharp (or subtract a flat—the equivalent of adding a sharp) to the home key’s signature and list that key to the right.
4. Add a flat to (or subtract a sharp from) the home key’s signature and list that key to the left.
5. In the lower row, list the relative major or minor keys for each key in the upper row.



Example 3. The circle of fifths. Click to enlarge.

If you were to do this with F major as a starting point, you should end up with something like **Example 4**. Notice that the keys will always correspond to every major or minor triad in

the home key's universe of Roman numerals (so, in major: I, ii, iii, IV, V, and vi; in minor: i, III, iv, v, VI, and VII). This is a good way to check your work.

	One step flatwise	Starting key signature	One step sharpwise
starting key	B $\flat$	F	C
relative key	Gmi	Dmi	Ami

Example 4. *Identifying closely related keys of F major.*

While it's possible to modulate to any key, certain keys are much more common than others:

- In major: I→V and I→vi (e.g., C→G and C→Am)
- In minor: i→III and i→v (e.g., Cm→E $\flat$ and Cm→Gm)

Writing modulations with pivot chords

If you're writing a modulating phrase that uses pivot chords, you'll need to choose a pivot chord, then determine an appropriate progression.

Identifying potential pivots

To identify potential pivot chords between two keys (**Example 5**):

1. Create a table with two columns.
2. List all triads in the old key on the left.
3. List all triads in the new key on the right.
4. Match triads that appear in both columns.

Remember that the best pivots are ones that are predominants in both keys.

Old key		New key
i – dm		I – FM
ii° – e°		ii – gm
III – FM		iii – am
iv – gm		IV – BbM
v – am		V – CM
VI – BbM		vi – dm
VII – CM		vii° – e°

Example 5. Identifying pivots to modulate from Dm to F.

Choosing a progression

Our ears tend to need time to adjust to hearing a new key. If you want your new key to sound firmly established, it's therefore best not to cadence too quickly after your pivot. A good strategy can be to use deceptive motion to avoid a cadence in the new key, and then to retry and successfully achieve a cadence afterward (**Example 6**). Notice that **Example 6** begins by establishing the home key with a standard tonic expansion progression.



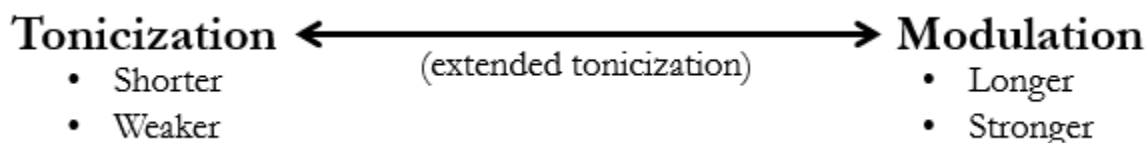
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Example 6. Writing a modulating phrase.

Tonicization versus modulation

Tonicization and modulation can be viewed as two poles on a spectrum based on the length of the passage in question and the strength with which a new key is established (**Example 7**). Modulations are longer and stronger than tonicization. What does “stronger” mean here? The clearest modulations are those in which the new key is established with the cadence, and then the passage continues in the new key after the

cadence. Weaker modulations might only establish the new key with the cadence, then go right back to the home key. Sometimes people will simply hear a passage differently: some people's ears seem to more willingly accept key changes than others. In your analysis, you should be able to represent your hearing of a given passage and explain why you hear it that way, and you should also be able to understand why someone else might hear it differently.



Example 7. *Spectrum between tonicization and modulation.*

In between clear tonicizations and modulations is a gray area that we call “extended tonicization.” These are passages like the one in **Example 8** where the passage is longer than two chords (longer than, for instance, V_5^6 / V to V), but not so long that it leads to a cadence to establish true modulation. In such cases, we temporarily analyze in a new key, and we show it by placing the Roman numeral of the new key underneath a bracket that underlies the entirety of the extended tonicization. **Example 8** begins in $E\flat$ major, then tonicizes F minor, so we put Roman numeral ii under the bracket. In the case of **Example 8**, the extended tonicization also helps us transition from $E\flat$ major to C minor—in other words, the extended tonicization itself serves as a pivot area.

Often, analysts realize an extended tonicization is taking place when one of two things happens:

1. The analyst realizes they have been writing x/ii , y/ii , z/ii over and over again in a short space.
2. The Roman numerals stop making functional sense in the home key, but the upcoming cadence is still in the home key.



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Example 8. *Extended tonicization in Joseph Bologne, String Quartet Op. 4, II (0:25-0:39).*

Assignments

1. Extended Tonicization and Modulation to Closely Related Keys ([.pdf](#), [.docx](#)). Asks students to review tonicization, identify closely related keys and pivot chords, analyze, and create a modulating progression.

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V. CHROMATICISM

This section includes commonly discussed topics in chromatic harmony, including [modal mixture](#), [Neapolitan](#) and [augmented sixth chords](#), and [common-tone chords](#). The remaining chapters go into depth on more niche topics that might be included in more advanced courses dedicated to chromatic harmony and 19th- and early 20th-century music.

Prerequisites

This section assumes a familiarity with the topics covered in [Fundamentals](#) as well as the chapters in the [Diatonic Harmony, Tonicization, and Modulation](#) section.

Organization

The first chapter, [Modal Mixture](#), introduces students to the notion of borrowed scale degrees and chords from the parallel mode. This chapter should be considered fundamental to the chapters that follow in this section.

Next, students learn about the chromatic predominant chords most common in Western European common-practice music: the [Neapolitan](#) and [augmented sixth](#) chords, and how those chords behave idiomatically in this repertoire. This is followed by a

CHROMATICISM CHAPTERS

- Modal Mixture
- Neapolitan 6th (bII6)
- Augmented Sixth Chords
- Common-Tone Chords (CT° 7 & CT+6)
- Harmonic Elision
- Reinterpreting Augmented Sixth Chords
- Reinterpreting Diminished Seventh Chords
- Augmented Options
- Equal Divisions of the Octave
- Chromatic Sequences
- Parallel Chromatic Sequences
- The Omnibus Progression
- Altered and Extended Dominant Chords
- Neo-Riemannian Triadic Progressions

discussion of [non-functional diminished seventh and augmented sixth chords](#) that builds upon students' knowledge of these chords in a functional context, which they learned in previous chapters.

[Harmonic Elision](#) teaches students about how to resolve dominant and diminished seventh chords such that its resolution suppresses or removes an expected chord for one that is similar but functionally distinct from the chord it replaced. This chapter could immediately follow the chapters on [tonicization](#) and is a particularly useful primer for the [Chromatic Sequences](#) chapter later in this section.

The chapters on [reinterpretation of augmented sixth chords](#) and [diminished seventh chords](#) serve as an entry point into the discussion of modulation into distant keys, and to harmonic ambiguity in music. These chapters require a firm understanding of the introductory chapters that discuss these chords. Given its inherent ambiguity, the chapter on the [augmented triad](#) follows nicely and also serves as a transition into discussions of [equal divisions of the octave](#).

The chapters on [chromatic sequences](#), [parallel chromatic sequences](#), and [the omnibus progression](#) work well together as a mini-unit on harmonic pattern repetition in chromatic music, and cycle back on earlier knowledge of diatonic sequences. Preceding these chapters with a discussion of [equal division of the octave](#) can provide more context to the overall sound of these progressions.

The chapter on [altered and extended dominant chords](#) introduces students to chords that are “taller” than seventh chords and to the notion of altering chord members, for example with a flattened or raised fifth. This chapter can be spun into a discussion of [jazz harmony](#), covered elsewhere in this textbook, and provides an opportunity for an interesting discussion surrounding the use of these chords in these two distinctly different repertoires.

Finally, the chapter on [Neo-Riemannian triadic progressions](#) gives students the tools necessary to begin to analyze chromatic music that features non-functional triadic progressions, and to compose interesting chromatic progressions that don't follow the norms of functional tonality. This chapter is equally useful as a capstone to a unit or course on chromatic harmony or as part of a course on 20th- and 21st-century music.

MODAL MIXTURE

Brian Jarvis

KEY TAKEAWAYS

- Modal mixture involves borrowing notes from the parallel key.
- Mixture is more common in major keys (borrowing from the parallel minor).
- Mixture changes the quality of a chord, but not its function.
- Mixture can be used in melodies, one or more chords, extended tonicizations, and modulations.
- Chords with lowered roots use a flat sign in front of the Roman numeral (e.g., $\flat$ VI).

CHAPTER PLAYLIST

Modal mixture (or borrowing) is the harmonic technique of mixing the notes from the parallel major and natural-minor modes (e.g., C major and C minor). This results in changing the chord qualities and/or melodic “color” to achieve expressive effects not available in the main scale itself. In the majority of cases, this occurs in major-key pieces where notes from the parallel minor are borrowed; most of this chapter reflects that norm. **Examples 1** and **2** provide a brief review of parallel minor scales and their associated solfège and scale degrees. Notice the three differences between the scales: *mi/me* ($\hat{3}/\downarrow\hat{3}$), *la/le* ($\hat{6}/\downarrow\hat{6}$), and *ti/te* ($\hat{7}/\downarrow\hat{7}$).



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Example 1. Comparison of parallel major and minor scales and their solfège.



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Example 2. Comparison of parallel major and minor scales and their scale degrees.

Melody and Harmony

While these changes may only be reflected in a single melodic line to add color to a specific moment, quite often they have a pronounced harmonic effect. By borrowing notes from the parallel scale, the chord qualities change, as shown in **Examples 3** and **4**:



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Example 3. Comparison of parallel major and minor chord qualities.



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Example 4. Comparison of parallel major and minor Roman numerals.

Common Progressions

Chords with *le* ($\downarrow \hat{6}$) only: ii^{o6} , $ii^{\emptyset 7}$, and iv

As you might expect, not all of these modal mixture possibilities show up with equal frequency. Cadential

predominant chords are common targets, and the chords in **Example 5** below appear with some frequency in cadential progressions, each of which only borrows *le* ($\downarrow \hat{6}$) from the parallel minor key.



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Example 5. Common predominant mixture chords: ii^{o6} , $ii^{\phi 7}$, and iv .

Altering Chord Roots

Borrowing *me* ($\downarrow \hat{3}$) and *te* ($\downarrow \hat{7}$) is also common. These scale degrees generate the chords $\flat VI$, $\flat III$, and $\flat VII$ (**Example 6**). Notice that when the root of the chord is changed from its original position in the scale, an accidental is placed in front of the Roman numeral to signify this change. In this context, these accidentals do not literally indicate “flat” or “sharp,” but rather that the root is lowered ($\flat$) or raised ($\sharp$) by a half step from how it usually appears in the scale.



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Example 6. Modal mixture possibilities involving altered roots.

Tonic and Dominant

Using modal mixture with tonic and dominant chords is also possible (see **Example 7**). Changing from I to i is a common technique, but V to v is not as common. When v occurs in a major key, it is more likely to indicate an [extended tonicization or modulatory passage](#) instead of a single instance of modal mixture.



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Example 7. Modal mixture with tonic and dominant.

Using Modal Mixture

Using modal mixture is as simple as lowering a few notes, but it is most common for chords to be fully borrowed from the minor scale, not just partially. For example, only using *le* ($\downarrow \hat{6}$) when a chord also uses *mi* ($\hat{3}$) is uncommon. It is also common that once modal mixture enters, it stays until the harmony moves on to another harmonic category. So, if there are two predominant chords and the first one uses modal mixture, the second chord very likely to include it as well (as in **Example 8**). The modal mixture is likely to stop once the predominant area has moved on to the dominant harmonic category, but not always.



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Example 8. Comparison of a diatonic progression and the same progression with modal mixture in the predominant area.

Picardy Third

The one common use of modal mixture in minor keys is called a picardy third, in which a minor-key piece or movement ends with a major tonic chord (**Example 9**). The origin of the name “picardy” is unknown; the technique was quite common in the 16th and 17th centuries but faded in popularity in the 18th and 19th centuries.



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Example 9. Harmonic progression ending with a picardy third.

Large-Scale Modal Mixture

While modal mixture may only involve a brief melodic change or one or more chords, it is also used in extended tonicizations and can be used to facilitate a modulation to a distantly related key. **Example 10** shows a modulation between two distantly related keys ($B\flat$ major and $D\flat$ major) using a chromatic pivot chord to smooth out what could be a rather abrupt modulation. The subdominant chord uses *le* ($\downarrow \hat{6}$) instead of the diatonic *la* ($\hat{6}$), which makes the chord sound like iv in the first key but ii in the second key.



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Example 10. A progression that uses modal mixture to modulate to a distantly related key.

Musical Examples

Example 11 shows a simple harmonic progression that borrows $\downarrow \hat{6}$ from the parallel minor key, which produces modal mixture. Notice the change in quality from ii_3^4 to $ii^\emptyset_3^4$.



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Example 11. Camille Saint-Saëns, *Samson et Dalila*, Act II, “Mon cœur s’ouvre à ta voix” (*excerpt begins at 1:36*). Note that the $B\Diamond$ is borrowed from the parallel minor key, creating modal mixture.

Example 12 is a more extensive usage of modal mixture. Modal mixture is introduced at the third system and continues until the conclusion of the phrase at the bottom of the page. This results in a modulation from E major to its parallel minor, E minor. Notice in particular the dramatic effect of starting a phrase in a major key and ending in a minor key with the same tonic.



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Example 12. Alfredo Catalani, *La Wally*, Act I, “Ebben? Ne andrò lontana” ([excerpt starts at 0:50](#)). Larger-scale modal mixture starting in measure 14.

Assignments

1. Modal Mixture Assignment ([.pdf](#), [.docx](#)). Includes spelling, figured bass realization, 4-part voice-leading with Roman numerals, and analysis of musical excerpt. [Access audio.](#)

NEAPOLITAN 6TH ($\flat\text{II}^6$)

Brian Jarvis

KEY TAKEAWAYS

- The major triad built on *ra* ($\downarrow \hat{2}$) is a chromatic predominant chord called a Neapolitan sixth ($\flat\text{II}^6$).
- $\flat\text{II}$ is typically found in first inversion ($\flat\text{II}^6$).
- In voice leading, *ra* resolves down to *ti* ($\downarrow \hat{2} - \hat{7}$).

CHAPTER PLAYLIST

The Neapolitan sixth ($\flat\text{II}^6$) is a chromatic predominant chord. It is a major triad built on *ra* ($\downarrow \hat{2}$) and is typically found in first inversion. While the name “Neapolitan” is a reference to the Italian city of Naples (Napoli), the historical connection is quite shallow, as the chord was used in many other European cities in the 18th and 19th centuries.

Context

The Neapolitan sixth is essentially a chromatic version of a ii^{06} chord. It functions the same and can be used in the same context, but it has a more dramatic effect because of its chromatic root, *ra* ($\downarrow \hat{2}$). Like ii^{06} , it is typically used in a cadential context. $\flat\text{II}^6$ can be found in major and minor keys but is more common in minor keys. Due to the similarities between $\flat\text{II}^6$ and ii^{06} , both are approached harmonically in the same way. Listen to [Example 1](#) below to compare a simple cadential progression with ii^{06} and then with $\flat\text{II}^6$.



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Example 1. To change from ii^{o6} to bII^6 , lower $\hat{2}$ (re to ra).

Voice Leading

There is a standard voice leading associated with bII^6 . In general, the chromatic tones follow standard altered-tone practice: the altered notes continue to move in the direction in which they were altered. In this case, *re* ($\hat{2}$) has been lowered to *ra* ($\downarrow \hat{2}$), so its tendency is to continue downward. Because bII^6 resolves to a V chord, ultimately *ra* ($\downarrow \hat{2}$) will resolve down to the closest member of the dominant triad, which is *ti* ($\uparrow \hat{7}$). Of course, the true dominant chord is often delayed by a $cad.^6_4$ chord, and so that voice will typically have *do* ($\hat{1}$) between the two: *ra–do–ti* ($\downarrow \hat{2} - \hat{1} - \uparrow \hat{7}$). Notice also that the *le* ($\downarrow \hat{6}$) tends to resolve down to *sol* ($\hat{5}$). **Example 2** illustrates the standard voice leading (see the red and blue notes in particular).



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Example 2. Standard voice-leading paradigms when bII^6 resolves to V.

Example 3 shows a relatively straightforward example of a bII^6 chord occurring in the context of a cadential progression. Note that the harmonic rhythm is a half note long, so think of beats 3 and 4 in measure 6 as part of a single harmony.



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Example 3. Frederic Chopin, *Nocturne in F minor, Op. 55, no. 1*. Neapolitan sixth as part of a cadential progression.

Associated Progressions

Common progressions

- ♭II⁶–V
- ♭II⁶–vii^{o7}/V–V

While ♭II⁶ often goes directly to V (with or without a cad.⁶₄), the applied chord vii^{o7} commonly occurs between ♭II⁶ and V, creating the progression ♭II⁶–vii^{o7}/V–V (**Example 4**). The added diminished chord intensifies the push toward the expected dominant.



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Example 4. Using vii^{o7} between ♭II⁶ and V.

Less Common Uses

As mentioned above, the Neapolitan mostly appears in a small number of stock harmonic progressions. Less often, however, the Neapolitan can be found in root position ♭II, and it may lead to an inverted dominant instead of the root-position version (V⁴₂ in particular).

While the Neapolitan is most often used as a single chord within a cadential progression, it—like any other chord—can be prolonged through an [extended tonicization](#) or even used as a key area, as in **Example 5**. ♭II is introduced first as a temporary tonic and elaborated with a pedal point, then the phrase ends with a typical cadential progression with the Neapolitan sixth: ♭II⁶–vii^{o7}/V–V⁷–i.



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Example 5. “Erlkönig” by Franz Schubert (1815; [excerpt begins at 3:23](#)) tonicizes the Neapolitan chord and then uses it as part of a cadential progression.

Assignments

1. Neapolitan Sixths ([.pdf](#), [.docx](#)). Asks students to spell ♭II⁶, realize figured bass, write 4-part voice-leading with Roman numerals, and analyze a musical excerpt.

AUGMENTED SIXTH CHORDS

Brian Jarvis

KEY TAKEAWAYS

- Augmented sixth chords are a group of chromatic predominant chords containing the interval of an augmented sixth between *le* and *fi* ($\downarrow \hat{6} - \uparrow \hat{4}$).
- There are Italian (It^{+6}), French (Fr^{+6}), and German (Ger^{+6}) augmented sixth chords.
- Augmented sixth chords have no root, and they resolve to a root-position dominant chord.

CHAPTER PLAYLIST

Brief Overview

Augmented sixth chords are a category of chromatic predominant harmonies whose name is derived from the inclusion of a very specific interval: the augmented sixth between *le* and *fi* ($\downarrow \hat{6} - \uparrow \hat{4}$). Each augmented sixth chord (Italian, French, and German) contains one or two other scale degrees in addition to this interval, as summarized in the chart below and illustrated in **Example 1**. Augmented sixth chords can occur in both major and minor keys, but they're more common in minor.

+6 Type	Scale Degrees	Solfege
Italian	$\hat{1}$	<i>do</i>
French	$\hat{1}$ and $\hat{2}$	<i>do & re</i>
German	$\hat{1}$ and $\downarrow \hat{3}$ (or $\hat{1}$ and $\uparrow \hat{2}$)	<i>do & me</i> (or <i>do & ri</i>)



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Example 1. Overview of the different augmented sixth chords.

Context

You're now familiar with the process of finding a chord's root for Roman numeral analysis, but augmented sixth chords are not typically categorized by root. Instead, they are identified as chords containing the augmented sixth between *le* and *fi* ($\downarrow \hat{6} - \uparrow \hat{4}$) and further categorized according to the other notes in the chord, as shown above. The names “Italian,” “French,” and “German” are more colorful than historical, but each chord is based on this characteristic interval.

Example 2 shows the specific scale degrees of the augmented sixth interval and their resolution. Notice that both notes in this interval are active notes: each one resolves to *sol* ($\hat{5}$) from a minor second away.



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Example 2. Standard voice leading of the augmented sixth interval.

Augmented sixth chords are another strategy for creating harmonic intensification with chromaticism. They are mostly used as a predominant harmony (though they can serve an embellishing function as well—see [Common-Tone Chords](#)), and they lead directly to root-position V at a cadence point. They may intensify the push toward half and authentic cadences, and the V chord may have a seventh and/or include a cad._4^6 . **Example 3** shows all three types in a simple cadential setting (authentic cadence versions). Note that you can expect that *le* ($\downarrow \hat{6}$) will be the bass for this chord, but *fi* ($\uparrow \hat{4}$) can be in any other voice. The Ger^{+6} is typically followed by a cad._4^6 , which serves to offset the parallel perfect fifths that would have happened between G–D and F $\sharp$ –C $\sharp$; the cad._4^6 may follow the other types as well. In a four-voice texture, the Fr^{+6} and Ger^{+6} don't require doubling; in the It^{+6} , which has only three unique pitches, the tonic is typically doubled because it is not an active note.



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Example 3. All three types of augmented sixth chords in a cadential context.

Connection to the lament-bass progression

When augmented sixth chords precede a half cadence, they resemble a phrygian half cadence and/or the lament-bass progression, where the iv^6 chord is substituted with an augmented sixth chord by replacing fa with fi ($\hat{4}$ with $\uparrow \hat{4}$). The example below shows a few versions of the lament bass, illustrating how just one small change to the standard lament-bass progression can introduce an augmented sixth chord.



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Example 4. Examples of replacing iv^6 with an augmented sixth chord in lament-bass progressions.

Recognizing augmented sixth chords when analyzing

Because augmented sixth chords are not root-based like you're used to, you need another strategy to find them. Trying to determine the quality by stacking the chord in thirds would become confusing because it would contain a diminished third. The easiest method is simply to memorize that the bass motion $le-sol$ ($\downarrow \hat{6} - \hat{5}$) can support this progression and if chords occur above those scale degrees and the chord with le ($\downarrow \hat{6}$) also contains fi ($\uparrow \hat{4}$), then you've likely identified an augmented sixth chord. From there, just determine the specific subtype (Italian, French, or German) by looking at the remaining chord members.

Ger⁺⁶ in major keys: *me* vs. *ri* (↓ $\hat{3}$ vs. ↑ $\hat{2}$)

When a Ger⁺⁶ is used in major keys, *me* (↓ $\hat{3}$) is often respelled to avoid writing the same letter name twice in a row with different accidentals, since Ger⁺⁶ typically resolves to a cad.₄⁶, which already contains *mi* ($\hat{3}$). Using *ri* (↑ $\hat{2}$) instead of *me* (↓ $\hat{3}$) also allows for a clearer indication of the ascending motion of the line. **Example 5** shows this variant spelling of the Ger⁺⁶.



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Example 5. Alternative spelling of the Ger⁺⁶ chord in major keys.

The German Diminished Third Chord

In the 19th century, composers introduced a variant of the Ger⁺⁶ that used *fi* (↑ $\hat{4}$) in the bass instead of *le* (↓ $\hat{6}$) (**Example 6**). This inverts the augmented sixth interval, making it a diminished third instead. The Ger⁰³ is very similar to vii⁰⁷/V—the only difference is that Ger⁰³ has *le* (↓ $\hat{6}$) but vii⁰⁷/V has *la* ($\hat{6}$)—and they both resolve to root-position V.



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Example 6. Using the Ger⁰³.

Musical Example

Ernesto Nazareth's tango "Remando" (**Example 7**) uses a Ger⁺⁶ in m. 60 as part of the cadential progression. Notice the stepwise bass motion beginning in that measure, *la-le-sol* ($\hat{6}$ – ↓ $\hat{6}$ – $\hat{5}$), as a technique to approach the augmented sixth chord by step in the bass. The melody of this dance features

many accented passing tones, so the $C\sharp$ during the Ger^{+6} should be considered embellishing given that context. As is typical with the Ger^{+6} , the following dominant chord is embellished with a cad._{4}^{6} .

The musical score excerpt shows a piano accompaniment in 4/4 time, key of D major. The right hand plays a melodic line with eighth and sixteenth notes, while the left hand provides a harmonic bass line. Roman numerals and chord symbols are written below the staff to indicate the harmonic structure. The progression includes a German augmented sixth chord (Ger+6) which resolves to a dominant chord (V7). The final chord is a cadential dominant (cad.4^6). The score is annotated with various musical notations, including accidentals, dynamics, and articulation marks.

Example 7. Ernesto Nazareth, *Remando* (*excerpt starts at 1:48*). German augmented sixth chord as part of a cadential progression.

Assignments

1. Augmented Sixth Chords ([.pdf](#), [.docx](#).) Asks students to spell augmented sixth chords, realize figured bass, write 4-part voice-leading with Roman numerals, and analyze a musical excerpt. [Audio 1 – Frederic Chopin](#), [Audio 2 – Scott Joplin](#) (excerpt starts at 0:56).

Media Attributions

nazareth_remando_annotated

COMMON-TONE CHORDS (CT^{o7} & CT⁺⁶)

Brian Jarvis

KEY TAKEAWAYS

- The common-tone diminished seventh chord (CT^{o7}) and common-tone augmented sixth chord (CT⁺⁶) have the same pitches as vii^{o7} and Ger⁺⁶ but a different function: to embellish the upcoming chord (a major triad or dominant seventh chord, typically I or V).
- Common-tone chords are so named because they contain the root of (i.e., have a common tone with) the chord being embellished.
- In a four-voice texture, the fifth of the embellished chord is often doubled.

CHAPTER PLAYLIST

The common-tone diminished seventh chord (CT^{o7}) and common-tone augmented sixth chord (CT⁺⁶) represent a completely different usage of two chords with which you are already familiar: vii^{o7} and Ger⁺⁶. Whereas these chords typically function in a more progressive harmonic context, when employed as common-tone chords, they serve a purely embellishing function and are the result of the culmination of multiple simultaneous neighbor tones. Common-tone chords share a common tone with the chord being embellished, whereas vii^{o7} and Ger⁺⁶ do not.¹ You can expect that the embellished chord will either be a major triad or sometimes a dominant seventh chord, and the Roman numeral will be either I or V. Minor

1. Ger+6 does have a common tone with $\text{cad.}^{\text{+6}}_4$, but not with the dominant chord that follows it, which is the actual destination chord.

triads can be embellished in this way too, but this is far less common, so this chapter will focus on major triads and dominant seventh chords only.²

Deriving a CT⁰⁷ chord from multiple neighbor tones

Example 1 shows how a CT⁰⁷ chord is produced through the layering of simultaneous neighbor tones. In the first system, each three-measure unit applies a single neighbor tone to the tonic chord. The second system uses two neighbor tones at a time—here, each three-measure unit is still a single tonic chord throughout, just with two neighbors instead of one. The final system shows all three neighbors combined into a single chord: a CT⁰⁷ chord. Notice that the chord in the middle has a fully diminished quality, but if you try to wrangle it into being some type of vii⁰⁷ chord, you'll come up with vii^o $\frac{4}{2}$ /iii. The problem is, there is no iii chord to be found, so that analysis wouldn't represent this music accurately.



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Example 1. Multiple neighbor tones can come together to form a CT⁰⁷ chord.

Creating a CT⁰⁷ chord

Creating a CT⁰⁷ chord is a little different from spelling a traditional chord because it doesn't have a root (similar to augmented sixth chords). To build one, focus on the neighboring aspect of the chord. Look again at the final system of **Example 1** and notice how the notes of the CT⁰⁷ chord relate to the tonic chord. The root of the tonic chord is also in the CT⁰⁷ chord—that's the common tone. The fifth of the resolving chord is doubled because it is embellished by both upper and lower neighbor tones (G–A–G and G–F♯–G). Finally, the third of the tonic chord is embellished by its lower neighbor a half step below (E–D♯–E). Finally, look at how the third of the chord is embellished by its lower neighbor (E–D♯–E).

You can create a CT⁰⁷ chord by going through the following procedure:

2. The neighbor effect is somewhat less striking when embellishing a minor triad, since the third of the minor triad creates a second common tone with the embellishing chord.

1. Find the root of the chord you want to embellish (this will be the common tone).
2. Find the upper and lower neighbors to the fifth of the embellished chord.
 - The upper neighbor will involve a whole step (major second).
 - The lower neighbor will involve a half step (minor second).
3. Find the lower neighbor (minor second in particular) of the third of the embellished chord.

Recognizing CT^{o7} when analyzing

Finding this chord in context involves being aware of all fully diminished seventh chords. For each fully diminished seventh chord you find, determine if it has a common tone with the chord it resolves to. If it doesn't, then it should be some form of vii^{o7} or an applied vii^{o7} chord. If it does have a common tone, then it is a CT^{o7} chord. Remember, though, that if the fully diminished seventh chord is followed by a cad.₄⁶, you need to look past the cad.₄⁶ embellishment to its resolution to determine if there is a common tone (see **Example 2**).



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Example 2. The cad.₄⁶ can produce a common-tone that does not relate to CT^{o7} chords.

Resolving CT^{o7} to V⁷

When a CT^{o7} chord resolves to V⁷ instead of a V triad, the fifth of the V⁷ chord (*re*, $\hat{2}$) is not doubled. Instead, the voice that moves from *re* to *mi* ($\hat{2} - \hat{3}$) in the CT^{o7} will continue upward to *fa* ($\hat{4}$) in the V⁷.

Example 3 compares the *re-mi-re* ($\hat{2} - 3 - 2$) line of the resolution to V with the *re-mi-fa* ($\hat{2} - \hat{3} - \hat{4}$) line of the resolution to V⁷.



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Example 3. Comparison of a complete neighbor CT^{°7} that resolves to V and to V⁷.

CT^{°7} with incomplete neighbors

The CT^{°7} is often preceded and followed by the same chord, producing complete neighbor tones in the pattern $x\text{--CT}^{\circ 7}\text{--}x$. However, the CT^{°7} chord may be preceded by a different chord instead ($y\text{--CT}^{\circ 7}\text{--}x$), and in such cases, one or more of the neighbor tones will be incomplete.

Example 4 demonstrates this situation. Notice that the first CT^{°7} is surrounded by different chords: first I, then V₃⁴. The arrow shows which chord the CT^{°7} is embellishing. Just like in complete-neighbor CT^{°7} contexts, the embellished chord is the one to focus on, not the preceding chord. This progression is an elaboration of the $I - V_3^4 - I^6$ progression that you've encountered with tonic prolongation but with CT^{°7} chords filling in the space between each chord providing a much more colorful version of what was a rather simple progression. When listening to **Example 4**, try to hear the underlying $I - V_3^4 - I^6$ progression as its underlying model.



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Example 4. A tonic expansion pattern elaborated by two different CT^{°7} chords comprising incomplete neighbors.

Creating a CT⁺⁶ chord

The other category of common-tone chords you'll encounter (especially in music of the later 19th century) is a German augmented sixth chord (Ger⁺⁶) that functions, like the CT^{°7}, as an embellishing chord. The effect is similar to the CT^{°7}, but a little darker, because all three neighbor tones are chromatic in this version instead of just two: a CT⁺⁶ chord uses a minor second neighbor above the fifth of the chord instead of a major second.

1. Find the root of the chord you want to embellish (this will be the common tone). Tonic is the most common harmony to embellish with a CT⁺⁶ chord.
2. Find the upper and lower neighbors to the fifth of the embellished chord. Both will be a half step.

- Find the lower neighbor (minor second in particular) of the third of the embellished chord.

When a CT⁺⁶ chord is embellishing a I chord (which is usually the case), you can think in terms of solfège to find the notes. The solfège is the same as for a Ger⁺⁶ chord: *le–do–me/ri–fi* (↓ $\hat{6}$ – $\hat{1}$ – ↓ $\hat{3}$ / ↑ $\hat{2}$ – ↑ $\hat{4}$). Because this chord is most often found in major keys, *ri* (↑ $\hat{2}$) would be a better spelling than *me* (↓ $\hat{3}$).

Example 5 below shows both chords (CT^{o7} and CT⁺⁶) for comparison. Note that the common tone is not always the bass note and that the augmented sixth interval may be inverted to become a diminished third instead, but the chord is typically labeled CT⁺⁶ in both contexts.



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Example 5. Comparison between a CT^{o7} and CT⁺⁶ chord, both as complete neighbors.

Musical Examples

The introduction to Scott Joplin’s “The Sycamore” shows how a CT^{o7} can be sandwiched between a cad.₄⁶ and its resolution to V⁷ (**Example 6**). It appears as though the bass is moving from D to F♯ and back to D, but the F♯ is not related to the functional bass of the passage.



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Example 6. Scott Joplin, “*The Sycamore*,” mm. 1–4. A CT^{o7} is introduced between the start of the cad.₄⁶ and its resolution to V⁷

In **Example 7**, Frederic Chopin uses a CT⁺⁶ in m. 8 at the conclusion of a parallel period that is occurring over a tonic pedal. This instance is a common-tone chord that is an incomplete neighbor, because the chord before it in measure 7 is V⁷ above the tonic pedal. Notice also that Chopin spelled the chord with a C♭ instead of a B♭. Spelling variants do happen with common-tone chords, but the B♭

spelling in this case would have clarified the neighboring function of that note with surrounding Cs in that voice.



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Example 7. Frederic Chopin, *Etude in F minor*, Op. 10, no. 9, mm. 1–9. A CT⁺6 occurs in the context of a tonic pedal in m. 8.

Assignments

1. Common-Tone Chords (.pdf, .docx.) Asks students to spell common tone chords, realize figured bass, complete 4-part voice leading with Roman numerals, and analyze a musical excerpt. [Access audio \(excerpt begins at 0:25\).](#)

Footnotes

HARMONIC ELISION

Brian Jarvis

KEY TAKEAWAYS

- Harmonic elision is the *suppression* of an expected chord (distinct from chord substitution).
- Leading-tone elision:
 - The expected triad is replaced by the dominant seventh chord with the same root or by a functionally equivalent diminished seventh chord.
 - The leading tone (or [applied leading tone](#)) is altered to become *te* ($\downarrow \hat{7}$) instead of resolving up by minor second.
 - The same bass note is maintained unless the bass had the leading tone (or applied leading tone).
- Raised-root elision:
 - The root of the expected chord is raised to become a leading tone (or applied leading tone).
 - The new chord can typically be V, V⁷, or vii^{o7}.
 - The bass should be as close to the expected bass note as possible.

CHAPTER PLAYLIST

Harmonic elision occurs when a harmonic progression seems to suppress or remove an expected chord for one that is similar but functionally distinct from the chord it replaced. It often feels like the combination of two simultaneous harmonic events. This is different from chord substitution, where the replacement of an expected chord just seems like a single unexpected event. However, some use the term “chord substitution” in a broader sense that would also include harmonic elision as described here. This chapter covers two types of elision: leading-tone elision and raised-root elision.

Context

Leading-tone elision with a dominant seventh chord

A leading-tone elision occurs when a chord has a leading tone (or an applied leading tone) that doesn't resolve as expected (up by minor second) and instead becomes the lowered version of itself (e.g., B becomes B $\flat$ or C $\sharp$ becomes C $\flat$). This can happen when a dominant-functioning chord resolves not to the expected triad but to a dominant seventh with the same root as the expected triad, as in **Example 1**. Note that the suppressed chord can be clearly identified given what we expect to happen in this harmonic context.



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Example 1. A harmonic elision where the expected chord is suppressed and replaced with a dominant seventh with the same root.

Leading-tone elision with a fully diminished seventh chord

Leading-tone elision can also occur when an expected triad is replaced by a fully diminished seventh chord that is functionally equivalent to the dominant seventh chord that could have replaced it (if there is one) and has the same bass note. **Example 2** shows each inversion of a V⁷ chord and the functionally equivalent vii^{o7} chord that can be used instead.



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Example 2. Functionally equivalent V⁷ and vii^{o7} chords.

Example 3 contains an example of this type of leading-tone elision. Notice that **Examples 1** and **3** are nearly identical except that **Example 3** is using the functionally equivalent fully diminished seventh chord instead (vii^{o7} instead of V₅⁶).



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Example 3. A harmonic elision where the expected chord is suppressed and replaced with a fully diminished seventh chord that has an equivalent function to the dominant seventh in **Example 1**.

Voice leading with leading-tone elision

When dealing with elision, the voice leading doesn't change much; the only difference is that the leading tone becomes the lowered version of itself instead of resolving up by minor second to the root of the next chord as it normally would. See the voice-leading comparison in **Example 4**.



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Example 4. Voice-leading comparison between a regular resolution and an elided one.

When the leading tone is in the bass

It is important to remember that if the leading tone before a leading-tone elision is in the bass, this means the bass will change, putting the upcoming chord in a different inversion. This is expected to happen with V6, V65, and viio7 (and any applied chords with the same Roman numerals) because they all have the leading tone in the bass. Common progressions for this occurrence are $V_5^6 - V_2^4/IV$ and $V_5^6/V - V_2^4$, as in **Example 5** below. In other situations, the bass note will stay the same.



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Example 5. Change of expected bass when the leading tone is in the bass and a leading-tone elision occurs.

Raised-Root Elision

Raised-root elision occurs when the root of the expected chord arrives in its raised version (e.g., B $\flat$ becomes B $\sharp$ or C becomes C $\sharp$) to become the leading tone in an applied chord. For example, a raised-root elision would occur if an expected chord with C as the root was suppressed and a chord with C $\sharp$ as a leading tone appeared instead. This could be any of the chords that use C $\sharp$ as a leading tone: A, A⁷, C $\sharp$ ^o, C $\sharp$ ^{o7} and C $\sharp$ ^{o7} (though the half-diminished option is not very common). The overall harmonic result is that the progression is pushed higher up the scale. In **Example 6**, the expected progression (based upon norms in this style) would be I⁶ – V⁴₃ – I. Instead, the final I chord is elided with a raised-root elision, because V⁶₅/ii (A⁷/C $\sharp$) takes its place. That chord then resolves to ii, so while the expected progression was heading toward I, the end result of the raised-root elision is that the progression resolves to ii, one step higher in the scale.



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Example 6. Raised-root elision.

The cad.⁶₄ version

Progressions with cad.⁶₄ can contain raised-root elision that is a little different because the expected root does appear with the arrival of the cad.⁶₄ but transforms into its raised version when the ⁶₄ resolves to the ⁽⁷⁾₅₃. **Example 7** illustrates this situation.



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Example 7. Raised root elision involving cad.⁶₄.

Finding Harmonic Elision

Harmonic elision is fairly easy to spot in Roman numeral analysis because you will notice incongruities in the sequence of symbols. For example, if you see the Roman numeral V_5^6 , you would expect I to follow, but with a leading-tone elision, you could see V_5^6 followed directly by V_2^4/IV , which should alert you to the fact that something unexpected has occurred. After looking at the progression, you can conclude that harmonic elision has taken place—you analyzed the chord correctly, but the chord you expected has been elided. The same is true for raised-root elision: if you saw V_5^6/V followed directly by V_5^6/vi instead of the expected V, you could investigate further and conclude that the V chord has been elided, with its root raised to become the leading tone of vi.

Notation: When an elision occurs, it's good practice to write the expected Roman numeral in your analysis but then cross it out and place the symbol for the chord that actually occurred. **Example 8** below shows an example of this style of notation.

Musical Example

The first phrase of Richard Strauss's song "Zueignung" (**Example 8**) includes three harmonic elisions. The first occurs on beat 4 of measure 6. It is expected that the G major chord on beat 3 will be followed by a C major chord, but the C major chord has been suppressed, and in its place, a chord with a $C\sharp$ is used instead. This is a raised-root elision because the expected root was C and a chord with $C\sharp$ occurred instead, with the $C\sharp$ functioning as an applied leading tone.

The second harmonic elision occurs in m. 8, where a quasi cad._4^6 (without the expected 4–3 part of the chord, but otherwise quite similar) never resolves to its $\frac{5}{3}$ version. Instead, the expected root, G, is suppressed and a $G\sharp$ appears in its place (as an applied leading tone to vi), making this another instance of a raised-root elision.

Measure 9 repeats the quasi cad._4^6 chord again. This time, it resolves to a chord with C as the root, but it still isn't the root-position tonic triad we expect. Instead, we find a leading-tone elision: the dominant's leading tone resolves down, making the C chord a dominant seventh (V^7/IV).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=5597>

Example 8. Richard Strauss, "Zueignung", Op. 10, no. 1, mm. 1–10 – Multiple harmonic elisions in a single phrase.

Assignments

1. Harmonic Elision ([.pdf](#), [.docx](#).) Asks students to spell chords, realize figured bass, write 4-part voice leading with Roman numerals, and analyze a musical excerpt.

CHROMATIC MODULATION

Bryn Hughes

Chromatic Modulation

Modulation to closely-related keys is a relatively easy task; we can find a pivot chord by looking at the group of chords shared between two keys that have nearly-identical key signatures. There are plenty of them. For example:

The image displays two musical staves, each representing a key signature. The first staff is for C major, showing the diatonic chords: C (I), Dm (ii), Em (iii), F (IV), G (V), Am (vi), and Bdim (vii°). The second staff is for G major, showing the diatonic chords: G (I), Am (ii), Bm (iii), C (IV), D (V), Em (vi), and F#dim (vii°). The chords that are common to both keys are highlighted with orange vertical bars: C (I) and Em (iii) from the first staff, and G (I), Am (ii), and Em (vi) from the second staff. The common chords are C, Em, G, and Am.

Example 1: Common chords in the keys of C and G major

When two keys are more than one accidental apart on the circle of fifths, however, it becomes more difficult to find a pivot chord that will enable a smooth modulation between the two keys.

To modulate to a distantly-related key, that is, a key that is more than one accidental away on the circle of fifths, requires us to use our knowledge of chromatic chords, such as those found through mode mixture. Mode mixture enables us to expand the number of possible pivot chords for modulation. For example, in the key of C major, the chords made possible through mode mixture (i.e. those chords found in C minor, its parallel key), we can now modulate easily to E-flat major (7 shared chords), A-flat major (4 shared chords), B-flat major (3 shared chords), and their relative minor keys, F minor and G minor. Example 2

shows the common chords shared between C major and E-flat major, made possible by using mixture chords in C major.

Diagram illustrating shared chords between C major and E-flat major through mode mixture. The diagram shows three staves of chords in C major, with 7 chords in common between the first two staves (E-flat major and C major mixture).

Staff 1 (E-flat major)	Staff 2 (C major mixture)	Staff 3 (C major diatonic)
E♭ (I)	Cm (i)	C (I)
Fm (ii)	Ddim (ii°)	Dm (ii)
Gm (iii)	E♭ (♭III)	Em (iii)
A♭ (IV)	Fm (iv)	F (IV)
B♭ (V)	Gm (v)	G (V)
Cm (vi)	A♭ (♭VI)	Am (vi)
Ddim (vii°)	B♭ (♭VII)	Bdim (vii°)

Example 2. Shared chords between C major and E-flat major, made possible through mode mixture.

Example 3 shows a modulation from the key of A major to F major, using iv from A major as a pivot chord. Example 4 shows this technique being used by Verdi in his opera *Rigoletto*.



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Example 3. Modulation from A major to F major using a mixture chord in A major (iv) as a pivot chord.



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Example 4. Modulation from D-flat major to F-flat major using a mixture chord in D♭ major (♭VI6) as a pivot chord.

Conversely, we can use diatonic chords in the old key as mixture chords in the new key to modulate to

distant keys in the “sharpwise” direction on the circle of fifth. Example 5 shows the potential pivot chords when modulating from C major to A major by way of the diatonic chords in C major as mixture chords in the new key of A major.

The image displays three staves of music in treble clef, each with a key signature of two sharps (F# and C#). The first staff shows the diatonic chords of C major: I (C), ii (Dm), iii (Em), IV (F), V (G), vi (Am), and vii° (Bdim). The second staff shows the diatonic chords of A major: i (A), ii° (Bdim), bIII (C), iv (Dm), v (Em), bVI (F), and bVII (G). The third staff shows the diatonic chords of C major again: I (C), ii (Dm), iii (Em), IV (F), V (G), vi (Am), and vii° (Bdim). Brackets on the right indicate that 0 chords are in common between the first and second staves, and 7 chords are in common between the second and third staves.

Example 5. Potential pivot chords when modulating from C major to A major.

A modulation using this technique in a chorale setting is shown in Example 6.



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Example 6. Modulation from A-flat major to C major using a diatonic chord in A-flat major (vi) as a pivot chord that is interpreted as a mixture chord (iv) in C major.

Example 7 shows an interesting chromatic modulation from Brahms’s Waltz, op. 39, no. 14. Here, Brahms uses a diatonic viio6 chord in the local key of G major to pivot to E major, reinterpreting the chord as iio6, a mixture chord in the new key of E major.



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Example 7. Modulation from G major to E major using a diatonic chord in G major (vii^o6) as a pivot chord that is interpreted as a mixture chord (iio⁶) in E major.

Common-Tone Modulation

Sometimes we can use a common-tone, rather than a pivot chord, to modulate to distantly related keys. In particular, the key areas that are a third away from the home key are easily modulated to using this technique. These keys, chromatically altered tonics that are a third away from the home key, are called “chromatic third” or “chromatic mediant” relations. For example: C and A^b major (share the common tone C), C and E^b major (share the common tone G), C and A major (share the common tone E), C and E major (share the common tone E).



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Example 8. Common tones shared between chromatic mediants.

We can modulate to distant keys in several ways. Chromatic modulation refers to a modulation to a distant key by way of a chromatic chord. Enharmonic reinterpretation involves respelling and resolving a chromatic chord (usually a German augmented sixth or diminished seventh chord).

The German augmented-sixth chord may be respelled to resemble a dominant seventh chord. If you use the German augmented-sixth from the home key, the resulting modulation will be up a half step.

Likewise, you can re-spell a dominant seventh chord to resemble a German augmented-sixth chord. If you use the dominant seventh chord in the home key, the resulting modulation will be down a half step. You can, of course, use this trick with any dominant-seventh chord (say, a secondary dominant), opening up numerous possibilities for modulation.

Assignments

1. Coming soon!

Media Attributions

chromatic modulation – closely related keys

distantly related keys – mixture to diatonic

distantly related keys – diatonic to mixture

REINTERPRETING DIMINISHED SEVENTH CHORDS

Bryn Hughes

Chromatic Modulation Using Enharmonically Reinterpreted Diminished-Seventh Chords

Diminished-seventh chords can also be respelled for the purposes of modulating to distant keys. Each diminished-seventh chord can be respelled such that any of the its four notes is the root, and thus, can be resolved to any of four different target chords.

Assignments

1. Coming soon!

AUGMENTED OPTIONS

Mark Gotham

KEY TAKEAWAYS

The augmented triad is:

- much rarer than the other three triad types (major, minor, and diminished).
- interesting for several reasons including
 - that rarity itself, and
 - the symmetrical construction, which creates potential flexibility and ambiguity (just like with the diminished seventh chord)
 - most often seen in one of two forms:
 - as III+ in harmonic minor (this being the only form in the major/minor system without chromatic alteration), and
 - as a chromatic passing chord between V and I in a major key: V, V+, I.

Aren't we forgetting something here? We're now well into chromatic harmony, yet we've hardly mentioned one of the four types of ostensibly diatonic triads: we're up to speed with augmented sixth chords, but not the augmented triad. So what is this augmented triad all about? How do composers use it? How have we neglected it so long (and why do so many textbooks brush over it altogether)?

Recall that we have four types of triads that can be constructed with major and minor thirds alone:

- Diminished triad (minor third + minor third)
- Minor triad (minor third + major third)
- Major triad (major third + minor third)
- Augmented triad (major third + major third)

So the augmented triad is part of this set of possibilities, but apparently not an equal member, at least not

in the eyes of common practice composers. Clearly major and minor triads are mission critical to tonal music, and so is the diminished triad, especially in its dominant function role (as vii^0 and as a part of V^7). The augmented triad is a slightly peripheral character in relation to those protagonists.

Always Chromatic?

Part of that rarity has to do with the structure of the major/minor system itself: III^+ in harmonic minor is the only time the augmented triad appears in the major/minor system without chromatic alteration. This III^+ triad is closely related to both the dominant (V) and minor tonic (i): in both cases, two scale degrees are held common and only one semitone distinguishes the chord tone which changes:

- III^+ and V: $\hat{5}$ and $\hat{7}$ in common, semitone between $\hat{2}$ and $\hat{3}$;
- III^+ and i: $\hat{3}$ and $\hat{5}$ in common, semitone between $\hat{1}$ and $\hat{7}$.

Overall, I'd say that the sound and usage of III^+ typically suggests a dominant function. See what you think of the following example from the opening of Schubert's "Der Atlas" ([Example 1](#)) in which:

- B $\flat$ and D remain constant throughout ($\hat{3}$ and $\hat{5}$).
- G moves to F $\sharp$ and back ($\hat{1}$ and $\hat{7}$).
- This arguably gives the impression of a tonic-dominant alternation, but with very slight changes.

Etwas geschwind

The image shows a musical score for Schubert's "Der Atlas" from Schwanengesang, D.957. It is in 3/4 time and B-flat major. The score is for Voice and Piano. The piano part features a prominent augmented triad (III+) in the right hand, consisting of B-flat, D, and F-sharp. The left hand provides a bass line with chords. The tempo is marked "Etwas geschwind".

Example 1. Extract from the start of Schubert's "Der Atlas" (from Schwanengesang, D.957), showing the augmented triad III^+ (possibly, depending on your analytical viewpoint) and certainly how closely related this chord is to both V and i.

Here is the entire song:



 One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=3991>

Schwanengesang, D.957 by OpenScore Lieder

The small steps between these chords relate to a key part of the “parsimonious voice leading” that’s so important to the “Neo-Riemannian” approach to harmony, which seeks to account for the extended tonal relations that become more common in the late 19th century. For more on that, see [Neo-Riemannian Triadic Progressions](#). For now, let’s continue to look at some examples of the augmented triad in practice.

Rarely focal

The relatively peripheral role and the rarity of augmented triads may be thought to diminish its importance, though as the price of gold, diamond, and other rare commodities attest, that very rarity can be valuable. For Schoenberg, this makes the augmented triad “better protected against banality” than the diminished triad and seventh (1911, trans. ed. 1983, p. 239).

The idea of rarity also needs unpacking: when we speak of “rarity” in harmony, we usually mean that it is unusual to see that chord in a focal role. This speaks to Richard Cohn’s observation that “when an augmented triad appears in music before 1830, its behavior is normally well regulated and unobtrusive, tucked into the middle of a phrase rather than exposed at its boundaries, passed through quickly and lacking metric accent” (2012, p. 43).

This may be true in the general case, though that’s not to say there aren’t glorious counterexamples.

Example 2 sets out such an example from the “mente cordis” section that concludes the “Fecit Potentiam” of Bach’s Magnificat (1723, 1733). This is a remarkable moment: not only is there an augmented triad at all, but it is introduced by nearly full forces, spanning the full register, and after a dramatic general pause which itself is preceded by a diminished seventh. You couldn’t hope to find a clearer, more dramatically foregrounded augmented triad in any repertoire.

Soprano I
Soprano II
Alto
Tenor
Bass
Reduction

su-per-bos men - te cor - dis
su-per-bos men - te cor - dis
sper - sit su-per-bos men - te cor - dis
di - sper - sit su-per-bos men - te cor - dis
su-per-bos men - te cor - dis

[D: V] b: viio7/v III+6 VI7 viio65/v

Example 2. A prominent augmented chord in the “Fecit Potentiam” of Bach’s Magnificat with a possible harmonic reading of this passage that sees the augmented triad setting up a deceptive cadence in the middle of a passage in V minor enclosed by two secondary dominants, $viio^7/v$.

Chromatic passing chord

Although there is only one diatonic form of the augmented triad (III+ in minor), there are clearly many more possibilities when we expand the remit to include chromatic alterations. Here too, however, some are more common than others. A particularly favored use sees the augmented chord as part of a chromatic passing motion from V to I in major, with the whole-tone step from $\hat{2}$ to $\hat{3}$ “filled in” with a chromatic semitone motion that gives a fleeing . This can appear in several ways:

- As a straightforward V–V+–I
- With another harmony on the initial $\hat{2}$: e.g., ii–V+–I
- With or without sevenths: e.g., ii⁷–V+⁷–I

Example 3, from Fanny Mendelssohn Hensel’s *Gondellied* (6 Lieder, Op. 1, no. 6), sets this out.

Measures 19–20 can be seen as a V^6/V –V+–I cadence in A (or, with sevenths, V_5^6/V –V+⁷–I) where:

- the augmented chord appears in a dominant function;
- the crucial note of that augmented chord (B $\sharp$) is the raised supertonic, arising through chromatic motion from $\hat{2}$ to $\hat{3}$ (both in the voice part and doubled in the piano).

Example 3.
Extract from Fanny
Mendelssohn
Hensel's
Gondellied (6
Lieder, Op. 1, no.
6)

Here is the entire song:



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[Hensel, Fanny \(Mendelssohn\) – 6 Lieder, Op.1, No.6 – Gondellied](#) by [OpenScore LiederCorpus](#)

The Augmented Triad as Figure or Ground in Liszt's *R. W. Venezia*

[Score on IMSLP](#)

So far, we have seen examples of the augmented triad in diatonic form (III+), and as a chromatic alteration but with a clearly defined function (V+). Let's now venture further into the chromatic territory and to pieces which use the augmented triad in a prominent, focal way. Liszt's late music includes some fascinating miniatures, many of which heavily emphasize the augmented triad.¹ *R. W. Venezia* is one such work, highlighting the augmented chord in general, and C# augmented [C#, F, A] in particular. This chord receives such a weighting that it stakes a remarkable claim to a kind of overall primacy or tonicity that at least challenges and perhaps even vanquishes the corresponding claim from a tonal center (Bb).

Cohn (2012, 47), after Harrison (1994, 75ff.), discusses a similar emphasis of the diminished chord in Schubert's "Die Stadt," rightly observing that "rhetorical garments normally reserved for consonances" are

1. See Cohn 2000; Forte 1987; Gut 1975; Hantz 1982; McKinney 1993; Satyendra 1992, 1997; Todd 1981, 1996.

used in this repertoire to afford dissonant chords a kind of surrogate tonic status (see also Morgan 1976). Those rhetorical strategies are well summarized by the pithy notion of “first, last, loudest, longest.”

R.W. Venezia begins with a C♯ augmented chord outlining, resolving by parsimonious voice leading to B♭ minor as the start of a rising chromatic sequence which ultimately turns into a long succession of rising (initially parallel augmented) triads that climax in a blazing, *forte* B♭ major. That forte section then moves through more parsimonious voice leading cycles before returning to C♯ augmented, now *fortissimo*. Finally, this C♯ augmented chord initiates a descent which deftly combines the pitches of B♭ minor and C♯ augmented [B♭, C♯, F, A], leading to an ambiguous close on a unison C♯. That final C♯ is repeated, carrying with it the ambiguity right up to the last note. If the second, final C♯ were a B♭, then the piece would come down more firmly in favor of B♭ minor. As it is, Liszt maintains the delicate balance and leaves us wondering which is the figure and which the ground.

In short, C♯ comes “first” and “last,” while B-flat probably wins in the “loudest” stakes, leaving “longest” as the primary vehicle of ambiguity. The augmented chord is used considerably more than the average for the time, even for Liszt (a considerably above-average user), though still not to the same extent as major or minor triads. Then again, the C♯ augmented triad specifically is used to approximately the same extent as B♭ major and minor combined, raising the case for it as “tonic.” Whether that is enough is open to debate; ultimately, I hear them in an amazingly effective balance where neither quite shines through.

Anthology Examples

This chapter has surveyed some claims about how relatively common or otherwise specific particular progressions are. But so far, we’ve just looked at examples. To make sense of this kind of claim, we ought to consider the overall case. We don’t have space here to go into that in detail, but this final section provides some direction toward extensive lists of further examples for you to explore.

First, [here](#) is an initial list of approximately 200 examples gathered from the literature. The list could be thought of as an augmented triad “canon”—those instances notable enough to have been mentioned in either the theoretical or historical literature. These repertoire occurrences are varied in function and tone. Many are indeed “merely” incidental appoggiaturas and decorations, while others are fundamental, referential sonorities; some are isolated cases, others are a core part of wider, recurring harmonic processes; some have an ambiguous role, others have a clear musical and even extra-musical meaning including topical associations which generally center on death, ambivalence, or mystery.²

2. See Moomaw, “The Expressive Use of the Augmented Fifth” (1985, p. 354 ff.) for numerous apparent extra-musical uses, perhaps most remarkably his very final example, no. 213e, for the depiction of cannon shots in Mondonville’s *Daphnis et Alcimadure* (1754).

Second, head to the [Harmony Anthology](#) chapter for a list of moments in the [OpenScore Lieder](#) collection that analysts have viewed in terms of augmented chords. The list is sortable by composer, collection, song, measure, Roman numeral (figure) and key. Each entry includes a link to the score.

Assignments

1. Head to the section on augmented chords in the [Harmony Anthology](#) chapter and pick one (or more) of the repertoire examples listed in which an analyst has identified the use of an augmented chord.
 - For that passage, make a Roman numeral analysis of the measure in question and one or two on either side (enough to establish a chord progression and some context).
 - Create one such harmonic analysis including the augmented triad provided (figure and key are given in the table).
 - If you disagree with that reading (as you may well do), then provide an alternative harmonic analysis without it.
2. Do step 1 for several cases and identify any that seem similar to each other, and to the above. For instance, for the cases given as V+ in the anthology, are many of them similar to the chromatic passing motion in the Hensel above? Can you find any dramatic examples like the Bach? Do you see any other recurring practices not described in this chapter?

Media Attributions

Atlas

Bach

Hensel Extract

Footnotes

EQUAL DIVISIONS OF THE OCTAVE

Bryn Hughes

In the 19th century (and even as early as the late 18th century), composers became more interested in creating ambiguity in their music; avoiding chord progressions that explicitly confirmed a tonal center allowed them to thwart listeners' expectations. One way of achieving this ambiguity was to use chord progressions in which the roots of the chords divide the octave equally. In a purely diatonic system, chord progressions tend to divide the octave unequally—think about the tritone leap in a descending-fifths sequence, or the half steps in an ascending-step sequence, for instance. In a tonal system, the asymmetry of major and minor scales serves to pull chords and scale degrees towards a tonic. Conversely, root progressions that divide the octave equally quickly bring the music outside of the diatonic scale. For example, consider a root progression by major thirds: C–E–G $\sharp$ /A $\flat$ –C. While the chords built upon C and E could certainly be harmonized by chords within the C-major scale, the chord with a root of G $\sharp$ /A $\flat$ cannot. Further, the root progression from G $\sharp$ /A $\flat$ to C subverts the harmonic functions that define the tonal system: this chord progression does not contain any sort of dominant to tonic motion at all. The earliest examples of this are found as short passages in larger works that otherwise abide by the norms of common-practice tonality. Nevertheless, these examples are remarkable in that they foreshadow an unhinging of the tonal system, making way for compositional practices in the 20th century and beyond to new systems of pitch organization.

Ways to divide the octave equally

There are only *five* ways to divide a single octave equally. Such root progressions would move by:

Minor 2nd

This is somewhat trivial, as it simply produces the chromatic scale. Chord progressions in which roots move by ascending or descending minor seconds do exist, though.



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Example 1. Dividing the octave by minor seconds (a chromatic scale).

Major 2nd

Plenty of music has been written using the whole-tone scale, which divides the octave equally into major seconds. Much of this music is not tonal, or even triadic. There are a handful of examples in which tertian chord roots outline the whole-tone scale.



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Example 2. Dividing the octave by major seconds (a whole-tone scale).

Minor Third

Roots progressing by minor third outline the diminished-seventh chord. These chord progressions are most often found in examples where each of these chord roots outlining the division of the octave are tonicized, or otherwise interrupted by intervening chords. More rarely, they're found in progressions in which the chord roots outlining the division are presented in immediate succession. These kinds of progressions also tie in with the octatonic scale, which contains overlapping diminished-seventh chords.



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Example 3. Dividing the octave by minor thirds, outlining a diminished-seventh chord

Major Third

Chord progressions in which the roots move by major third will outline the augmented triad. These chord progressions can be found both in examples where the chords are in immediate succession, and with intervening chords. These progressions go hand-in-hand with the hexatonic scale, which contains two overlapping augmented triads.



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Example 4. *Dividing the octave by major thirds, outlining an augmented triad.*

Tritone

The last way in which one might divide the octave equally is by tritone. A chord progression that does this would simply be two chords, so repertoire examples would be somewhat trivial.



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Example 5. *Dividing the octave by tritone.*

Of course, you can create chord progressions in which roots progress consistently by other intervals, like perfect fourths and fifths. These will create tonal ambiguity, but they will not come to completion within a single octave in the way the five listed above do.

Assignments

1. Coming soon!

CHROMATIC SEQUENCES

Bryn Hughes

KEY TAKEAWAYS

- Diatonic sequences repeat musical segments and are transposed in a regular pattern within a key.
- Chromaticized diatonic sequences include can include chromatic embellishments or chromatic chords, such as applied (secondary) dominants. These sequences avoid strict transposition of both interval size and quality.
- Chromatic sequences differ from diatonic sequences in that both the size and quality of the interval of transposition is maintained throughout the sequence. Diatonic sequences preserve the interval size, but not the quality, to ensure that they stay within a single key.
- Remember, with all sequences, the voice leading must be consistent within every voice. Chord voicings should match between all corresponding components.

Descending-Fifths Sequence

Consider the following two-chord sequence (**Example 1**), often referred to as the “descending-fifths sequence.”



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Example 1. A diatonic descending-fifths sequence.

The sequence model, a root progression by descending fifth, is transposed down by second in each subsequent copy of the model. Because the sequence uses chords entirely from the key of G major, the root progressions don't match exactly throughout the sequence. For example, the root progression between the IV and viio chords is an augmented fourth, whereas the root progressions between every other pair of chords is either a perfect fifth or perfect fourth. We “cheat” in the sequence in this way in order to keep the music within a single key. If the interval between successive chord roots was consistently a perfect fifth/fourth, the root progression would be as follows: G–C–F–B $\flat$ –E $\flat$ –A $\flat$ –D $\flat$... and so on. The sequence would rather quickly bring the music outside of the key of G major, and into new chromatic territory. It would become a chromatic sequence.

Chromatic sequences differ from their diatonic counterparts in a few important ways:

- The chords that initiate the sequence model and each successive copy contain altered scale degrees.
- The chords within the pattern are of the same quality and type as those within each successive copy of that pattern.
- The sequences derive from those that divide the octave equally.

Importantly, chromatic sequences are not merely sequences that contain chromatic pitches. **Example 2** shows the same descending-fifths sequence, this time with alternating secondary dominant chords. While the sequence contains chromatic chords (the secondary dominants), it is not a truly chromatic sequence because the overall trajectory of the sequence is still one that traverses the scale steps of a single key. Notice that the progression of chord roots on successive downbeats still matches the purely diatonic sequence shown in **Example 1**: G–F $\sharp$ –E–D.



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Example 2. A diatonic descending-fifths sequence with alternating secondary dominant-seventh chords.

Conversely, we can create a truly chromatic sequence if we ensure that the progression of chord roots maintains a consistent pattern of intervals throughout the sequence. An easy way to do this is to make the second chord of the sequence model into a dominant-seventh chord that can be applied to the first chord of the subsequent copy of the model. In **Example 3**, the second chord of the model is now F⁷ instead of a diatonic IV chord. We interpret this as V⁷ of the chord that follows, which is, in turn, another dominant-seventh chord.



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Example 3. A chromatic descending-fifths sequence with interlocking secondary dominant-seventh chords.

The voice leading in the above sequence requires some attention. Because every chord is interpreted as a dominant-seventh of the chord that follows, it is not possible to resolve both the leading tone and the chordal seventh as normal. As is the case whenever you connect seventh chords with roots a fifth apart, the voice leading requires an *elided resolution*. Instead of the chord you expect to hear following a dominant-seventh chord, you get a dominant-seventh chord with the same chord root. For example, we expect to hear either a C or Cm chord following a G⁷ chord. An elided resolution would result in a C⁷ chord in place of the expected chord. An example of an elided resolution is shown in **Example 4**. The example shows the expected C resolution in parentheses. The elided resolution essentially “elides” the chord we expect with the following chord, C⁷. In a sense, we mentally skip over the expected chord to get to the next dominant-seventh chord. An important result of the elision is that the leading tone of the first dominant-seventh chord, B, resolves down by half step to become the new chordal seventh. Likewise, when the chordal seventh in the first dominant-seventh chord, F, resolves down by half step, it becomes the new leading tone. This leading tone/chordal seventh exchange is essential for proper voice leading in chord progressions that use interlocking seventh chords, such as the sequence above. Furthermore, this kind of voice leading is integral to the study of jazz harmony, as you will find in other parts of this textbook.



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Example 4. An elided resolution of a dominant-seventh chord.

Returning to **Example 3**, notice that the progression of chord roots on each successive strong beat divides the octave equally into major seconds. This results in a sense of tonal ambiguity, making the Roman numeral analysis of these chords tenuous, at best. In particular, the chords identified with asterisks in the example are only labeled as such for consistency. In many cases, when analyzing highly chromatic music, it is often quite difficult to assign Roman numerals to chords; this tonal ambiguity is part of the

aesthetic of this kind of music. In cases like this, it is often convenient to also analyze the music using lead-sheet symbols. These have been included in the examples in this chapter.

Ascending 5–6 Sequence



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Example 5. A diatonic ascending 5–6 sequence.



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Example 6. A chromaticized diatonic ascending 5–6 sequence, featuring secondary dominant chords.

The above examples present the diatonic ascending 5–6 sequence (**Example 5**) and its chromaticized variant (**Example 6**). Note that both of these include an inconsistent pattern of intervals between chord roots in the second measure. To that point, the pattern of chord roots was a descending minor third followed by an ascending perfect fourth. From beat 1 to beat 2 in m. 2, the chord roots are D to B $\flat$ —a major third. To make this a truly chromatic sequence, this interval must be corrected to match the others. Thus, we would change the B $\flat$ ⁷ to a B⁷. Likewise, we would then change the chord that follows the B⁷ to a chord with a root of E (rather than E $\flat$), to preserve the root progression by perfect fourth (**Example 7**).



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Example 7. A chromatic ascending step sequence, featuring secondary dominant chords.

A similar problem arises with the chord qualities used at the beginning of each subsequent copy of the sequence model. The first chord of the sequence is major, so for it to be a chromatic sequence, we must change the remaining first chords of each iteration to be major as well. The final result is a sequence in which the chord on every strong beat is a major triad with roots a major second apart. If it were to traverse the entire octave, the sequence would divide the octave into major seconds. In **Example 7**, though, the sequence stops once it reaches the E major triad, treats that triad as a dominant chord, and modulates into A major. The modulation brings the music down a half step from its starting key. Distant modulations such as these are one of the reasons that chromatic sequences can be powerful tools.

Descending 5–6 Sequence



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Example 8. A diatonic descending thirds sequence.



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Example 9. A chromatic descending 5–6 sequence that modulates from D major to C major.



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Example 10. A chromatic descending 5–6 sequence using inverted chords on every weak beat. The sequence outlines the whole-tone scale on every strong beat.

The familiar “Pachelbel” sequence (**Example 8**) can derive a chromatic sequence in a couple of ways. The diatonic version of this sequence alternates root motion by perfect fourth with either major or minor

seconds. The fully chromatic version of this sequence replaces the root motion by second with root motion by minor third (**Example 9**). This version of the sequence traverses the octave by major seconds, outlining the whole-tone scale and creating a strong sense of harmonic ambiguity by its end. When you listen to **Example 10**, for instance, notice that the D major chord that finishes the sequence hardly sounds like the tonic, even though, nominally, it is. This version of the sequence also uses inverted chords on every weak beat, creating a bass line that descends through the chromatic scale.

Assignments

1. Coming soon!

PARALLEL CHROMATIC SEQUENCES

Bryn Hughes

Parallel 6/3 Chords

Parallel Dominant Chords

Parallel Augmented Triads

Assignments

1. Coming soon!

THE OMNIBUS PROGRESSION

Bryn Hughes

The omnibus progression is a special type of chromatic sequence in which the bass and another voice in the texture move in contrary motion. Most commonly, the omnibus progression is used to prolong dominant harmony, but it can also be used as a means of modulating into distant keys.

Example 1 shows the prolongation of a dominant-seventh chord via a voice-exchange between the leading tone (in the soprano) and the root of the chord (in the bass).



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Example 1. *The omnibus progression prolongs dominant harmony using a chromatic a voice exchange between the leading tone and the root.*

Notice that the voice leading in this progression is as smooth as possible: The only voices that are moving are the ones involved in the voice exchange. The other voices remain static as common tones.

The harmony throughout the

There are two ways of writing an omnibus progression: with the bass and upper voices converging, or with the bass and upper voices diverging.

The converging omnibus progression begins on a root-position dominant-seventh chord. The bass moves up-ward by semitone, while the voice with the leading tone moves downward by semitone, creating a voice exchange. The remaining two upper voices maintain common tones.

Moving three semitones in this fashion brings you to another root-position dominant-seventh chord. Moving four semitones in this fashion brings you to the same dominant-seventh chord on which you began the progression, but this time, in first inversion.

The omnibus progression can be used to move into distant keys (and eventually traverse the octave) if, once you reach the new root-position dominant-seventh chord (that you arrived at after three semitones), you find the new leading tone and begin the process again.

The diverging omnibus progression works almost identically, but instead of moving the leading tone in contrary motion to the bass, you move the seventh. To move into distant keys, find the new seventh in the root-position dominant-seventh chord and repeat the process.

Assignments

1. Coming soon!

ALTERED AND EXTENDED DOMINANT CHORDS

Bryn Hughes

Altered dominant chords

Altered dominant chords feature either an augmented or diminished fifth. Augmented fifths are indicated in analysis by “+” beside the Roman numeral. Diminished fifths are indicated by a “o” beside the Roman numeral.

Dominant with an augmented fifth

If you raise the fifth of a dominant triad, it will become an augmented triad. Typically, raised fifths resolve upward by step to the third of its target chord. Note that the augmented triad is a symmetrical chord that can be interpreted in multiple ways, making it difficult to identify its root without proper surrounding context. Like the diminished-seventh chord, this means that the augmented triad can be a pathway to distant, chromatic modulations. See Example 1, which shows the three possible enharmonic interpretations and resolutions of the C augmented triad.

Importantly, these chords do not resolve easily to minor triads, since the augmented fifth would not be able to resolve upward by step.



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Example 1: The three possible resolutions of the C augmented triad.

The Dominant with Diminished Fifth

When you add a 7th to a Vo chord, you get a chord that sounds precisely like a French augmented-sixth chord. This equivalence becomes even clearer when you use the Vo7 chord in second inversion, leaving the lowered fifth in the bass voice to resolve downward by step. As Example 2 shows, the chords Vo4/3/V and the French augmented-sixth chord are identical.



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Example 2: The dominant chord with a diminished fifth, and its equivalence with the French augmented-sixth chord.

Extended dominant chords

Extensions can be added to dominant chords to create new and interesting sonorities. These chords are typically found only in root position.

When composing these chords in a four-voice texture, you need to decide which notes to leave out. These chords will always include the root and the chordal seventh.

The V9 chord replaces a doubled root with a ninth. The ninth should resolve down by step.

The V11 chord replaces the third with an eleventh. The eleventh “resolves” by common-tone. This chord typically includes both the ninth and the eleventh, and resembles a IV chord with scale-degree 5 in the bass.

The V13 chord replaces the fifth with a thirteenth. The thirteenth “resolves” by leaping down by third to scale-degree 1.

Assignments

1. Coming soon!

NEO-RIEMANNIAN TRIADIC PROGRESSIONS

Bryn Hughes

KEY TAKEAWAYS

- Neo-Riemannian theory, named after music theorist Hugo Riemann, provides a means of rationalizing triadic progressions that involve sharing common tones, more so than staying within one key.
- Every Neo-Riemannian transformation toggles between one major and one minor triad.
- The most basic Neo-Riemannian transformations shift one note and keep two common tones.
 - **Relative** relates a major triad and the minor triad a minor third lower, such as C and Ami.
 - **Parallel** relates a major triad and the minor triad sharing the same root, such as C and Cmi.
 - **Leading-tone exchange** relates a major triad and the minor triad a major third higher, such as C and Emi.
- Other important Neo-Riemannian transformations keep one common tone and shift two notes.
 - **Slide** relates a major triad and the minor triad one semitone higher, such as C and C#mi.
 - *Nebenverwandt* relates a major triad and the minor triad a fifth below, such as C and Fmi.
- **Hexpole** relates a major triad and the minor triad a major third below, such as C and A♭mi. This transformation is unique because it does not keep any common tones; instead, each note is shifted by a half step to get to the new chord.
- Neo-Riemannian transformations are abbreviated to one letter each: R, P, L, S, N, and H.
- Theorists have come up with several networks of transformations that help visualize these relationships, such as the *Tonnetz*, the Weitzmann regions, and the Cube Dance.

A one-page summary of transformations is available [as an interactive score](#) and [as a PDF](#).

In the late 19th century, composers often used triadic progressions that confound conventional Roman

numeral analysis. Consider the following excerpt from Brahms's concerto for violin and cello ([Example 1](#)):

Example 1. Brahms, *Concerto for Violin and Cello, I*, mm. 268–79 (10:22).

A reduction of the chord progression in the excerpt above can be found in [Example 2](#). The passage connects two $A\flat$ major triads; however, the chords in between those triads do not belong to $A\flat$ major in any useful way, nor do they follow any of the conventions of functional harmony.

Example 2. Brahms, *Concerto for Violin and Cello, I*, mm. 270–76, reduction.

One might dismiss the passage altogether as “non-functional harmony,” but when you listen to it, it follows a certain kind of logic. As Richard Cohn writes, “if this music [music that is triadic but functionally indeterminate] is not fully coherent according to the principles of diatonic tonality, by what other principles might it cohere?” (1998, 169).

Neo-Riemannian Transformations

Neo-Riemannian theory describes a way of connecting major and minor triads without a tonal context.

Example 3 shows the three basic Neo-Riemannian operations. Notice that each operation preserves two common tones in a triad and changes its mode.

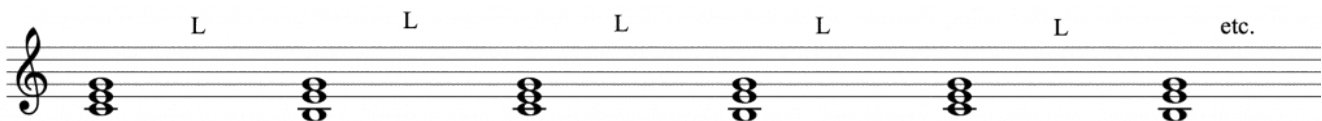
- The **Relative** transformation (R) preserves the major third in the triad and moves the remaining note by whole tone.
- The **Parallel** transformation (P) preserves the perfect fifth in the triad and moves the remaining note by semitone.
- The **Leading-Tone Exchange** transformation (L) preserves the minor third in the triad and moves the remaining note by semitone.



Example 3. The three basic Neo-Riemannian operations: Relative, Parallel, and Leading-Tone Exchange.

It's important to note that each transformation is a toggle between two chords. As an analogy, think of the caps lock key on your keyboard, which toggles between two cases of letters. If you are typing with lowercase letters and then press caps lock, this tells your keyboard to begin typing in uppercase letters. But if you press caps lock again, it toggles back to lowercase—it doesn't go to some third case.

Similarly, if you do the L transformation on a C major triad, you get an E minor triad. If you do the L transformation on an E minor triad, you return to a C major triad. Put another way, successive repetitions of the same transformation alternate between two chords, as shown in **Example 4**.



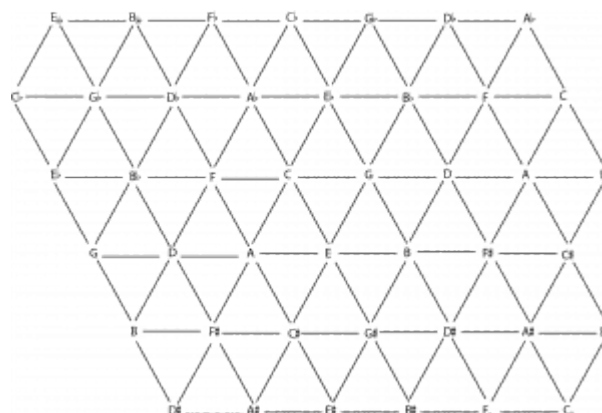
Example 4. Successive L transformations on C major and E minor triads.

While most 19th-century composers didn't write progressions using the same transformation over and over again, you will find this technique used in twentieth-century works like [“O Superman” by Laurie Anderson](#), which uses successive L transformations throughout.

The *Tonnetz*

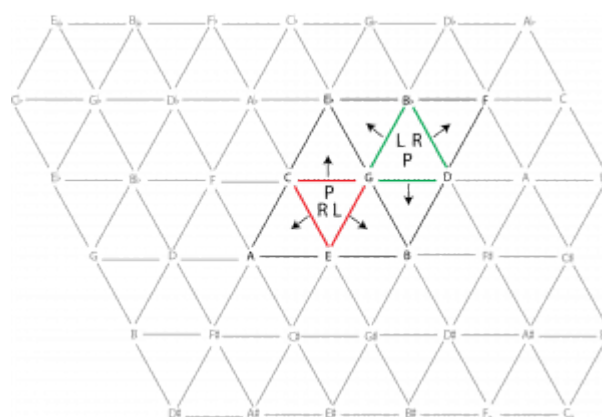
Example 5 shows a *Tonnetz*. A *Tonnetz* is a visual representation of pitches arranged such that perfect fifths are read from left to right, major thirds are read diagonally from the top left to the bottom right, and minor thirds are read diagonally from the bottom left to the top right. Any three pitches in a triangle form a major or minor triad. Neo-Riemannian transformations can be visualized by flipping a triangle along one of its three edges.

- The (P)arallel transformation flips the triangle along the edge belonging to the line of perfect fifths (left to right).
- The (R)elative transformation flips the triangle along the edge belonging to the line of major thirds (top left to bottom right).
- The (L)eading-tone transformation flips the triangle along the edge belonging to the line of minor thirds (top right to bottom left).



Example 5. The Tonnetz.

Example 6 shows each of the transformations on the *Tonnetz*. If you perform a P transformation on the C major triad, highlighted with red edges, it will flip along the C–G side to become C minor. Similarly, L will flip the triad along the G–E edge to become E minor, and R will flip the triad along the C–E edge to become A minor. Note that if you start on a minor triad, such as the G minor triad highlighted with green edges, all of the flips will be in the opposite directions. Returning to the example from Brahms’s concerto for violin and cello, we now have a means of understanding how this chord progression works.

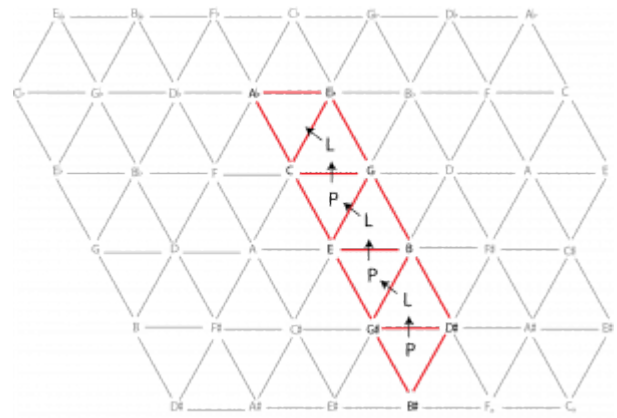


Example 6. Tonnetz showing the three Neo-Riemannian operations (P , L , and R) performed on a C major triad and a G minor triad.

Example 7 shows that the two $A\flat$ major triads are connected by a series of P and L transformations between chords.

The excerpt from the Brahms concerto navigates a column of triangles moving upward from the bottom right of the *Tonnetz*, shown in **Example 8**. Note that you need to enharmonically re-interpret the G $\sharp$ major triad as an A $\flat$ major triad at the starting point.

The *Tonnetz* is useful for visualizing the proximity of major and minor triads; notice that all of the triads in a given key are close together, while tonally disparate keys are also far apart on the *Tonnetz*. Conversely, the *Tonnetz* is helpful for imagining interesting chord progressions that you might not think of if you're limiting yourself to typical common-practice syntax.

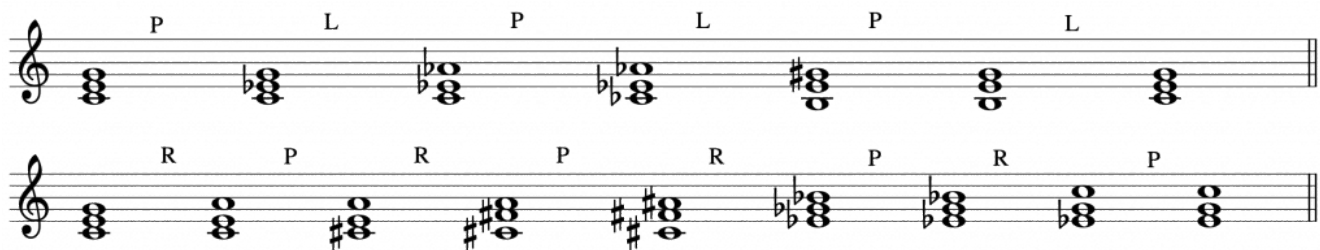


Example 8. Brahms's concerto for violin and cello, mm. 270–76 on the *Tonnetz*.

Chains or Cycles of Transformations

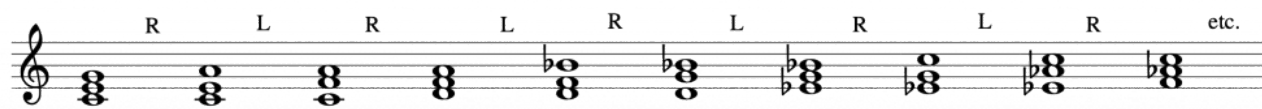
While you can use Neo-Riemannian theory to create or analyze just about any chord progression, composers have often focused on chains of operations that create closed cycles of triads. Cycles begin and end on the same chord, and they follow a specific pattern of transformations (much like a sequence). The progression from the Brahms example above is a PL cycle because it alternates P and L transformations and begins and ends on the same chord.

There are three possible cycles that use two transformations: the PL cycle, the RP cycle, and the RL cycle. As you can see in **Example 9**, the PL and RP cycles “close the loop” after relatively few transformations: six for the PL cycle, and eight for the RP cycle.



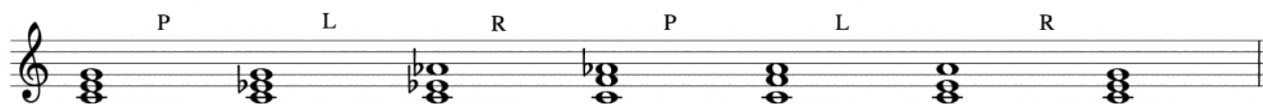
Example 9. PL and RP cycles.

Conversely, the RL cycle (**Example 10**) is quite long: it passes through all 24 major and minor triads. Since this cycle takes so long to “close the loop,” it is often ignored or presented in truncated form.



Example 10. *The RL cycle.*

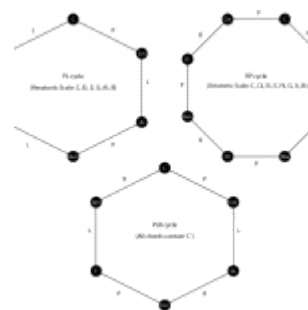
There is one three-transformation cycle that is noteworthy: the PLR cycle. As **Example 11** shows, it takes two cycles of the PLR transformations to return to the starting chord.



Example 11. *The PLR cycle.*

Of the cycles mentioned above, both the PL and RP cycles generate a parent scale made up of all of the notes used by its constituent triads. The PL cycle generates the hexatonic scale, a symmetrical scale made up of alternating semitones and minor thirds. The RP cycle generates an octatonic scale, another symmetrical scale made up of alternating semitones and major seconds. You might consider these scales to represent the “overall sound” of the cycle. Each PLR cycle is centered around a single pitch, which is contained in each of the triads within the cycle.

Each of these cycles is illustrated in **Example 12**.



Example 12. *PL, RP, and PLR cycles related to their parent scales/ common tones.*

Other Transformations

There are three other types of Neo-Riemannian transformations that occur frequently enough in the repertoire that they are worth mentioning here.

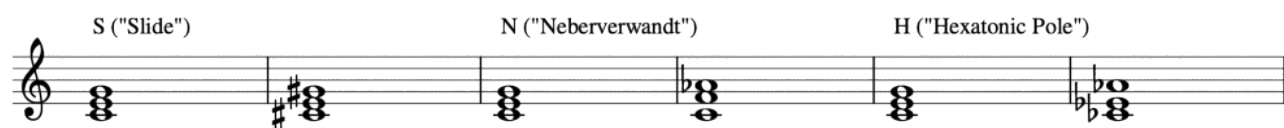
- The **Slide** transformation (S) (short for “slide”) is effectively the opposite of the P transformation: it moves the two pitches that form the perfect fifth in a triad by semitone and changes the mode of the triad.¹
- The *Nebenverwandt* transformation (N) moves both members of the minor third in a triad by

1. This term was coined by David Lewin.

semitone and again changes the mode. *Nebenverwandt* means “neighbor-related” in German, and it describes the neighbor-tone-like motion of this third.²

- The **Hexpole (H)** transformation connects a triad to its modal opposite a third away by moving each voice by a single semitone, generating the hexatonic poles in the hexatonic PL cycle discussed above and shown in **Example 12**.³

These three transformations are shown in **Example 13**.



Example 13. *S, N, and H transformations.*

Of course, all of the above transformations can be considered combinations of the staple P, L, and R transformations. For example, you could describe H as “PLP.” Indeed, you can describe the connection between *any* two major and/or minor triads as combinations of transformations: you can get from one triad to any other in five steps or less. The most interesting are those that use *parsimonious* voice leading: voice leading in which no single voice moves more than a step. There are numerous other combinations you could come up with—try some on your own!

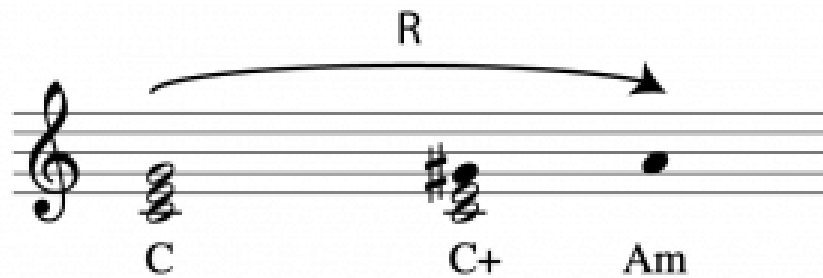
More Networks of Neo-Riemannian Transformations

Augmented triads

Although it is not part of the staple Neo-Riemannian transformations, which only deal with major and minor triads, the augmented triad provides a useful link *between* major and minor triads, specifically those that are connected by R transformations. Upon scrutinizing the above examples, you may have noticed that the R transformation isn’t quite the same as the P and L transformations, because it moves its non-preserved note by two semitones, while the others move their non-preserved note by one semitone. In a sense, the R transformation is twice as much “work” as the P and L transformations. If we fill in the gap between two R-related triads, an augmented triad emerges, as shown in **Example 14**.

2. This transformation was introduced by Richard Cohn.

3. Robert Cook is attributed with referring to this as the H transformation.



Example 14. The *R* transformation with an intervening augmented triad.

Things get interesting when you consider the augmented triad's ambiguity. Because it is a symmetrical chord (like the diminished seventh chord), you can enharmonically respell the augmented triad such that any of its chord members can act as the root. For example, the C augmented triad in **Example 14** could also be spelled as an E augmented triad (E–G#–B#), or an A $\flat$ augmented triad (A $\flat$ –C–E). As a result, you can resolve the augmented triad to three different minor triads by moving a single voice by semitone, depending on how its root is interpreted. **Example 15** shows the three possible resolutions of the C $^+$ triad.



Example 15. Three different spellings of the augmented triad resolving to three different minor triads.

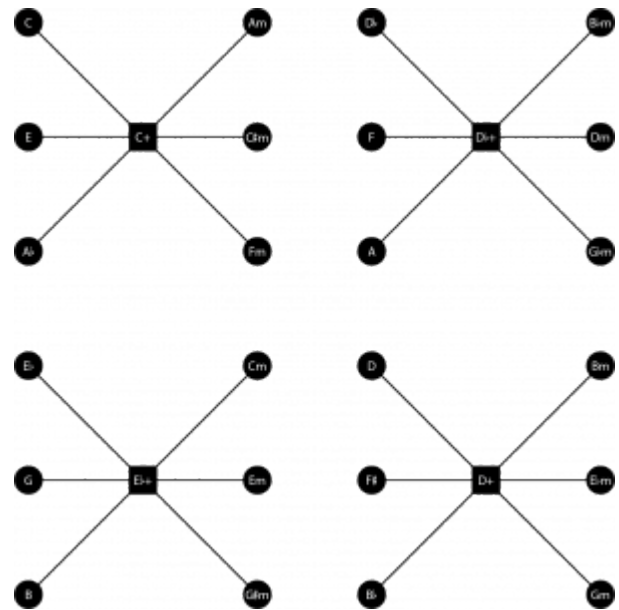
Likewise, the same augmented triad can connect to three different major triads by moving a single voice by semitone, as shown in **Example 16**.



Example 16. Three different major triads connect to the same augmented triad.

Example 17 illustrates the four augmented triads (yes, there are *only* four, due to the symmetry of the chord) and the major and minor triads they can resolve to by moving only one voice by semitone. Each augmented triad and its six associated triads are referred to as Weitzmann regions, named after the theorist Carl Friedrich Weitzmann, who wrote at length about the augmented triad and its versatility in several 19th-century treatises.

Each line in a Weitzmann region represents moving one note in a triad by a single semitone. When you trace a path from a triad on the left to a triad on the right, you'll find several of the transformations discussed previously. R, S, and N each require a total move of two semitones, and each of these can be traced through any given Weitzmann region.



Example 17. The four Weitzmann regions.

The Cube Dance

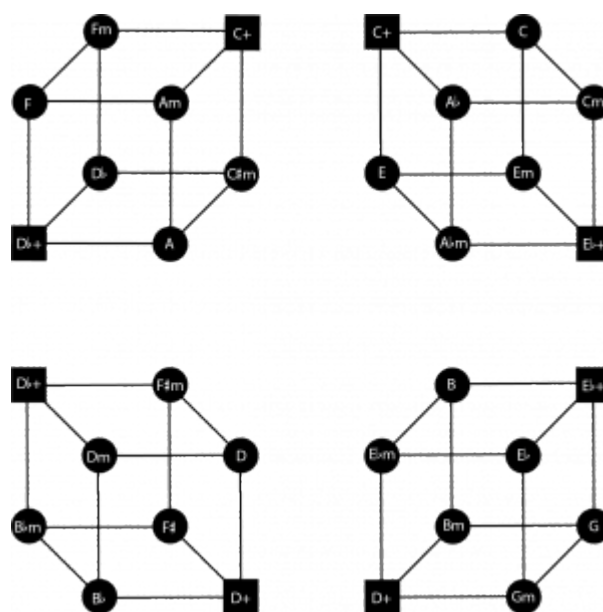
Recall that the LP, RP, and PLR cycles are “closed loops.” These recurring patterns are interesting, but could grow stale after a while. What if there were a way to “modulate” between cycles? Enter the augmented triad.

Take another look at the major triads connected to the C^+ Weitzmann region: C, E, and $A\flat$. Notice that these three major triads are the same as those found in the PL cycle that started on C, found in [Example 12](#). The minor triads in that PL cycle can be found in a different Weitzmann region: the $E\flat^+$ region. If we add augmented triads into our PL cycles, we grow the group of possible chords within a cycle from six to eight. Instead of representing these cycles on a hexagon, let's illustrate them using a cube, as shown in [Example 18](#).

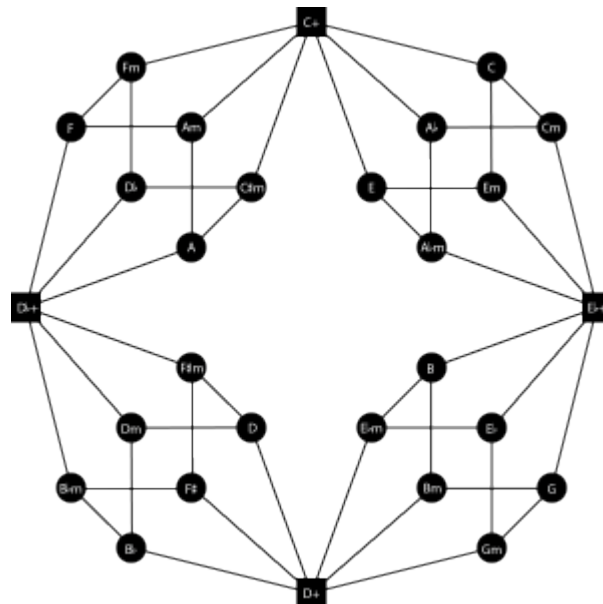
The PL cycle that starts on C can be found in the top right of [Example 18](#). Each side of the cube represents the motion of one note in the triad moving by semitone. When the triads move from major to minor, these are either P or L transformations. The augmented triads that connect to the major and minor triads are on opposite corners of the cube, and, of course, these connect to each adjoining triad by a one-semitone move as well.

Now, how might we “modulate” from one PL cycle to another? Notice that the *same* augmented triad can be found in two different cubes. If we wrote a chord progression within one PL cycle, we could “jump” to an adjacent PL cycle by navigating to one of the two augmented triads and continue in the new cycle. In a sense, each cube is connected to two other cubes via an augmented triad. We can use these connections to create a single illustration that provides us a map of all major and minor triads connected by a single semitone. This was first explained by Jack Douthett and Peter Steinbach (1998), who referred to this diagram as a “cube dance.” The cube dance has been reproduced in [Example 19](#).

Using the cube dance model, you could create a chord progression starting in the PL cycle that includes C, and modulate to a new PL cycle via either the C^+ or $E\flat^+$ triads. If you wanted to get from C to, say, D, you would have to modulate twice: either through C^+



Example 18. PL cycles with added augmented triads.



Example 19. The Cube Dance (originally conceived by Douthett and Steinbach).

and $D\flat^+$, or $E\flat^+$ and D^+ . Though the other cycles are not depicted clearly on the cube dance model, you can also use augmented triads to modulate between RP cycles, or PLR cycles, or indeed any group of Neo-Riemannian transformations that include R transformations.

Perhaps even better than the *Tonnetz*, the cube dance illustrates the proximity of major and minor triads. If we equate proximity with the total number of semitones needed to move from one triad to another, the cube dance diagram puts chords together that we would intuitively consider to be “close” to one another, while those that we might consider “distant” are relatively far apart. Moreover, the cube dance (and even the *Tonnetz*) does this without reference to a tonal center, making it useful for rationalizing chord progressions from music of the 19th and 20th (and even 21st) centuries that is triadic but shies away from functional tonality. This can be incredibly helpful when analyzing this kind of music, or even when writing your own.

Further Reading

- Cohn, Richard. 1996. “Maximally Smooth Cycles, Hexatonic Systems, and the Analysis of Late-Romantic Triadic Progressions.” *Music Analysis* 15, no. 1 (March): 9–40.
- Cohn, Richard. 1997. “Neo-Riemannian Operations, Parsimonious Trichords, and Their *Tonnetz* Representations.” *Journal of Music Theory* 41, no. 1 (Spring): 1–66.
- Cohn, Richard. 1998. “Introduction to Neo-Riemannian Theory: A Survey and a Historical Perspective.” *Journal of Music Theory* 42, no. 2 (Autumn): 167–80.
- Cohn, Richard. 1998. “Square Dances with Cubes.” *Journal of Music Theory* 42, no. 2 (Autumn): 283–96.
- Cohn, Richard. 2004. “Uncanny Resemblances: Tonal Signification in the Freudian Age.” *Journal of the American Musicological Society* 57, no. 2 (Summer): 285–323.
- Douthett, Jack, and Peter Steinbach. 1998. “Parsimonious Graphs: A Study in Parsimony, Contextual Transformations, and Modes of Limited Transposition.” *Journal of Music Theory* 42, no. 2 (Autumn): 241–63.
- Engebretsen, Nora, and Per F. Broman. 2007. “Transformational Theory in the Undergraduate Curriculum – A Case for Teaching the Neo-Riemannian Approach.” *Journal of Music Theory Pedagogy* 21:39–69.
- Mason, Laura Felicity. 2013. “Essential Neo-Riemannian Theory for Today’s Musician.” Master’s thesis, University of Tennessee, Knoxville. https://trace.tennessee.edu/utk_gradthes/1646.

Assignments

1. Worksheet on Neo-Riemannian Transformations ([.pdf](#), [.mscz](#)). Asks students to perform P, L, R, SLIDE, N, and H on individual triads, to realize chains of transformations, and find a transformation chain to connect two chords.
2. Composing with Neo-Riemannian Transformations ([.pdf](#), [.mscz](#)). Asks students to use the Cube Dance and other Neo-Riemannian cycles to compose a short minimalist piano solo.

Media Attributions

brahms concerto for vln vc 268-79

brahms_vc_vln_concerto_reduction

NROs_-_basic_voice_leading_examples PLR

multiple L transforms

The Tonnetz

tonnetz with NROs in color

Brahms analysis on the tonnetz

PL and RP cycles

RL cycle

PLR cycle

PL, RP, and PLR cycles

SNH transformations

R transformation with intervening augmented triad

augmented_triads2

augmented_triads3

weintzmann regions

individual cubes

cube dance

Footnotes

VI. JAZZ

This section introduces students to the basics of harmony, rhythm, and improvisation within traditional jazz and blues. Like any other equally broad genre, jazz encompasses more musical languages than are represented here, of course, but students will gain familiarity with idioms that structure subgenres such as swing and bebop.

Prerequisites

This section assumes a familiarity with the topics covered in [Fundamentals](#) as well as the [Tonicization](#) chapter.

Organization

The first chapter, [Swing Rhythms](#), introduces students to common and stylistic rhythms that are often found in swing music and subgenres that grew out of it.

Next, students learn about simple and complex [chord symbols](#) and how those symbols are idiomatically [voiced](#) in a jazz context.

The next few chapters discuss common harmonic formulas encountered in jazz repertoires: [ii–V–I](#); [embellishing chords](#) such as applied chords and common tone diminished seventh chords; and [substitutions](#) such as the tritone substitution, mode mixture, and substituting applied chords.

JAZZ CHAPTERS

- Swing Rhythms
- Chord Symbols
- Jazz Voicings
- ii–V–I
- Embellishing Chords
- Substitutions
- Chord-Scale Theory
- Blues Harmony
- Blues Melodies and the Blues Scale

Improvisation is discussed in the [Chord-Scale Theory](#) chapter, which also introduces students to how jazz musicians use modes to improvise.

The final chapters of this section cover the [formal/harmonic](#) and [melodic](#) aspects of traditional blues music. This also serves as a transition into the following [section on popular music](#), a genre that borrows heavily from the blues.

SWING RHYTHMS

Megan Lavengood

KEY TAKEAWAYS

- Swing eighths are notated as regular straight eighths but performed unevenly, in a quasi-triplet rhythm where the first note is twice as long as the second.
- Backbeat, a syncopation created through accent on beats 2 and 4 of a quadruple meter, is common in jazz.
- Syncopation occurs when the hierarchy of the meter is obscured.

Jazz has many characteristic uses of rhythm that define it as a genre. This chapter introduces two especially significant rhythms—swing eighths and the backbeat—and discusses syncopation generally.

The Basic Swing Groove

Swing eighths

One of the most recognizable features of swing rhythms is swung eighth notes. Swing eighths are performed as uneven eighth notes in a quasi-triplet rhythm, shifting the proportion from 1:1 to, roughly, 2:1—that is, the first eighth note is about twice as long as the second eighth note. This is illustrated with notation in **Example 1**.



Example 1. *Swing eighths are performed so that the first eighth is roughly twice as long as the second.*

While in some sense it may be more accurate to notate the eighth notes of a jazz tune as a triplet rhythm as notated in **Example 1**, imagine how cluttered that would be! Instead, swing eighth notes in jazz are always written as straight eighth notes, and performers are expected to know to swing them.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=2622#oembed-1>

The overture from the musical *Anything Goes* contains passages with both straight and swing eighths. The first few minutes are swung; this is easiest to hear at 0:36 when all the instruments in the ensemble play swing eighths together (**Example 2**). While listening, tap along to the swing eighths—and note that the tempo is very brisk, so you’ll be tapping quite quickly.

Contrast this with the straight eighths in the middle section of the overture, which begins at 0:52 (**Example 3**). The feel changes dramatically during this straight section. As you listen, tap along to the straight eighths, which are at a considerably slower tempo than the first part’s swing eighths.

After a quick transition in the trumpets, swing eighths return for the third part of the overture, which begins at 1:39. The swing eighths are audible in the hi-hat cymbal of the drumset.

The triplet rhythm notated in **Example 1** is a common way to explain swing, but in reality, the exact ratio of swing eighths varies from piece to piece and from performer to performer. Generally speaking, faster tempos tend to be more straight and slower tempos tend to employ a more dramatic swing. Compare the swing of “[Eternal Triangle](#)” by [Dizzy Gillespie](#) and “[Duet](#)” by [Count Basie](#)—the former has a more even swing rhythm, while the latter has a more uneven swing.

Rhythm at 0:36 as notated



Rhythm at 0:36 as sounded



Example 2. The entire ensemble plays the notated rhythm at 0:36 of the overture to *Anything Goes*.

Drum rhythm at 0:52



Example 3. This rhythm, with straight eighths, occurs in a drum part throughout the second part of the *Anything Goes* overture.

Backbeat

The next most significant rhythmic feature of jazz is the backbeat. The backbeat is an accent on beats 2 and 4 of a quadruple meter. This is the opposite of the typical accent structure of classical music, where beats 1 and 3 are usually the most accented. (Beat 1 is still important in jazz, though—that’s still usually where chord changes occur and roots of chords are sounded. It just may not be the *loudest* beat.)

The backbeat and the swing eighth together make up an important part of a standard swing drum beat (**Example 4**). The backbeat is accented with the closed hi-hat cymbal, while the swing eighths are played on the ride cymbal. Drum beats vary widely and are typically improvised, but these are two components you will find in most jazz drum patterns.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=2622>

Example 4. Standard swing drum beat with swing eighths and a backbeat.

When tapping along with jazz tunes, try tapping along to the backbeat, rather than the downbeat.

Syncopation

Before understanding syncopation, it is important to understand meter more generally (refer to the chapters on [simple](#) and [compound](#) meter). Meter emerges when a series of equally spaced pulses imply a sense of hierarchy. For example, $\frac{4}{4}$ time, which most jazz is in, is a series of four quarter notes (equally distant beats) in which beat 1 is most important, beat 3 less important, and beats 2 and 4 least important of all. “Importance” here means that important things happen on beat 1: things like chord changes, key changes, and so on. These important things might also happen on beat 3, but it is less common, and it’s relatively unusual to see chord changes on beat 2 or 4.

Syncopation occurs when this sense of hierarchy is subverted in some way. There are many ways to achieve this subversion, and the backbeat is actually one such example. By sounding on beats 2 and 4, but not on beats 1 and 3, the backbeat creates syncopation by accenting the less important beats of the $\frac{4}{4}$ meter. Another common jazz syncopation is accenting the second offbeat eighth of an eighth-note pair, as in **Example 2** above.

In addition to accents that obscure the beat, syncopation can also be created through rests and ties: for example, avoiding downbeats when beginning melodic lines. An example of syncopation created with rests and ties is in **Example 5**.





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Example 5. Syncopation in Carla Bley, “*Donkey*” (1976).

Further reading

- Aebersold, Jamey. 2000. *Jazz Handbook*. New Albany, IN: Jamey Aebersold Jazz.
- Straus, Joseph N. 2012. *Elements of Music*. 3rd ed. Upper Saddle River, NJ: Pearson.

Assignments

1. Swing Rhythms video ([.mscz](#); PDFs for [C instruments](#), [B \$\flat\$ instruments](#), [E \$\flat\$ instruments](#), [F instruments](#), and [bass clef instruments](#)). Asks students to make a video with a partner performing idiomatic swing rhythms. [Download backing track](#)
2. [Jazz Rhythms by Jamey Aebersold](#). Make a recording in which you perform these rhythms. Pick three rhythms that create syncopation in different ways, and explain how the beat is obscured to create syncopation (through ties? rests? etc.).

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CHORD SYMBOLS

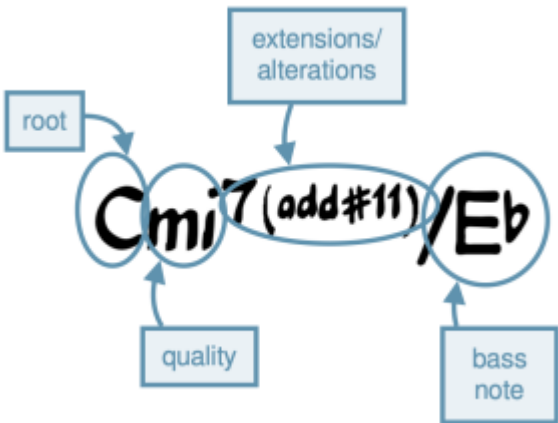
Megan Lavengood

KEY TAKEAWAYS

- Chord symbols tell you the root of the triad, the quality of the triad, any extensions to the triad, and any non-root bass note.
- Chord symbols don't reference a specific key. Instead, symbols are always assumed to be a certain quality unless otherwise indicated:
 - Triads are assumed to be major.
 - Sevenths added to the triad are assumed to be minor.
 - All other extensions and added tones are assumed to be major/perfect.
- Alterations are shown through sharp and flat symbols, or through plus and minus symbols. Both systems are prevalent in the real world; when writing your own charts, pick one system and stick with it consistently. This textbook will use the sharp/flat system of showing alterations.

There are two systems of shorthand for discussing harmony used in this textbook: chord symbols and Roman numerals. Chord symbols are also sometimes called “lead sheet symbols” because you will find them on lead sheets, which are jazz scores that typically notate only a melody and these chord symbols.

Chord symbols can pack a lot of information into a few letters. A complex symbol is given in **Example 1**, with annotations to show the various possible components of a chord symbol.



Example 1. There are four components to a chord symbol: 1) the root of the triad, 2) the quality of the triad, 3) the presence of extensions beyond the triad, and 4) the bass note.

Basics of Chord Symbols

Triads

Chord symbols are based on the major triad as the norm. If you see nothing but a note name as a chord symbol, this means to play a major triad. Other symbols are added to indicate other triad qualities, as summarized in **Example 2**.

triad quality	chord symbol (for a chord with a root of C)
major	C
minor	Cmi, Cm, C-
diminished	C ^o , Cdim, Cm ^(b5) , Cm ⁽⁻⁵⁾
augmented	C+, Caug

Example 2. Chord symbols for triads.

Notice that there are several ways to represent each non-major triad quality. This is because chord symbols were created along the way as jazz developed and were never completely standardized. The symbols in **Examples 2** and **3** are not comprehensive, but you can likely decode other variations based on the ones here. It’s good to be aware of all the possible ways of representing these different triad qualities, but stick to one method for yourself. In **Examples 2** and **3**, the symbols used in this textbook are given first.

Seventh chords

The most common addition to a triad is the interval of a seventh. An added seventh is indicated with the Arabic number 7 written after the root, superscript.

As with the triad, the numeral 7 by itself indicates a default quality: a minor seventh. Alterations to the symbol indicate other possibilities, resulting in the seventh-chord symbols summarized in **Example 3**:

Note: because triads are major by default and sevenths are minor by default, the symbol C^7 indicates a dominant-quality seventh chord (major triad + minor seventh).

seventh-chord quality	chord symbol (for a chord with a root of C)
dominant seventh chord	C^7
major seventh chord	C^{ma7} , C^{maj7} , $C^{\Delta7}$
minor seventh chord	C^{mi^7} , C^{m^7} , C^{-7}
half-diminished seventh chord	$C^{\emptyset7}$, $C^{m^7\flat5}$, $C^{-7\flat5}$
diminished seventh chord	C^{o7}

Example 3. Chord symbols for seventh chords.

This table only shows the five traditional seventh-chord qualities, but others are possible, such as $m^{(maj7)}$, aug^7 , and more. Again, these tables are not comprehensive, but when you encounter an unfamiliar symbol, you should be able to use your knowledge of basic symbols to figure out what it means.

Bass notes

In much of jazz and pop, the bass note is the root of the chord. (Bassists may improvise around other notes, rather than strictly staying on the root of the chord, but this wouldn't affect how the harmony is

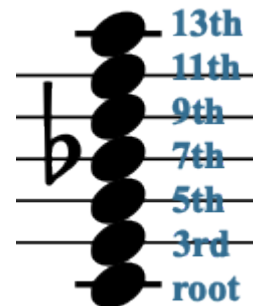
written down.) For this reason, chord symbols are assumed to indicate root position chords unless otherwise indicated.

If the bass note should be something other than the root, this is shown with a slash followed by the letter name of the bass note. For example, C/E means to play a C major triad with an E in the bass.

Significantly, the bass note does not need to be a member of the chord! C/F $\sharp$ would indicate to play a C major triad over an F $\sharp$.

Extensions

Jazz harmony often involves not only playing the notes explicitly indicated by the chord symbol, but also adding upper extensions. The term extension comes from the idea of *extending* the stack of thirds that creates harmonies. The seventh is the most common triadic extension, but jazz often makes use of higher extensions—stacking more and more thirds onto the basic triad results in the ninth, eleventh, and thirteenth ([Example 4](#)).



Interval size

You may notice that ninths, elevenths, and thirteenths are just compound versions of seconds, fourths, and sixth, respectively, so why use the more difficult-to-conceptualize compound intervals, instead of just calling these intervals seconds/fourths/sixths? There are two reasons:

Example 4.

Adding more thirds beyond the seventh produces ninths, elevenths, and thirteenths.

1. The presence of an extension in a chord symbol implies the presence of all other extensions below it as well. So, an eleventh chord is not just a triad plus the eleventh—it's a triad plus an eleventh, ninth, and seventh.¹
2. Extensions are often [voiced](#) (played) above the other chord members. In other words, in actual performed music, the extension really sounds a thirteenth above the root, not a sixth (for example).

1. Although all the extensions below the highest extension are *implied*, they are not necessarily played. In fact, usually all the possible notes are *not* played, and some of the extensions between the highest and the seventh are omitted. The differences between what is notated, what is understood, and what is actually played are discussed more in the chapter on [Jazz Voicings](#).

Interval quality and alterations to extensions

While the default quality of the seventh is minor, extensions and additions are assumed to be major (ninths and thirteenths) or perfect (elevenths) unless otherwise indicated. The chord in [Example 4](#), then, is simply a C^{13} chord: all the extensions are major/perfect intervals above C, except the seventh ($B\flat$), which is minor.

Other interval qualities are shown with sharp and flat symbols that raise or lower the default pitch by a half step. So, a $C^{7(\sharp 11)}$ chord would include an $F\sharp$ above the root—an augmented eleventh—instead of the typical $F\flat$.

Note that in this context, these symbols are to be interpreted relatively. So, $\sharp 11$ really means “raise the eleventh” and $\flat 9$ really means “lower the ninth”—as

[Example 5](#) shows, the altered note will not necessarily be a sharp or flat pitch.. This is discussed more below under “[Chord Symbols vs. Roman Numerals](#).”

For clarity, always write “7” before listing altered extensions. Furthermore, altered extensions often placed in parentheses, so that a performer can easily see that the accidental is to be applied to the extension, not to the root of the chord. If multiple altered extensions are used, slashes might also be used to clearly delineate the alterations, as shown in [Example 5](#).

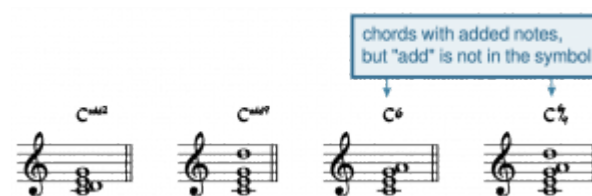


Example 5. Accidentals in chord symbols and in the corresponding notation—note that in chord symbols, sharp/flat signs indicated a bigger/smaller interval, not necessarily an actual sharp/flat note.

Added Notes (add) and Suspensions (sus)

add

To indicate that a note is added to a chord *without* implying a seventh underneath, the word “add” is written into the symbol. C^{add9} , for example, is a C-major triad with a D voiced above the triad, but without any seventh: **C–E–G–D**. (Recall that C^9 otherwise implies a minor seventh added to the C triad as well: **C–E–G–B $\flat$ –D**.) You can also add notes



Example 6. Examples of chords with added notes.

within a triad: $C^{\text{add}2}$ indicates a C-major triad with an additional D that is voiced *inside* the triad: **C–D–E–G**.

In the case of an added sixth, we simply use the numeral 6 without “add”—for example, a C major triad with an added sixth is written as C^6 . There are two reasons why this is acceptable (and normal) shorthand: one, the added sixth is especially common, and two, there is no possible interpretation that one might confuse it with. Another common addition to triads is the sixth and ninth together, which is also indicated without the word “add”: for example, C_9^6 .

SUS

Another alteration is the suspended chord, abbreviated “sus,” which indicates that the third of the chord should be replaced with another interval above the root (**Example 6**). The term comes from a common type of suspension, in which the fourth above the bass resolves to the third above the bass. Indeed, a sus chord will often be followed by a non-sus chord with the same root (though this is not required by any means).



Example 7. Chords with suspensions (sus chords).

The default assumption is that the third of the chord is replaced with a perfect fourth above the root. C_{sus}, then, would yield the notes **C–F–G**—the E of the C triad is replaced with F.

Occasionally, you may see a sus^2 chord, which replaces the third with the major second above the root ($C\text{sus}^2 = \text{C–D–G}$).

To write the symbol for a seventh/extended chord with a suspension, the “sus” abbreviation comes *after* the extension, as in $C^7\text{sus}$. This is for clarity’s sake, since $C\text{sus}^7$ might look too much like $C\text{sus}^2$.

TRY IT!

Check and see if you understand chord symbols by taking out a sheet of scrap paper and notating the

harmonies indicated by the chord symbols below. As you complete each chord, you can pull the slider to the right to reveal the correct answer.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://viva.pressbooks.pub/openmusictheory/?p=2624#h5p-8>

You can also view and listen to the answer [on Musescore.com](https://www.musescore.com).

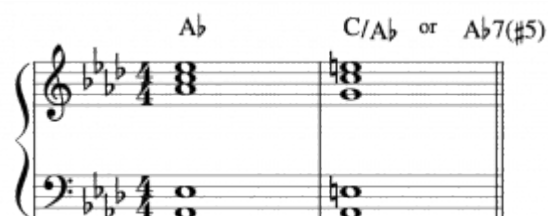
Chord Symbols vs. Roman Numerals

It's important to understand that chord symbols are absolute labels, while Roman numerals are relative labels. Roman numerals are more theoretical and abstract, because they tell you the location of a chord *relative to* the key of the piece. Chord symbols, on the other hand, tell you exactly (*absolutely*) which notes are being played in this given chord, without reference to any key. It's important to leave the relative thinking behind temporarily when you interpret chord symbols. Chord symbols do not reference keys.

Chord symbols are *not* analytical—they're a shorthand way of writing a score. In other words, the purpose of chord symbols is to get performers' fingers to the right notes at the right time. Chord symbols may represent things in a less functional sense if it means the symbol is easier to interpret. **Example 7** is one such case:

although the second chord really functions as an $A\flat^{7(\#5)}$ chord, neighboring to the regular $A\flat$ triad, the symbol $C/A\flat$ is probably easier to process and thus

preferred. (However, neither symbol is inherently right or wrong all the time—both will result in the right notes being played, and the better choice depends on context.)



Example 7. In many contexts, the simpler symbol $C/A\flat$ is preferred to something more analytically descriptive, like $A\flat^{7(\#5)}$.

Keeping these issues in mind helps in understanding the logic present in the system of chord symbols. Even though there is a lot of variation in chord symbols, learning a few rules will help you decipher any symbol.

Assignments

1. Chord symbols basics worksheet ([.pdf](#), [.mscz](#)). Asks students to identify and write triads and seventh chords with chord symbols.
2. Chord symbols with extensions ([.pdf](#), [.mscz](#)). Asks students to identify and write extended chords with chord symbols.

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Less confusing © Megan Lavengood is licensed under a [CC BY-SA \(Attribution ShareAlike\)](#) license

Footnotes

JAZZ VOICINGS

Megan Lavengood

KEY TAKEAWAYS

- Space chords to mimic the spacing of the harmonic series: use large, wide intervals in lower registers, and smaller, closer intervals in upper registers.
- Extensions should be voiced in the higher voices.
- If you double a note, usually double either the bass or the root of the chord.
- Omitting the fifth of the chord is almost always perfectly acceptable.
- Use smooth or “lazy” voice leading: move each voice as little as possible between chords to achieve a smooth, easy-to-perform sound. A common smooth voice-leading schema in jazz is to lead from the third of one chord to the seventh of the next, while another line connects the ninth of the first chord to the thirteenth of the second chord.
- Guidelines can be ignored, but this should be a conscious and deliberate decision to achieve a desired effect.

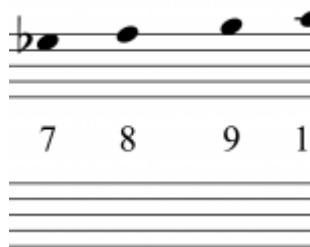
So far in this unit, you have written chords in an unvoiced format. While unvoiced chords are useful for conceptualizing harmony, you would not want to perform these tall stacks of thirds. This chapter will discuss how to voice these harmonies in a manner that is idiomatic to jazz. We will focus on voicings that play the root in the left hand at all times so that the harmony is always clear, although in performance, the root is often omitted (because it is covered by the bassist).

Spacing

The common spacing of chord members in musical textures has much to do with acoustics. We discuss pitches as specific frequencies—for example, A 440, the note to which most orchestras tune, refers to

pitch A that has a frequency of 440 Hertz (Hz). But in fact, when an acoustic instrument plays A 440, 440 Hz is only one of the frequencies that is activated at that moment in time. The instrument will also activate the harmonics above that pitch, because the vibrating body causes other, shorter vibrations to occur simultaneously. These harmonics are part of what create an instrument's unique timbre.

The harmonic series is approximated in **Example 1**.¹



Example 1. The harmonic series, as approximated in notation.

Note that the pitches are spaced widely apart in the lower harmonics, but become closer and closer together in the upper harmonics: the distance between partials 1 and 2 is an octave, but beginning at partial 13, the distance between subsequent partials is only a half step.

In general, spacing in music approximates the harmonic series: notes are further apart in lower registers, and closer together in higher registers. Putting notes close together in a low register tends to sound muddy and dissonant, even when the chords are consonant. When notes are spaced wide apart in the upper registers, the upper note will sound quite prominent and isolated in the texture (though this can sometimes be a good thing).

Remember that the bass line is probably played by the upright bass—and this instrument sounds an octave lower than written, so its lowest note is an E₁, three Es below middle C. It's normal for the bass to be in a register very much apart from the rest of the ensemble.

Chord extensions should be left in the upper registers of the texture. Recall that this is reflected in their names—a thirteenth is not the same as a sixth in jazz harmony. Voice the thirteenth somewhere above the seventh of the chord; otherwise, it will sound like the sixth.

Doubling

In general, a safe note to double is the bass note. Most often, the bass note is a relatively stable member of the chord. Because it's the foundation of the texture, it sounds good to double the bass.

Another good option is to double the root of the chord, even if it is not in the bass. The root note, like the bass, is typically a stable tone, and will strengthen the chord when doubled.

1. The notes of the harmonic series do not conform to twelve-tone equal temperament, but they have been notated at the nearest pitch for the sake of convenience.

Omitting Notes

Jazz harmonies often contain many notes, thanks to the common practice of extending the harmonies. It often wouldn't be desirable for all these notes to be given equal weight in the voicing, so it's common to omit some notes when voicing these extended harmonies.

The most common note to omit is the fifth of the chord. Because the fifth is an early pitch in the harmonic series (partial 3), it tends to strengthen the root of the chord without adding much character on its own. Listen and compare the various chords in **Example 2**, and notice that removing the fifth does very little to alter the overall sound of the chord, whereas omitting the seventh or root alters the sound substantially!



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=2627>

Example 2. *Omitting the fifth is common, as it does not substantially alter the sound. The seventh and root are hardly ever omitted.*

Omitting the root runs the risk of destabilizing the entire chord. However, if there is a bass player in the performing ensemble, you may deliberately omit the root in the other voices. The bassist will typically provide the root of the harmony and ensure that the chord sounds stable. The last chord in **Example 2**, then, would sound just fine if a bassist were playing a G below that voicing.

When dealing with extended chords, it becomes possible or desirable to omit other members of the chord besides the fifth, but it is difficult to generalize here. Usually, omitting tones is done to avoid excessive dissonance with other important chord members.

Smooth Voice Leading

We have been discussing harmonies as vertical entities so far: as a stack of notes that go bottom-to-top on the page. Vertical thinking is used a lot in music theory and by pianists and guitarists, but for almost everyone else, music is experienced horizontally: as a sequence of notes in time. It's important for musicians to be able to think of music both vertically *and* horizontally through voice leading.

Voice leading in jazz and many other styles should generally be smooth—that is, voices should ideally

move as little as possible when going to a new chord (except the bass, which often leaps). Smooth voice leading helps different chords sound more logically connected (**Example 3**). When writing your own chord progressions, it may be helpful to imagine your voices as lazy: they want to move as little as possible! The smallest possible move is the common tone: not moving at all, but instead remaining on a single tone that is common to both chords. The next most preferable movement is movement by whole or half step. Skips (movement by third) are also easy to perform and easy to sing, and there are many situations that will force you to skip when voice leading.

Leaps are primarily used to provide contrast and excitement in voice leading. They are to be used sparingly, and with good reason. Leaps sound most natural when they are within a single chord: because the chord underpinning the horizontal movement is staying the same, it's easy for the voice to leap within that chord. When the chord is changing, though, adding leaps tends to make the chords sound disconnected and can make the piece difficult to perform. Leaping over a chord change is certainly possible, but it may take extra practice, and remember: your voices are lazy!



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Example 3. Smooth voice leading helps chords sound connected to one another.

Jazz Voice Leading Paradigms

Throughout the Jazz section of the textbook, we will assume that the bass is playing the root of the chord at all times. So when discussing jazz voice leading, we will focus instead on the upper voices only.

Two upper voices: the 3–7 voice leading paradigm

If you are writing for only two voices above the bass, you should typically use the third and seventh of the chord (omitting the fifth). This produces smooth voice leading between any two chords whose roots are related by fifth or by second, as illustrated in **Example 4**. If the two chords are related by fifth (e.g., C^7-F^7 or G^7-Cma^7), then one voice will alternate between the third and the seventh of the chord, and the other voice will do the same but in the opposite order. If the two chords are related by second, then the voices would move in parallel motion, and one voice would play the thirds of each chord while the other

voice plays the sevenths of each chord. Notice that this yields only two kinds of intervals in the right hand: fourths and fifths.



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Example 4. The 3–7 voice leading paradigm as applied to a ii–V–I progression (left) and a V–IV–I progression (right).

Three upper voices: adding extensions

A beginner may want to add the chord fifths when incorporating a third upper voice, but a more stylistically appropriate option is often to add extensions to the chord and continue to omit the chordal fifth. In particular, we can build on the two-voice 3–7 paradigm by adding a third line on top that alternates between ninths and thirteenths. Example 5 duplicates the voice leading from Example 4, but adds this third voice.



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Example 5. A paradigm for jazz voicing with three upper voices. The two lower voices use the 3–7 paradigm; another smooth line is formed by adding a top voice connecting ninths and thirteenths (shown in blue).

Extensions are often altered from their default major quality. It can be difficult for a beginner to know when to alter extensions. As a starting point, try the extension that fits within the overall key, as in **Example 5**—note that there are no accidentals added in the top voice. If the diatonic version of the extension sounds awkward, experiment with raising or lowering the extension, and let your ear be your guide in choosing which variation of the extension sounds best. **Example 6**, which [you may also download as a handout](#), demonstrates the most common extensions for chords of certain qualities, organized from simple to complex. But you shouldn't randomly select from these options—what sounds most fitting often depends on the surrounding chords, not just the quality of that chord alone. Experimenting with these extensions will help a beginner to develop a sense of what sounds most stylistic.



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Example 6. Common extensions to add for each chord quality.

Guidelines versus Rules

Most of the above principles are not really rules that you must follow, but rather guidelines for writing stylistically. The guidelines here represent what is most common in jazz music.

Guidelines are not always followed, but knowing them empowers you to *choose* not to follow them with the full understanding of the resulting sound. In other words, feel free to break the rules, but make sure you know why you're doing it!

Further reading

- Coker, Jerry. 1984. *Jazz Keyboard for Pianists and Non-Pianists: Class or Individual Study*. Miami: Alfred Music.

Resources

- [Common chord symbols with extensions handout](#), by Brendan Schnabel.

Assignments

1. Voicing worksheet ([.pdf](#), [.mscz](#)). Asks students to identify common voice leading patterns in a voiced jazz texture and to write voiced chord progressions with good voice leading.

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Footnotes

II-V-I

Megan Lavengood

KEY TAKEAWAYS

- $ii^7-V^7-Ima^7$ in major, or $ii^{\emptyset 7}-V^7-i^7$ in minor, is a fundamentally important progression in traditional jazz.
- The $ii-V-I$ progression can be identified through a combination of root motion by fifths plus its distinctive sequence of chord qualities ($mi7-7-ma7$ in major, or $\emptyset 7-7-mi7$ in minor).
- Because this progression is so important to jazz, the concept of [applied chords](#) can expand to include applied subdominant chords—i.e., the ii chord.
- Incomplete $ii-V-I$ s, i.e., $ii-V$ s, can also be identified because the combination of root motion and quality is so distinctive.

CHAPTER PLAYLIST

Example 1 shows final cadences from four jazz tunes. Look at the harmonies—a pattern should be apparent. (You can listen to the tunes through the [Spotify playlist for this chapter](#).)



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Example 1. “[Afternoon in Paris](#),” “[All the Things You Are](#),” “[My Funny Valentine](#),” and “[Joy Spring](#)” all share similar harmonic progressions at their final cadences: $ii-V-I$.

All the examples end in perfect authentic cadences (PACs). But the similarities don't end there: each PAC is preceded by the ii chord. So we have three chords, each related to the next by fifth.

This ii–V–I progression is one of the most important progressions in jazz music. You can find it reliably at cadences, but also as a building block that occurs throughout a tune. When the progression occurs in a major key, as in the snippets in **Example 1**, the chord qualities of these chords are $mi7-7-ma7$. When the tune is in minor, the shift in mode changes the quality of the harmonies to $\emptyset 7-7-mi7$ (the V chord is major whether you are in a major or minor key). Both of these progressions and a typical voice-leading pattern are summarized in **Example 2**.



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Example 2. Prototypical harmonies and voice leadings in ii–V–I progressions, in both major and minor modes.

ii–V–I as Schema

Schema is a useful concept in music theory, used in many ways within this book ([pop harmony](#), for one). Put simply, schemas are common patterns our brains can recognize, even when variations are altering a specific presentation of that schema.

The ii–V–I progression is an example of a schema. It happens so frequently that informed listeners can recognize the schema in many formats. Some examples of alterations are given in **Example 3**. In “[Misty](#),” the ma^7 chord is replaced with a 6 chord (this occurred in “[My Funny Valentine](#)” in Example 2 also). In “[Prelude to a Kiss](#),” the typically dominant-quality V chord is replaced with an augmented chord (the minor seventh is preserved). The V chord is altered in “[A Night in Tunisia](#),” but this time, the fifth is lowered instead of raised.



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Example 3. The ii–V–I is still recognizable, even if alterations occur.

Applied ii–Vs

An important marker of dominant-function chords is the chord’s quality. This is most obvious in the case of the dominant seventh quality, since it has “dominant” in the name. Fully diminished chords also have dominant function.

The compositional technique of applied chords capitalizes on the relationship between quality and function by taking dominant chords out of their key and dropping them into a new key. The applied dominant chords retain their function as dominant chords even when applied to a chord other than I (this concept is fully explained in the [Tonicization chapter](#)).

The omnipresence of ii–V–I as a schema in jazz means that in this style, we can have not only applied dominants, but applied ii chords as well. In other words, the entire ii–V–I progression can be used in keys other than the tonic key to tonicize another chord. The association between these chord qualities and root motions is so strong that a ii–V progression need not even resolve to its I chord to create the effect of a ii–V.

Take the rest of the A section of “[Afternoon in Paris](#)” as an example (**Example 4**). Not only does it end with a ii–V–I progression, but it begins with two other ii–V–Is: one tonicizing B $\flat$ major, which is $\flat$ VII in the key of C, immediately followed by another in A $\flat$ major, which is $\flat$ VI in the key of C.

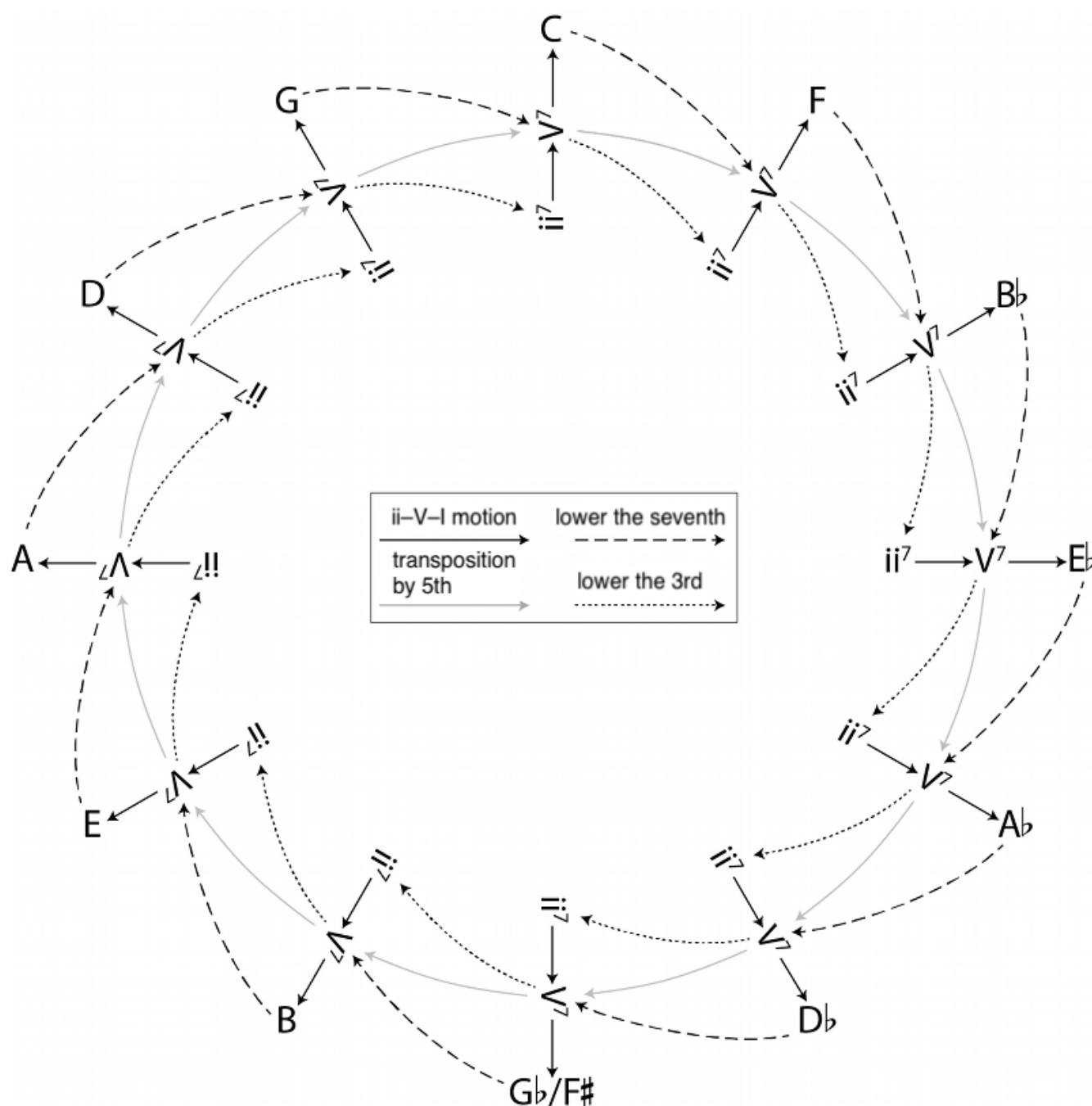
The musical notation consists of three lines of chords, each starting with a circled measure number (1, 10, 18) and a double bar line. Above the chords, functional labels are placed with brackets indicating their relationship to the preceding chord.

- Line 1 (Measures 1-9):**
 - Measure 1: C $\sharp$ M $\flat$ 7
 - Measures 2-3: C $\flat$ M $\flat$ 7 F7 (labeled $\flat$ VII above)
 - Measure 4: B $\flat$ M $\flat$ 7
 - Measures 5-6: B $\flat$ M $\flat$ 7 E $\flat$ 7 (labeled $\flat$ VI above)
 - Measure 7: A $\flat$ M $\flat$ 7
 - Measures 8-9: D $\flat$ M $\flat$ 7 G7 (labeled I above)
 - Measures 10-11: C $\sharp$ M $\flat$ 7
 - Measures 12-13: D $\flat$ M $\flat$ 7 G7 (labeled 1. above)
 - Measures 14-15: C $\sharp$ M $\flat$ 7 (labeled 2. above)
- Line 2 (Measures 16-23):**
 - Measure 16: D $\flat$ M $\flat$ 7
 - Measure 17: G7
 - Measure 18: C $\sharp$ M $\flat$ 7/E
 - Measure 19: A7
 - Measure 20: D $\flat$ M $\flat$ 7
 - Measure 21: G7
 - Measure 22: C $\sharp$ M $\flat$ 7
 - Measure 23: D $\flat$ M $\flat$ 7 G7
- Line 3 (Measures 24-31):**
 - Measure 24: C $\sharp$ M $\flat$ 7
 - Measures 25-26: C $\flat$ M $\flat$ 7 F7
 - Measure 27: B $\flat$ M $\flat$ 7
 - Measures 28-29: B $\flat$ M $\flat$ 7 E $\flat$ 7
 - Measure 30: A $\flat$ M $\flat$ 7
 - Measures 31-32: D $\flat$ M $\flat$ 7 G7
 - Measure 33: C $\sharp$ M $\flat$ 7
 - Measures 34-35: D $\flat$ M $\flat$ 7 G7

Example 4. “[Afternoon in Paris](#)” by John Lewis uses ii–V–I progressions in different keys in sequence.

ii-V space

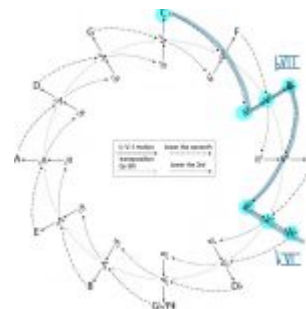
By relating all possible ii-V-I motions together, we can come up with a space in which these progressions operate, and visualize how the ii-V-I's in “Afternoon in Paris” are related. This idea comes from [Michael McClimon \(2017\)](#), and his “ii-V space” is reproduced in [Example 5](#). The space is arranged as the circle of fifths (note the letter names at the end of each progression), with each chord in the circle preceded by a ii-V.



Example 5. McClimon's ii-V space relates ii-V progressions of keys related by fifth.

There are four different variations of arrows in **Example 5**, and each signifies a different transformation from the first chord to the chord at the other end of the arrow. The two solid arrows have to do with root motion: the black arrows connect chords within a ii–V–I schema, while the gray arrows show the circle-of-fifths relationships. The dashed arrows show changes to chord quality. The larger dashes indicate that the chord is the same except that the seventh has been lowered, so each larger-dashed arrow connects a $ma7$ chord to a $(dom)7$ chord with the same root. The smaller dashes show that the chord is the same, but the third has been lowered: each smaller-dashed arrow connects a 7 chord to a $mi7$ chord with the same root.

Example 6 traces the progressions in “Afternoon in Paris” that were annotated in **Example 4**. Notice how the space helps to illustrate the logic of the progression: by transforming the preceding $I ma7$ chords into $ii7$ chords, it forces a modulation down by whole step.



Example 6. “Afternoon in Paris” transforms $I ma7$ chords into minor seventh chords, thus changing their function: they become $ii7$ chords.

Understanding a piece through the ii–V schema

The logic of a chromatic progression like the one in Lee Morgan’s “Ceora” becomes more intelligible when viewed through this lens. An analysis originally by McClimon is explained in the video below (**Example 7**).



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<https://viva.pressbooks.pub/openmusictheory/?p=2629#h5p-12>

Example 7. “Ceora” by Lee Morgan is entirely composed of ii–V–Is.

Turnarounds

A particularly common version of applied ii–Vs comes in what is called the turnaround. In the broadest sense, a turnaround is a progression that serves to loop back to the original tonic chord, and the typical progression that achieves this is I–vi–ii–V–I. Using the concept of applied chords, we can substitute a V^7/ii for the vi chord, since they share the same root. But we can also precede that V^7 with its ii chord—effectively, a ii/ii (two of two). Thus, the ii chord of the turnaround is tonicized with its own ii–V–(I) progression. This tonicized version of the turnaround is a very common variant (**Example 8**).



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Example 8. The turnaround schema has diatonic and chromatic variants.

Further reading

- Aebersold, Jamey. 1974. *The II–V⁷–I Progression*. Vol. 3. Jamey Aebersold Play-A-Long Series. New Albany, IN: Jamey Aebersold Jazz.
- McClimon, Michael. 2017. “Transformations in Tonal Jazz: ii–V Space.” *Music Theory Online* 23 (1). <http://mtosmt.org/issues/mto.17.23.1/mto.17.23.1.mcclimon.html>.

Assignments

1. ii–V–I worksheet ([.pdf](#), [.docx](#)). Worksheet playlist Note that these lead sheets are not public domain and thus cannot be posted here; however, the lead sheets are not difficult to find if you search the internet or ask around.
2. Composing with ii–V–I worksheet ([.pdf](#), [.mscz](#), [.musicxml](#)). This functions as a preparatory assignment for the Bebop Composition.

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McClimon’s ii–V space © Michael McClimon adapted by Megan Lavengood is licensed under a [CC BY-SA \(Attribution ShareAlike\)](#) license

ii–V space with “Afternoon in Paris” © Megan Lavengood is licensed under a [CC BY-SA \(Attribution ShareAlike\)](#) license

EMBELLISHING CHORDS

Megan Lavengood

KEY TAKEAWAYS

This chapter presents two ways of adding new harmonies to an existing chord progression.

- An applied ii chord, as in the ii–V–I schema, can be used to embellish a dominant-quality chord. In other words, preceding a dominant-quality chord with the $mi7$ or $\emptyset7$ chord a fifth above it creates the effect of a ii–V.
- Common-tone diminished seventh chords (CT^{o7}) create neighboring motion in all voices that embellish a chord. The root of the chord of resolution is always shared as a member of the CT^{o7} —hence the term “common tone.” (Note: *See this chapter for more information on CT^{o7} chords in Western classical music.*)

Jazz performers often aim to add their own twist to existing jazz standards. One way of doing this is to add new chords that embellish existing chords in the progression. This chapter explores two ways that performers improvise by embellishing harmonies in jazz.

This chapter will use the opening few bars of “Mood Indigo” by Duke Ellington (1930) as a backdrop and add embellishing chords to it. If you take a moment to familiarize yourself with the tune, the following discussions will make more sense. Listen to Louis Armstrong’s interpretation of this song, embedded below, while following the chords of the first few bars, given here.



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Example 1. Chords for the first four measures of “Mood Indigo” by Duke Ellington.

Embellishing Applied Chords

Applied V^7

Any chord in a progression can be embellished by preceding it with an [applied dominant chord](#).

Example 2 takes the surprising $G\flat$ chord of measure 7, divides it in half, and replaces the first half note of the chord with its applied V^7 chord. In principle, this can be done with any chord in the progression.¹



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Example 2. Inserting a $D\flat^7$ chord before the $G\flat^7$ chord creates an applied V of $G\flat$, which is not present in the original chord progression of “Mood Indigo.”

Applied ii

The chapter on $ii-V-I$ discusses the use of [applied \$ii-V-I\$ s](#), i.e., $ii-V-I$ progressions that occur in keys other than the tonic key. Many jazz tunes have these applied $ii-V$ s built in, but a performer could add their own as well. A dominant chord can often be embellished by adding its ii chord before it, transforming it into a $ii-V$ schema.

“Mood Indigo” by Duke Ellington begins with the progression $B\flat-C^7-Cmi^7-F^7-B\flat$. That first C^7 could be embellished by adding a Gmi^7 before it, creating a temporary $ii-V$ that then proceeds to another $ii-V$. Rhythmically, this means cutting the duration of the C^7 into two halves and replacing the first half with the applied ii chord. The result is the progression in **Example 3** below.

1. The $G\flat$ chord is itself a tritone substitution for C^7 , which would be the applied V^7 of F^7 . [Tritone substitutions are discussed in another chapter.](#)



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Example 3. Inserting a Gm^7 chord before the C^7 chord creates a $ii-V$ in F , which is not present in the original chord progression of “Mood Indigo.”

Common-Tone Diminished Seventh Chords (CT^{o7})

The common-tone diminished seventh chord (hereafter CT^{o7}) is a voice-leading chord, which means that the chord is not based on a particular scale degree like most other harmonies, but rather the result of more basic embellishing patterns. In this case, the embellishing motion is the neighbor motion. To create a CT^{o7} , the root of the chord being embellished is kept as a common tone (hence the name), and all other voices move by step to the notes of the diminished seventh chord that includes that common tone. This is best explained in notation, as in **Example 4**.

The CT^{o7} can be used to prolong any chord. Rhythmically, the chord would be inserted somewhere in the middle of the total duration of the harmony, leaving the prolonged harmony on either side of it (as in **Example 4**). Another option is to skip the initial statement of the prolonged harmony and instead jump straight into the CT^{o7} . **Example 5** adds both types of CT^{o7} to “Mood Indigo,” the melody of which is particularly suggestive of CT^{o7} embellishments. In this example, the CT^{o7} chords are not given their own Roman numerals, to show that they do not significantly affect the harmonic progression of the phrase—instead, they embellish the chords around them with chromatic neighbor tones. Similarly, the CT^{o7} chords are not shown with chord symbols, because these chords are often not written into lead sheets but improvised by the performers.



Example 4.
Common-tone diminished sevenths share a common tone with the root of the chord being embellished, shown here with ties.



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Example 5. A CT^{07} embellishes the opening $B\flat$ chord, inserted on beat 3 of the whole-note harmony. A CT^{07} also embellishes the C^7 chord, displacing the C^7 by a half note.

Embellishing Chords in a Lead Sheet

As with substitutions, embellishments are not always represented the same way in a lead sheet.

- There may not be any embellishing chord notated, and instead, the performers are improvising this addition as they play.
- The embellishing chord may be built into the chord progression and thus be notated in the chord symbols.
- The embellishing chord may be indicated as an alternate harmonization and shown in the chord symbols with parentheses around the embellishing chords.

This is illustrated in **Example 6** with different ways of showing a CT^{07} in “Mood Indigo” by Duke Ellington.



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Example 6. Embellishing chords can be (a) unwritten and improvised by performers, (b) written into the chord symbols, or (c) indicated as an alternative harmonization with parentheses.

Further reading

- Levine, Mark. 1995. *The Jazz Theory Book*. Petaluma, CA: Sher Music.

Assignments

1. Bebop composition. Asks students to build on knowledge of [swing rhythms](#), [ii–V–I](#), [embellishing chords](#), and substitutions to create a composition in a bebop style.
 - [PDF](#): Complete instructions + template
 - MSCZ: [Template for lead sheet](#), [template for voicings](#)
 - [DOCX](#): instructions only

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Footnotes

SUBSTITUTIONS

Megan Lavengood

KEY TAKEAWAYS

This chapter discusses methods for altering chord progressions through chord substitution.

- A progression that moves by fifth can substitute the first chord with the dominant chord that shares the same root. This makes the first chord an applied chord to the second chord.
- Mode mixture is when a piece in a major key uses chords borrowed from the parallel minor key (or vice versa, though this is less common).
 - In jazz, the most common mixture chords are substituting $ii^{\flat 7}$ for ii^7 and adding $\flat 9$ to a V^7 chord.
 - The most common mixture chords, including $ii^{\flat 7}$ and $V^{7\flat 9}$, substitute *le* for *la* ($\downarrow \hat{6}$ for $\natural \hat{6}$).
- Tritone substitutions replace a dominant chord with another dominant chord a tritone away. The name refers both to the interval between the original and substituted chords and to the fact that the two chords share the same tritone.

Creating new interpretations of old favorite tunes is one of the cornerstones of jazz, and because of this, the concept of chord substitutions is extremely important. Substitutions provide a way for performers and arrangers to put a new spin on more well-trodden harmonic progressions. This chapter uses the turnaround as a basic progression to be altered, but these substitutions can be applied anywhere in a harmonic progression.

Applied Chords as Substitutions

As discussed in the Tonicization chapter, an applied chord can be productively related to the diatonic chord with which it shares a root note.

Because root motion by fifth is extremely common in jazz, there are many opportunities for performers to simply substitute the first chord in a fifth-wise chord progression with the dominant seventh built on the same root. One especially common place where this is implemented is in the turnaround, where, because each chord is related to the next by fifth, a chain of applied V^7 s is a common variant (**Example 1**).



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Example 1. When a progression has root motion by fifth, the quality of the first chord can be changed to dominant seventh in order to transform it into an applied V^7 .

Mode Mixture

“All of You” by Cole Porter is a composition that has mode mixture built into it. Listen to [this recording by Ella Fitzgerald](#) (transcribed in **Example 2**), conveniently in C major, and observe how the alternation between $A\flat$ (la , $\hat{6}$) and $A\flat$ (le , $\downarrow \hat{6}$) catches the ear and imbues a sense of sentimentality in the song. $A\flat$ here can be understood as being borrowed from the parallel minor (C minor), a practice known as mode mixture.



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Example 2. “All of You” by Cole Porter uses a minor iv chord (Fmi) and a half-diminished ii chord ($D^{\circ 7}$) even though the tonic is major.

Many songs, like “All of You,” have mixture built into their chord structure. But mixture chords can also work as improvised substitutions: a chord within a diatonic chord progression can be substituted with its minor-mode variant to produce a color change that won’t change the overall function of the chord. A mixture substitution works best when the scale degree being inflected is la ($\hat{6}$), and is therefore being transformed into le ($\downarrow \hat{6}$). As an example, consider the turnaround in **Example 3**: instead of a diatonic

version, one may choose to incorporate le ($\downarrow \hat{6}$) to generate some more colorful harmonies. These particular substitutions—changing a ii^7 to a $ii^{\emptyset 7}$, and a G^7 to a G^{7b9} —are particularly common uses of mode mixture in jazz.



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Example 3. Mixture chords are most effective when they involve $\downarrow \hat{6}$. Mixture and diatonic versions of the same chord have the same function.

Tritone Substitutions

While the above methods of substitution are common in pop and classical styles as well, the tritone substitution is unique to jazz. Tritone subs take the place of V^7 chords, either applied or diatonic. The “tritone” part of the name comes from two key roles of tritones in these substitutions:

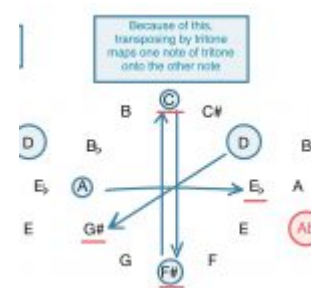
1. The substituted chord is a tritone away from the chord it is replacing.
2. The chords are related because they share the same tritone.

This relationship is best explained graphically, as in **Example 4**: because the tritone evenly divides the twelve-tone collection, transposing by tritone maps the tritone onto itself. Speaking practically, the bottom line is that any dominant seventh chord can be replaced by the dominant seventh chord a tritone away, and the progression still functions the same way.

One way to recognize a tritone sub is by its chromatic resolution downward by a minor second.

Example 5 shows how tritone substitutions are commonly used in the turnaround.

- As discussed [above](#), it's common to replace the diatonic chords with applied chords that share the same root, yielding a progression consisting entirely of V^7 chords—this is shown in the right-hand harmonization on the top row.
- From there, tritone substitutions can be used for any V^7 chord.
- Most commonly, every other chord is replaced with a tritone sub, yielding a chromatic bass line and



Example 4. Mapping the twelve-tone chromatic collection onto a circle helps to illuminate the symmetry of a tritone.

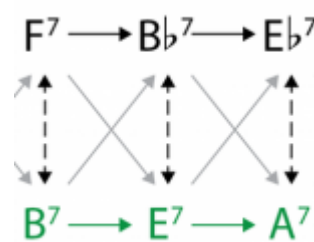
smooth voice leading, as in the bottom row of harmonizations.



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Example 5. Because tritone substitutions can replace any applied dominant chord, in progressions moving by fifth like the turnaround, chords may first be (conceptually) substituted with their applied variants, and then tritone substitutions can be used to create a chromatic bass line.

The [ii–V–I chapter](#) visualized the ii–V–I schema within a voice-leading space constructed by [Michael McClimon \(2017\)](#). McClimon further visualizes the tritone substitution as a kind of shadowing space behind the typical ii–V space (**Example 6**). [Click here to view his animation of the progression of “Blues for Alice” and its movement through the ii–V space with tritone substitutions.](#) Notice that the tritone-substituted V⁷ chord is preceded by its ii⁷ chord, and that both chords are in the green space that McClimon places behind the foreground ii–V space.



Example 6. The tritone substitution space parallels the diatonic space.

Substitutions in a Lead Sheet

[As with embellishing chords](#), substitutions are not always represented the same way in a lead sheet.

- There may not be any substitution notated, and instead the performers are improvising this addition as they play.
- The substitution may be built into the chord progression and thus be notated in the chord symbols.
- The substitution may be indicated as an alternate harmonization and shown in chord symbols with parentheses around the substituted chords.

This is illustrated in **Example 7**, with different ways of showing a modally mixed ii^{ø7} chord in “Satin Doll” by Duke Ellington.

a. no substitution



b. notated mode mixture



c. mode mixture as alternate harmonization



Example 7. Substitutions can be (a) improvised and not notated in the score at all, (b) written directly into the chord symbols, or (c) written in parentheses to indicate that the substitution is optional.

Further reading

- Levine, Mark. 1995. *The Jazz Theory Book*. Petaluma, CA: Sher Music.
- McClimon, Michael. 2017. "Transformations in Tonal Jazz: ii–V Space." *Music Theory Online* 23 (1). <http://mtosmt.org/issues/mto.17.23.1/mto.17.23.1.mcclimon.html>.

Assignments

1. Bebop composition. Asks students to build on knowledge of [swing rhythms](#), [ii–V–I](#), [embellishing chords](#), and substitutions to create a composition in a bebop style.

- [PDF](#): Complete instructions + template
- MSCZ: [Template for lead sheet](#), [template for voicings](#)
- [DOCX](#): instructions only

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McClimon Figure 10 © [Michael McClimon](#) is licensed under a [CC BY-SA \(Attribution ShareAlike\)](#) license

Parentheses © Megan Lavengood is licensed under a [CC BY-NC-SA \(Attribution NonCommercial ShareAlike\)](#) license

CHORD-SCALE THEORY

John Kocur

KEY TAKEAWAYS

Chord-Scale Theory is an approach to improvising that relates chords to scales.

- The name “Chord-Scale Theory” comes from the idea that the notes of a thirteenth chord can be rearranged as a seven-note scale.
- To determine chord-scales, identify key centers and chord functions through Roman numeral analysis.
- Roman numerals can be related to mode numbers. For example, if a chord is a **ii** chord in a major key, the **second** mode (dorian) can be used to color that chord.
- When playing chord-scales, place chord tones on the downbeat to connect improvised melodies to the chord progression.

This book covers modes from many different angles. For more information on modes, check [Introduction to Diatonic Modes \(general\)](#), [Modal Schemas \(pop\)](#), [Diatonic Modes \(20th/21st-c.\)](#), and [Analyzing with Modes, Scales, and Collections \(20th-/21st-c.\)](#).

CHAPTER PLAYLIST

One of the challenges of improvising jazz is making choices about pitches while also paying attention to groove, interaction, and narrative form. The Chord-Scale Theory is a method, taught at the Berklee College of Music and many other colleges and universities, that facilitates pitch choices in jazz improvisation. Chord-Scale Theory is based on George Russell’s *Lydian Chromatic Concept of Tonal Organization* ([1953] 2001), and it was popularized by jazz educators Jamey Aebersold, David Baker, and Jerry Coker.

The basic concept is that every chord comes from a parent scale; or, to put it another way, every chord in a progression can be colored by a related scale. For example, a Dmi^7 chord extended to the thirteenth consists of the notes D, F, A, C, E, G, and B, which are identical to the notes of the D dorian mode stacked in thirds (**Example 1**). Therefore, when confronting a Dmi^7 chord in a chord progression, an improvising musician could choose to improvise using the notes of the D dorian mode to create new melodies.



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Example 1. A Dmi^{13} chord and a D dorian scale have identical pitches.

Basic Chord-Scale Relationships

Starting a major scale on each of its seven notes will yield seven different modes. Each of the modes will have a different pattern of half steps and whole steps and thus a different color. (For more information, see [Introduction to Diatonic Modes](#) and/or [Diatonic Modes](#)).

Since the [ii–V–I schema](#) is so common in jazz standards, the three chord-scale relationships in **Example 2** are often taught first. **Example 3** shows these three relationships within the context of a ii–V–I progression in C.

Chord quality	Mode	Example
minor seventh chord	dorian	$Dmi^7 = D \text{ dorian}$
dominant seventh chord	mixolydian	$G^7 = G \text{ mixolydian}$
major seventh chord	ionian	$C^{ma7} = C \text{ ionian}$

Example 2. Basic chord-scale relationships.



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Example 3. Chord-scale relationships in a ii–V–I progression in C.

A beginning improviser might approach a song consisting mainly of ii–V–I progressions by simply applying the dorian mode to minor seventh chords, the mixolydian mode to dominant seventh chords, and the ionian mode to major seventh chords. As **Example 4** shows, an improvised melody can imply a harmony by placing chord tones on the downbeats, and a seven-note mode can be thought of as a four-note seventh chord with three passing tones ($\hat{2}$, $\hat{4}$, $\hat{6}$) or extensions (ninth, eleventh, thirteenth).



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Example 4. The basic chord-scale relationships for ii–V–I as they might be used in “Tune Up” by Miles Davis (1953).

Chord-Scales and Major Keys

There are many more possible chord-scale relationships beyond those above. The seven notes of the diatonic scale suggest seven basic chord-scale relationships, as summarized in **Examples 5** and **6**.

Roman numeral	Mode	Example in C major
I ^{ma7}	ionian	C ^{ma7} = C ionian
ii ⁷	dorian	Dmi ⁷ = D dorian
iii ⁷	phrygian	Emi ⁷ = E phrygian
IV ^{ma7}	lydian	F ^{ma7} = F lydian
V ⁷	mixolydian	G ⁷ = G mixolydian
vi ⁷	aeolian	Ami ⁷ = A aeolian
vii ^{ø7}	locrian	B ^{ø7} = B locrian

Example 5. Chord-scale relationships between Roman numerals and modes.



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Example 6. Chord-scale relationships for all diatonic harmonies in C.

A similar approach to the one above can be used to derive more chord-scale relationships from the melodic minor, harmonic minor, and harmonic major modes. To learn more about this, consult [Further Reading](#) below.

Applying Chord-Scales to Progressions within a Key

Reorganizing these relationships by chord quality reveals the choices listed in **Example 7** for matching chord qualities to scales. For example, when improvising on a minor seventh chord, a musician can choose from three chord-scales: dorian, phrygian, or aeolian (**Example 8**).

chord quality	scale(s)
minor seventh chord	dorian, phrygian, aeolian
major seventh chord	ionian, lydian
dominant seventh chord	mixolydian
half-diminished seventh chord	locrian

Example 7. The same chord-scale relationships as in **Example 5**, rearranged by chord quality.



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Example 8. Chord-scale choices for a minor-seventh chord.

However, it's important to realize that Chord-Scale Theory does not imply that the key modulates each time the chord changes. In other words, these chord-scales are not key centers. Since each mode will

imply different extensions, identifying chord functions through Roman numeral analysis helps an improviser choose chord-scales that best fit the key center.

For example, the opening measures of “[Fly Me to the Moon](#)” (1954) contain six of the seven diatonic chord-scale relationships in a circle-of-fifths root movement (**Example 9**). The chord progression in this example is clearly in the key of C, not seven different keys. Rather than simply coloring each minor chord with a dorian mode and each major chord with an ionian mode, differentiating between the vi and ii chords and between the I and IV chords will result in a more natural-sounding improvised line.



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Example 9. These chord-scales applied to “[Fly Me to the Moon](#)” by Bart Howard (1954) distinguish between different chords of the same quality, because the chords still have different functions.

Example 10 is the a transcription of the first chorus of John Coltrane’s improvised solo on “[Giant Steps](#)” (1960), transposed to B $\flat$ for tenor saxophone. Because of the fast tempo and unusual key center relationships, Coltrane improvises melodies that consist mainly of arpeggios and scale fragments. Note how he uses the ionian mode on major chords, the mixolydian mode (with a passing tone between *do* and *te* [$\hat{1}$ and $\downarrow \hat{7}$] in m. 9) on dominant seventh chords, and the dorian mode on minor chords.



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Example 10. Transcription of the first chorus of “[Giant Steps](#)” by John Coltrane (1960).

Limitations of Chord-Scale Theory

Some jazz educators have pointed out limitations of the Chord-Scale approach, such as:

- **The absence of voice leading between chords.** Chord-Scale Theory can lead a student to see each chord as a new key center, instead of viewing an entire chord progression as derived from a parent

scale. This can result in choppy, un-melodic improvisation that lacks smooth voice leading between chords.

- **Lack of the chromaticism commonly used in bebop and blues-based styles.** Chord-Scale Theory generally does not account for neighbor tones, passing tones, secondary leading tones, and blue notes employed by bebop musicians such as Charlie Parker, Dizzy Gillespie, and Bud Powell.
- **The anachronism of applying a 1960s modal concept to tunes from 1920–50.** Louis Armstrong and Charlie Parker did not think in terms of chord-scales. Educators such as Hal Galper and Hal Crook emphasize the importance of melodic embellishment, chord tone improvisation, and blues-based improvisation before delving into chord-scale relationships.
- **The avoidance of the oral tradition.** Chord-Scale Theory emphasizes the eye and intellect rather than the ear and intuition. Practicing chord-scale relationships does not substitute for transcribing improvised jazz solos, memorizing tunes, improvising along with recordings, or jamming with other musicians as the preferred methods of learning the oral tradition of jazz improvisation.

Further Reading

- Haerle, Dan. 1982. *The Jazz Language: A Theory Text for Jazz Composition and Improvisation*. Hialeah, FL: Alfred Music.
- Nettles, Barrie, and Richard Graf. 2015. *The Chord Scale Theory & Jazz Harmony*. Mainz: Alfred Music.
- Russell, George. (1953) 2001. *The Lydian Chromatic Concept of Tonal Organization: The Art and Science of Tonal Gravity by George Russell*. 4th edition. Brookline, MA: Concept Publishing Company.

Assignments

1. Coming soon!

BLUES HARMONY

Bryn Hughes and Megan Lavengood

KEY TAKEAWAYS

- Blues harmony differs from tonal and jazz harmony in a number of important ways, especially in the treatment of the dominant seventh chord.
- In a standard 12-bar blues, all chords are dominant seventh chords.
- The blues is a schema that can have many alterations without ceasing to qualify as “a blues.”
- Common variations on the 12-bar blues are the 16-bar blues, the minor blues, and the jazz blues.
- The jazz blues blends jazz and blues harmonic languages together.

CHAPTER PLAYLIST

The blues is an extraordinarily important genre in U.S. popular music. Not only is the tradition itself very old, with roots reaching back to the music of enslaved African Americans, but it continues to exert influence on 21st-century popular music.

The documentation on the history of the blues is quite limited due to its age, but the earliest blues songs existed in the late 1800s, and it seems to have grown out from earlier African American musical styles, such as field hollers and work songs, as well as microtonal and rhythmic characteristics of West African music. In this sense, although jazz musicians very frequently play the blues, the blues as a tradition has distinct origins from jazz. Jazz developed first in New Orleans through a mix of African, Caribbean, and European influences. The result of this distinction is that many of the truisms of jazz or tonal music do not hold true in the blues. Among the biggest harmonic differences are:

- Dominant-quality seventh chords can have any function (tonic, dominant, or subdominant).

- Plagal cadences provide structural closure, instead of authentic cadences.
- Major and minor thirds are freely mixed together, and even used simultaneously (sometimes written in chord symbols as a major/dominant chord with a #9 extension).

This chapter introduces some of the most common forms of the blues encountered in the 20th and 21st centuries.

12-Bar Blues

The blues is a schema: a frame of reference for understanding lots of different chord progressions. Blues progressions can all be understood as outgrowths from a basic prototype.

The 12-bar blues progression is composed of three phrases, typically four bars each. A major difference between the blues and more traditionally tonal music is that it emphasizes plagal cadences instead of authentic cadences. At its most basic, the harmony progresses as shown in **Example 1**:

1. The first phrase is entirely tonic harmony (I).
2. The second phrase contains two bars of subdominant (IV) and two bars of tonic (I).
3. The final phrase begins with one bar of dominant (V) followed by one bar of subdominant (IV) and two bars of tonic (I).
4. All chords are dominant seventh chords and do not fit into a single key.



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Example 1. A basic 12-bar blues.

This is the simplest version of the 12-bar blues, but innumerable variations exist upon these changes. One of the most common additions is that the second bar may move to IV, then return to I in the third bar. Another especially common trick is to employ some type of turnaround in the final bar or two of the progression, from something as simple as a V⁷ chord to a full III–VI–II–V progression. It can be difficult to find a blues tune that doesn't make some alteration from the basic form shown in **Example 1**. [“You Can't Do That” by the Beatles](#) (1964) is nearly the same, but it does add a V chord in the final bar as a turnaround.

Closely related is the 16-bar blues progression, which is composed of four 4-bar phrases, usually two iterations of tonic followed by subdominant and dominant

(**Example 2**). “Hoochie Coochie Man” by Muddy Waters (1954) is one example of a 16-bar blues.

Notice that the final phrase may or may not end with a turnaround. The 16-bar blues is not as common as the 12-bar blues, but it has somewhat heightened frequency in blues-based rock music.



Example 2. 16-bar blues.

Most commonly, the blues is in “major” (which, in this context, simply means that the tonic harmony has a major third above it—many pitches in a major blues fall outside the major scale). But another common variation on the blues is a minor blues. In a minor blues, the i and iv chords are minor sevenths instead of dominant sevenths; the V stays dominant. Because the motion from the major V to the minor iv can sound anticlimactic, the minor blues also typically replaces the V–IV–I motion in the third phrase with a ii–V–I (**Example 3**).



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Example 3. A typical minor blues.

Jazz Blues

As mentioned in the introduction to this chapter, the blues treats harmony differently from jazz, and one of the large differences is the reliance upon plagal rather than authentic cadences. The jazz blues is a variant of the 12-bar blues that mitigates this somewhat by adding several [ii–V progressions](#) to the blues.

Like the 12-bar blues, the jazz blues is composed of three 4-bar phrases. A basic version of the jazz blues is presented in **Example 4**.

Notice that the jazz blues mixes typical blues harmony (i.e., the use of non-V dominant seventh chords and plagal resolutions) with jazz harmonic schemas: specifically, it uses [ii–Vs](#) and turnarounds. In bar 8, instead of remaining on tonic, there is an applied ii–V that leads to the ii chord in bar 9. And in the third phrase, the V–IV–I of the standard blues is replaced with a ii–V–I more common to jazz.



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Example 4. The jazz blues adds ii–V progressions, replacing structural plagal cadences.

One recording that performs the blues this way is the [Lincoln Center Jazz Orchestra performing Duke Ellington’s “C Jam Blues.”](#) This is easiest to hear during the solo sections; however, not every repetition of this blues contains every chord shown in **Example 4**.

Examples of Variations

The blues can be varied extensively yet still qualify as the blues. [This chapter’s Spotify playlist](#) goes through several tracks that have some slight variations on the schemas outlined above:

- “Runaway Blues” by Ma Rainey (1928) uses a IV in the first tonic phrase, and it also embellishes the final V with an [applied V/V](#).
- “Empty Bed Blues, Pt. 1” by Bessie Smith (1928) follows a basic 12-bar blues but precedes most new harmonies with a [tonicizing ii–V](#) progression.
- “Surfin’ USA” by the Beach Boys (1963) presents a 16-bar blues, but the first two phrases each begin with two bars of V before two bars of I.
- “The Thrill is Gone” as recorded by B.B. King (1970) is in minor, and it replaces the ii–V of the final phrase with $\flat$ VI–V.

Musicians who have developed a familiarity with the blues will have no trouble recognizing the blues in a tune even with these variations and more.

Assignments

1. Worksheet on 12-bar blues ([.pdf](#), [.mscz](#)). Asks students to write basic and jazz 12-bar blues progressions, voiced and unvoiced, and to analyze altered blues progressions. [Worksheet playlist](#)
2. Worksheet on 12-bar blues, no jazz ([.pdf](#), [.mscz](#)). Same as Assignment 1, but simplified: asks students to write basic 12-bar blues progressions, voiced and unvoiced, and to identify unusual

chords in altered blues progressions. [Worksheet playlist](#)

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BLUES MELODIES AND THE BLUES SCALE

Megan Lavengood

KEY TAKEAWAYS

- In a blues song with a sung text, the lyrics consist of a line that is repeated, then followed by a contrasting line (**aab**). The melody often follows this structure as well.
- Blues melodies often leave large gaps to allow for call-and-response between the melodic instrument and other instruments.
- The blues scale is like a minor pentatonic scale with an additional chromatic passing tone:
do-me-fa-fi-sol-te ($\hat{1} - \downarrow \hat{3} - \hat{4} - \uparrow \hat{4} - \hat{5} - \downarrow \hat{7}$).
- The blues scale can be rotated to begin on its second note, creating a major blues scale:
do-re-ri-mi-sol-la ($\hat{1} - \hat{2} - \uparrow \hat{2} - \hat{3} - \hat{5} - \hat{6}$).

This chapter discusses some of the trends in blues melodies that shaped the blues as we know it today. As an example, this text will focus on one of the earliest recorded blues songs, “Gulf Coast Blues” by Clarence Williams, as recorded by the enormously commercially successful blues singer Bessie Smith in 1923.



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Example 1. “Gulf Coast Blues” (1923), recording by Bessie Smith and Clarence Williams.

Phrase and Lyric Structure

Much blues music is sung, and so lyrics play an important role in this genre. The four-bar phrases that make up the [12-bar blues](#) are commonly matched with lyrics that have an **aab** structure: the first line is stated and then repeated (sometimes with some alteration), and the third line contrasts. “Gulf Coast Blues” by Clarence Williams (1923) is one example of this ([Example 2](#)). The repeated lyric will often be set to a repeated melody, mimicking the **aab** structure of the lyrics, though this does not happen in “Gulf Coast Blues.”

structure	lyric
a	The man I love, he has done left this town
a	The man I love, he has done left this town
b	And if it keeps on raining, I will be Gulf Coast bound.

***Example 2.** Lyrics of “Gulf Coast Blues” by Clarence Williams.*

Another essential part of blues phrase structure is the notion of call-and-response, a feature likely inherited from the work songs of enslaved Africans and African Americans. The vocal, lyricized melody takes on the role of the “call” while an instrumental filler takes on the role of the “response.” Notice that in “Gulf Coast Blues,” each lyric labeled with an **a** is sung entirely and exclusively in the first two measures of the phrase. [Example 3](#) annotates a transcription of “Gulf Coast Blues” to show this call-and-response relationship.



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***Example 3.** Call-and-response in the melody of “Gulf Coast Blues.”*

The Blues Scale

Much as the harmonies of the blues tend not to stick to one diatonic key, flouting the norms of tonal music, the melodies are similarly chromatic to match. The blues scale, notated in the upper staff of [Example 4](#), attempts to generalize blues melodic practice into a scale on which beginning improvisers

can base their melodies. The blues scale is essentially a minor pentatonic scale with an added chromatic passing tone leading up to *sol* ($\hat{5}$).



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Example 4. The C blues scale creates stylistic clashes with the I and V chords of C major.

This blues scale is used in both major and minor blues tunes, despite the clashes with the underlying harmony. When this scale is combined with the chords of the major blues—I, V, and IV, or C major, F major, and G major in the key of C—the characteristic clashes between *mi/me* ($\hat{3}/\downarrow\hat{3}$) and *ti/te* ($\hat{7}/\downarrow\hat{7}$) are especially notable.

These clashes often produce blue notes—notes that are not really flat or natural, but somewhere in between. Blue notes seem to split the difference between *mi/me* ($\hat{3}/\downarrow\hat{3}$) or *ti/te* ($\hat{7}/\downarrow\hat{7}$).

The “major” blues scale

Some improvisers find it helpful to think of a major blues scale. The difference between a major and minor pentatonic scale is identical to the difference between the major and minor blues scale: the major blues scale is a rotation of the blues scale of its relative minor. Begin the blues scale on *me* ($\downarrow\hat{3}$), and you will get a blues scale for the relative major. These relationships are summarized in **Example 5**.



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Example 5. Rotating the blues scale to begin on its second note yields the major blues scale.

Compared to the minor blues scale, the major blues scale is less dissonant with major chords. When improvising, it can be helpful to think of improvising with the major blues scale over the major chords of the blues progression. But remember that using the blues scale (with flatted thirds and sevenths) over major chords is also a perfectly normal practice.

Assignments

1. Blues scales worksheet ([.pdf](#), [.mscz](#)). Asks students to spell scales and transcribe a melody that uses the blues scale. [Worksheet playlist](#)
2. Improvising with the blues scale ([.pdf](#), [.mscz](#)). Video assignment. Asks students to pair off and create videos with call-and-response improvisation. [Backing track available here.](#)
3. Blues composition ([.pdf](#), [.docx](#)). Asks students to synthesize information about blues harmony and blues melody.

VII. POPULAR MUSIC

POPULAR MUSIC CHAPTERS

- Rhythm and Meter
- Melody and Phrasing
- Introduction to Form in Popular Music
- AABA Form and Strophic Form
- Verse-Chorus Form
- Introduction to Harmonic Schemas in Pop Music
- Blues-based Schemas
- 4-Chord Schemas
- Classical Schemas (in a Pop Context)
- Puff Schemas
- Modal Schemas
- Pentatonic Harmony
- Fragile, Absent, and Emergent Tonics

This section introduces students to the important harmonic, rhythmic, and formal schemas that pervade English-language pop music after 1950. Most of the examples are drawn from Top 40 pop, but many other genres such as hip hop and indie are also represented.

Prerequisites

This section assumes a familiarity with the topics covered in [Fundamentals](#).

Organization

This section begins with [Rhythm and Meter](#), one of the musical domains that defines pop music as a genre most clearly.

The next few chapters discuss form in pop music, from a small scale ([Melody and Phrasing](#)) to a larger scale ([Introduction to Form in Popular Music](#), [AABA Form and Strophic Form](#), [Verse-Chorus Form](#)). These chapters are best taught sequentially.

The next several chapters take a schematic approach to understanding harmonies in popular music, beginning with an [Introduction to Harmonic Schemas in Pop Music](#). Instructors can cover as many or as few of these schemas as they like.

The final chapter zooms out and provides a broader view of tonality in popular music through the phenomena of Fragile, Absent, and Emergent Tonics.

RHYTHM AND METER IN POP MUSIC

Bryn Hughes; Kris Shaffer; and Megan Lavengood

KEY TAKEAWAYS

- Straight syncopation can be understood as taking a square rhythm and shifting some of the notes early by half the duration.
- Other syncopations are derived from dividing a unit into nearly even parts.
- A particularly common nearly even syncopation is the tresillo pattern of 3+3+2.

CHAPTER PLAYLIST

Straight Syncopation

In contemporary pop/rock music, syncopation typically involves taking a series of notes of equal durations, cutting the duration of the first note in half, and shifting the remaining notes early by that half duration.

For example, a series of four quarter notes, all sounding on the beat, can be transformed in this way by making the first note into an eighth note and sounding each successive quarter note one eighth note early—all on the offbeats.

This process can occur on any metrical level. The unit of syncopation (the duration of the first note, and the amount of shift applied to the following notes) is always half the duration of the straight notes. All of the following syncopations are relatively common in contemporary pop/rock music:

- If the duration of the series of “straight” notes is two beats, they will be syncopated by changing the first note to a single beat and shifting each of the other notes early by a beat.
- If the duration of the straight notes is one beat, they will be syncopated by a division (one half beat in simple meter).
- If the straight notes are each divisions, they will be syncopated by shifting each note by a subdivision.

As a convention, when we take a series of notes that each have a duration of one beat and shift them early by half a beat, we will call that *beat-level syncopation* (**Example 1**). When we take a series of notes that each have a duration of one division and shift them early by a subdivision, we will call that *division-level syncopation*.



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Example 1. *Straight syncopation moves the attacks forward by half the value of the metric level.*

Transcribing straight syncopations

Straight syncopated rhythms are easily identified by the frequently occurring offbeat rhythms. For example, if you listen to a song and conduct or tap the counting pulse, you may notice several notes in a row that are articulated between these pulses, with no notes articulated right on a pulse—this indicates syncopation.

Once you identify a syncopated passage—which may only involve two or three notes—figure out the metrical level on which the syncopation occurs. For example, in simple meter, if no notes are articulated directly on the counting pulse beats and one note is articulated in between each beat, the syncopation is occurring at the beat level. If no notes are articulated directly on the counting pulse beats and *two* notes are articulated in between each beat, listen to the passage again while tapping the *division*. If no notes are articulated directly on the division taps and one note is articulated in between each tap, the syncopation is occurring at the division level.

Determining the metrical level allows you to identify the durational value of the shift. If the syncopation occurs on the beat level (one note sounding between each counting pulse beat), the value of syncopation is a division: each beat-length note has been shifted one division early. If the syncopation occurs on the

division level, the value of syncopation is a subdivision: each division-length note has been shifted one subdivision early.

Lastly, determine how the syncopated pattern begins. Does the offbeat pattern simply begin offbeat? Or does the pattern begin with two quick notes back-to-back as in **Example 1**—one short note on the beat followed by the first of the longer syncopated notes?

Once you have determined the level of syncopation, the duration of the shift, and whether or not the pattern begins with a truncated onbeat note, the rhythmic pattern should be easy to notate. If, however, you are still having difficulty, try using the lyric syllables and the stress patterns of the lyrics to help you keep track of the individual notes and which ones are on or off the beat. Writing lyrics down before notating the rhythm can be a big help.

Tresillo

Drawing on its roots in African and Cuban musical traditions, another common rhythmic pattern in pop/rock is to divide a beat (or two beats) into three almost-equal groups: for example, dividing a half note into two dotted eighth notes and an eighth note (3+3+2). This pattern approximates a triplet while still maintaining the simple division of beats by 2, 4, 8, etc., creating an experience of something like a “fake triplet.” The term for this rhythmic pattern is *tresillo* (**Example 2**). A *tresillo* pattern can be heard after the opening cuatro solo of “*Despacito*” by [Luis Fonsi and Daddy Yankee](#) (2016) in the bass and bass drum. The *tresillo* pattern is extremely common, even in pop music that otherwise doesn’t seem to draw on Afro-Cuban music.



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Example 2. *Tresillo rhythms.*

The *tresillo* is actually more common than “real” triplets in most pop/rock genres, but true triplets do occur, so take care to distinguish between the two. “Cathedrals” by Jump, Little Children (1998) juxtaposes both, and it’s an excellent example for practicing performing and identifying *tresillo* patterns and real triplets. In **Example 3**, notice that the violins play quarter-note triplets against simple eighth notes in the guitar, but the guitar begins a *tresillo* accent pattern after the triplets stop.



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Example 3. “Cathedrals” by Jump, Little Children (1:01).

While tresillo patterns occur most often in 3+3+2 groupings, 3+2+3 and 2+3+3 are also possible.

The tresillo pattern can be expanded: in **Example 4**, the 3+3+2 pattern is doubled, resulting in 3+3+3+3+2+2. Nicole Biamonte (2014) refers to this pattern as the *double tresillo*. In the opening of “Electric Co.” by U2 (1980), the guitar plays subdivisions (sixteenths) grouped 3+3+3+3+2+2, while the kick drum plays straight beats (quarters) under the hi-hat playing straight subdivisions.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=385>

Example 4. The double tresillo.

Further Reading

- Biamonte, Nicole. 2014. “Formal Functions of Metric Dissonance in Rock Music.” *Music Theory Online* 20 (2). <http://www.mtosmt.org/issues/mto.14.20.2/mto.14.20.2.biamonte.html>.

Assignments

- Transcribing rhythms worksheet (.pdf, .mscz). Asks students to transcribe and identify straight syncopations as well as tresillo rhythms in “Sorry” by Beyoncé (2016). [Worksheet Playlist](#)

MELODY AND PHRASING

Bryn Hughes and Megan Lavengood

KEY TAKEAWAYS

Sections in pop/rock music typically consist of two, three, or four phrases. These phrases are usually organized as follows:

- Two-part: *aa'*
- Three-part: *aa'b* (often a 12-bar blues)
- Four-part: *srdc* (statement, restatement/response, departure, conclusion)

This chapter discusses the structure of song sections such as a verse, chorus, or bridge. Each section consists of at least two phrases—in pop/rock music, a phrase is a musical unit that typically lasts for four bars and corresponds to one line of the lyrics. In labeling these structures, phrases are designated by lowercase letters.

Two-Part

A section is two-part when the phrases that make up the section can be grouped into a first half and a second half. In two-part sections, the second half is usually based on the same music as the first half, and thus it is labeled *aa'*. Often these two halves begin the same but have different endings, participating in an antecedent–consequent (weak → strong) relationship.

The chorus to “[Livin’ on a Prayer](#)” (1’33”) has an *aa'* structure ([Example 1](#)). The first four-bar phrase (“Oh, we’re half-way there...”) and the second four-bar phrase (“Take my hand...”) have identical melody and harmony (so they both get the letter *a*), but different lyrics (so the second *a* is marked as “*a* prime”: *a'*). Note that in many songs, this relationship is not as clear cut. However, if the two phrases

begin with *similar* musical material, give them the same letter. New lyrics, new musical endings, or musical variations simply warrant a “prime.”

Very rarely, a section’s phrases can be grouped into two clear halves based on different music. Such a section is labeled *ab*.

Lyrics	Phrase
Whoa, we're halfway there Whoa, livin' on a prayer	<i>a</i>
Take my hand, we'll make it I swear Whoa, livin' on a prayer.	<i>a'</i>

Example 1. “*Livin’ on a Prayer.*”

Three-Part

A section containing three phrases is a three-part section. If the first two phrases are based on the same music and the third is different, the section is labeled *aa'b*.

12-bar blues progressions are the most common example of a three-part *aa'b* section. “Hound Dog” contains *aa'b* strophes (**Example 2**).

Lyrics	Phrase
You ain't nothin' but a hound dog Cryin' all the time	<i>a</i>
You ain't nothin' but a hound dog Cryin' all the time	<i>a'</i>
Well, you ain't never caught a rabbit and you ain't no friend of mine.	<i>b</i>

Example 2. “*Hound Dog.*”

Four-Part

A section composed of four phrases often contains a sentential structure (presentation → continuation → cadential/conclusion). In pop/rock music, this often appears as a basic musical idea in the first phrase, a repetition or “response” to it in the second, contrasting material in the third phrase (often employing

fragmentation, acceleration of harmonic rhythm, and movement away from tonic harmony), and a conclusion in the fourth phrase—either with a return to the basic idea and tonic harmony or with still newer material that forms a strong melodic, rhythmic, and harmonic conclusion. Walter Everett (2001, 132) has called such a four-phrase sentential structure in pop/rock music *srdc* (statement, restatement/response, departure, conclusion).

In conventional lettering, an *srdc* section could employ an *aaba* structure (with statement material returning as a restatement and again as the conclusion), or an *aabc* structure (where the conclusion material is new). Occasionally *abcd* or *abca* are possible, but only if *b* is a clear response to *a*, not simply new material.

An *srdc* structure tends to divide neatly into halves: *sr* and *dc*.

Bobby Darin's "[Dream Lover](#)" (**Example 3**) provides a classic example of a four-part *srdc* phrase structure.

Lyrics	Phrase
Every night I hope and pray A dream lover will come my way	<i>s</i> (statement)
A girl to hold in my arms And know the magic of her charms	<i>r</i> (repetition)
'Cause I want (yeah-yeah, yeah) A girl (yeah-yeah, yeah) To call (yeah-yeah, yeah) My own (yeah-yeah)	<i>d</i> (departure)
I want a dream lover So I don't have to dream alone	<i>c</i> (conclusion)

Example 3. "Dream Lover."

Further Reading

- Everett, Walter. 2001. *The Beatles as Musicians: The Quarry Men through Rubber Soul*. New York: Oxford University Press.

Assignments

1. Worksheet on Section Structures ([.pdf](#), [.docx](#)). Asks students to identify two-, three-, and four-part phrase organizations within sections. [Worksheet playlist](#)

INTRODUCTION TO FORM IN POPULAR MUSIC

Bryn Hughes and Megan Lavengood

KEY TAKEAWAYS

- This chapter addresses foundational concepts of form in music. (For discussions of specific forms, see the following two chapters: [AABA and strophic form](#) and [verse-chorus form](#).)
- Pop forms can be related to one another through the concepts of core and auxiliary sections.
- Sections can be defined through their formal and harmonic functions.

Those interested in the connections between pop and classical forms may wish to cross-reference [Formal Sections in General](#).

Sections within Pop Forms

In pop/rock music, a section typically spans between 8 and 24 bars and includes 2–4 phrases. (Some auxiliary sections may contain a single phrase.) A section presents a single formal function (such as strophe, bridge, prechorus, etc.) and presents a complete [two-, three-, or four-part pattern](#). A section typically sets a stanza of lyrics.

Section boundaries are usually made apparent by poetic structure (the end of a couplet or stanza) or by surface features of the song such as:

- a clear rhythmic, harmonic, and melodic arrival
- a change in instrumentation or volume

- a return to the beginning of a previously heard section

For instance, take the transition from a verse section to a chorus section at 2:42 in U2's "Pride (In the Name of Love)." The section boundary is delineated by a number of features simultaneously:

- The text closes out the verse's quatrain with a (more-or-less) rhyming lyric ("sky"—"pride") before beginning a new stanza.
- The end of the verse is signaled by a drum fill, a common end-of-phrase or end-of-section gesture.
- The general dynamic gets louder very quickly.
- The guitar becomes more active and is doubled by a second guitar part.
- The lead vocals rise in register.
- Background vocals are added to the lead vocal part.

All of these features help delineate the boundary between sections, and most of them also give the new section (the chorus) a higher energy level than the previous section (the verse).



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Terminology and Basic Concepts

The definitions used here are based on the research of Jay Summach (2012).

core section: Core sections form the main musical and poetic content of a song. Examples of core sections in pop forms include verse, chorus, strophe, or bridge sections.

auxiliary section: Auxiliary modules help to frame the core modules, introducing them, providing temporary relief from them, or winding down from them. They can include introduction, outro, or coda sections.

lyric-variant: A section or phrase is lyric-variant if each time it appears it brings (mostly) different lyrics.

lyric-invariant: A section or phrase is lyric-invariant if each time it appears it brings (mostly) the same lyrics. Lyric invariance tends to come at points of formal closure (tail refrains at the ends of strophes, choruses at the end of a verse-chorus song's formal cycle).

music-variant: A section or phrase is music-variant if each time it appears it brings (mostly) different music.

music-invariant: A section or phrase is music-invariant if each time it appears it brings (mostly) the same music.

on-tonic: A phrase or section is on-tonic when it begins with tonic harmony (I in root position).

off-tonic: A phrase or section is off-tonic when it begins on a harmony other than tonic.

harmonically closed: A phrase or section is harmonically closed when it ends with tonic harmony (I in root position).

harmonically open: A phrase or section is harmonically open when it ends on a harmony other than tonic.

turnaround: The use of a non-tonic chord (usually dominant) at the end of a harmonically closed unit to transition into the beginning of the following on-tonic unit. The song [“Woolly Bully” by Sam the Sham and the Pharaohs](#) contains a turnaround at the end of many of its strophes. One of these occurs at 0:54 — a simple V^7 chord to prepare the return of I as the next strophe begins.¹

closing rhetoric: Closing rhetoric involves common patterns and techniques that signal that the end of the song is likely coming soon. Typical patterns and techniques include immediate repetition of a core section (except for the first core section) or part of a core section, thinning out of the texture, late-song intensification, fadeout, and bringing a previously harmonically open section to a point of harmonic closure. Closing rhetoric is typically found in outros, codas, and the last core section of a song (A or C).

Analytical Notation

What follows are notational conventions for analyses of musical form in this text.

Capital letters

Sections are labeled with capital letters according to function:

1. Interestingly in this song, the guitarist doesn't always remember the turnarounds. Notice that at 0:28, the bass and baritone saxophone play the dominant, but the guitarist keeps tonic. At 1:18, the singer yells, “Watch it now! Watch it! Watch it!” as if warning the guitarist not to miss the turnaround in the next bar. He does the same in 2:08. When the guitarist gets the turnaround with the rest of the band, the singer yells, “You got it! You got it!” as if congratulating the guitarist.

- A section that functions as a strophe is labeled with an **A**
- A section that functions as a bridge is **B**
- A verse is labeled **V**
- A chorus is labeled **C**
- And so on—more sections are introduced in the following chapters.

Lowercase letters

Phrases are labeled with bolded lowercase letters according to their musical content. If two phrases use more or less the same musical framework (harmony, melody, and rhythm), they receive the same letter. Letters are assigned in the same manner as poetic rhymes: the first phrase is *a*, and any phrase that follows based on the same music is also *a* (primes are used for slight variations, such as new text or altered instrumentation); the next phrase with new musical material is *b*; and so on. These letters do *not* correspond to functions.

The single exception to this convention is when phrases within a section demonstrate a sentential progression (*srdc*), in which case the first phrase (statement) is labeled *s*; restatement/response, *r*; departure, *d*; conclusion, *c*.

Further Reading

- Summach, Jason. 2012. “Form in Top-20 Rock Music, 1955–89.” Ph.D. diss., Yale University.

Footnotes

AABA FORM AND STROPHIC FORM

Bryn Hughes and Megan Lavengood

KEY TAKEAWAYS

- Strophic form consists only of repeated strophes. Its form would be abbreviated as AAA.
- AABA form, also known as 32-bar song form, consists of a twice-repeated strophe (AA), followed by a contrasting bridge (B), followed by another repetition of the initial strophe (A).
- AABA and strophic form were especially common in older pop music (1960s and earlier).
- AABA and strophic form both have strophe sections as the main section, which features the primary lyrical and musical content of the song.

CHAPTER SPOTIFY PLAYLIST

Strophic Form

Songs that repeat the same basic multi-phrase unit throughout are in strophic form (sometimes abbreviated AAA because the same basic material, A, is repeated), and the basic unit that is repeated is called a strophe. Strophic form is more common in early rock-and-roll (1950s–1960s) than in the 1970s and beyond.

For an example of a strophic song, consider “Blue Suede Shoes” by Carl Perkins (1955).





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This song contains multiple sections, all of which have the same basic underlying music. Though the instrumentation and the lyrics change, the section beginning at 0:19 contains the same—or, at least, very similar—melody, harmony, and phrase structure as the sections that begin at 0:58, 1:37, and 1:54. Listening a bit more closely, we can hear a similar, but abbreviated, version of the same patterns at the opening of the song. Even the instrumental sections at 0:41 and 1:21 have the same underlying pattern, just a different melody in the form of a guitar solo. The entire song is a repetition of this same basic pattern, or slight variations of it, modeled at 0:19–0:41.

Example 1 is a bird’s-eye-view sketch of the form of “Blue Suede Shoes” to follow as you listen:

timestamp	section	abbreviation
0:00	strophe 1	A
0:19	strophe 2	A
0:41	instrumental strophe	A
0:58	strophe 3	A
1:21	instrumental strophe	A
1:37	strophe 1 (slightly varied)	A
1:54	strophe 4	A

Example 1. "Blue Suede Shoes" is in strophic form.

While “Blue Suede Shoes” is composed entirely of strophes, it is important to note that strophic songs can also contain so-called auxiliary sections such as intros, outros, and codas. An example of a strophic song with auxiliary sections is “I Wanna Be a Cowboy’s Sweetheart” by Patsy Montana & The Prairie Ramblers (1935). Follow the form chart in **Example 2** as you listen to this song, and notice that the intro and outro do not change the fundamental strophic form significantly.





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timestamp	section	lyrics
0:00	intro	[instrumental] Yodel-ey...
0:20	strophe 1	I wanna be a cowboy's sweetheart...
1:02	instrumental strophe	
1:32	strophe 2	I wanna ride Old Paint...
2:17	strophe 1	I wanna be a cowboy's sweetheart...
2:49	outro	Yodel-ey...

Example 2. "I Want to Be A Cowboy's Sweetheart" is in strophic form with auxiliary modules.

However, if a song has more than one main musical idea other than strophes and auxiliary sections, it is not strophic, but AABA form, which is discussed below, or verse-chorus form, discussed in [the next chapter](#).

32-Bar Song Form (AABA)

Another formal structure that is more common in early rock-and-roll is AABA form, also called 32-bar song form because in earlier “Golden Age” songs that make use of this structure, each section is eight measures long. AABA form, like strophic form, relies on the strophe to communicate the main lyric and musical ideas of the song, but it adds a contrasting bridge section in the middle.

As an example, listen to “I Want to Hold Your Hand” by the Beatles (1963).



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After a brief introduction, the song begins with two strophes. However, where “Blue Suede Shoes” followed this with an instrumental strophe, the Beatles move to a bridge at 0:52. This new section builds tension by contrasting and withholding the main strophe theme before it returns at 1:11. Note that the song begins and ends with the strophe, and the strophe contains the title lyrics. For many people, it’s also the the more memorable part of the song. Thus, the strophe is still the primary section. But now it has a secondary section to add interest and tension: the bridge (and an auxiliary section, the intro, to help get the song off the ground).

timestamp	section	abbreviation
0:00	intro	I
0:08	strophe 1	A
0:29	strophe 2	A
0:51	bridge	B
1:11	strophe 3	A
1:33	bridge	B
1:53	strophe 3	A

Example 3. "I Want to Hold Your Hand" is in AABA form, with a typical repeat of BA.

After the **AABA** cycle, “I Want to Hold Your Hand” repeats **B** and **A** again. This is typical for an **AABA** song—in almost all cases, they have a complete **AABA** cycle followed by either another complete cycle (**AABA**) or an incomplete one (typically **BA**). Once the first **AABA** cycle is complete, there tend not to be any new lyrics, only repetition of the whole or the end of the main cycle.

Sections of AABA and Strophic Forms

The pop form terminology used here and throughout *OMT* is based on the research of Jay Summach (2012).

Strophe (A)

As a main section, the function of a strophe section is to present the primary lyric and musical content and to provide a point at which the song might satisfyingly end.

In strophic form (**AAA**), strophes are the only core sections. Each strophe tends to set a stanza of text, with music that is self-contained and harmonically closed.

In 32-bar form (**AABA**), the strophe's functions—holding primary music/text and providing harmonic stability—are elevated through contrast with the bridge section. In **AABA** songs, strophe function often involves the prolongation of tonic harmony. Strophes tend to be shorter in **AABA** songs than in strophic songs.

In both forms, *srdc* is by far the most common internal pattern for strophes. For three-part strophes, the 12-bar blues progression is the most common pattern.

Bridge (**B**)

Bridges are contrasting sections, and share many traits with the continuation function of classical form. Bridge sections tend to play a transitional role (neither the point from which to depart nor the point of arrival) in the formal cycle. This generates heightened expectation for the return of **A** by contrasting with **A** and temporarily withholding it. A bridge section “must be followed by [the primary section] in order for its function to be satisfied” (Summach 2012, 79). Bridge sections tend to emphasize non-tonic harmonies and commonly end on dominant harmony.

As [the next chapter discusses](#), in verse-chorus songs, bridge sections are more free than in **AABA** form to contrast verse and chorus sections without a strong need to build expectation for the return of the chorus. In an **AABA** song, building expectation for the return of the strophe and arriving on dominant harmony in preparation of that return are essential to bridge function.

Introduction (**I**)

Introduction sections transition from the unmetered silence that precedes the song to the musical activity of the first core section. They tend to be short and untexted/instrumental, and they tend to present musical material from one or more core sections to come. This is often accomplished by the building up of musical material, perhaps through layering (e.g., one instrument at a time) or through a more generic building of energy.

Occasionally intros include non-core material. Such intros often correspond to an outro based on the same

material, and together they create a “bookend” effect. It is also possible to have multiple intro sections in a row, with each based on different music.¹

Outros (O) and Codas (X)

Outros function as a transition from song back to silence, and thus decrease energy. Often this is accomplished in the recording studio by way of a fadeout. When an outro section is present, it is almost always based on material from the last core section that preceded it. Otherwise, outros tend to draw material from the intro, creating a “bookend” effect (as in [“I Want to Be a Cowboy’s Sweetheart”](#) above). Outros exhibit closing rhetoric.

A coda is a song-ending section that presents new material—in other words, it is an outro not based on music previously heard. Like outros, codas exhibit closing rhetoric.

[Muse’s “Resistance”](#) is useful for distinguishing between these two terms, since it has both a coda and an outro. The coda, which contains new musical and narrative material, begins at 4:05, following the final chorus. This new section, which brings something of a conclusion (if an open-ended one) to the narrative, gives way to a song-ending outro at 4:54. Aside from the clear change in content and texture at 4:54, the outro is recognizable as an outro (versus a coda) by the return of material from the introduction, creating the “bookend” effect.

Refrains

A refrain is a lyric-invariant passage within a section that is otherwise lyric-variant. A refrain is too short to form its own section—typically a single phrase or even less.

A refrain is most often the last line or so of a section’s text (tail refrain); occasionally, it is the material at the beginning of a section’s text (head refrain). [“Cathedrals” by Jump, Little Children](#) (1998) contains a head refrain. Each strophe begins with the same line: “In the shadows of tall buildings....” [“Blue Suede Shoes”](#) and [“I Want to Hold Your Hand,”](#) each discussed at the beginning of this chapter, both contain tail refrains at the ends of their strophes, emphasizing the title lyrics.

1. Dexys Midnight Runners’s “Come On Eileen” contains several different intro sections with different musical content.

Further Reading

- Summach, Jason. 2012. “Form in Top-20 Rock Music, 1955–89.” Ph.D. diss., Yale University.

Assignments

1. AABA and Strophic Form ([.pdf](#), [.docx](#)). Asks students to identify formal sections and any variations to the form. [Worksheet playlist](#)

Footnotes

VERSE-CHORUS FORM

Bryn Hughes and Megan Lavengood

KEY TAKEAWAYS

- Verse-chorus form is a versatile song form that rapidly took over rock-and-roll in the 1960s and has dominated the genre ever since.
- In verse-chorus form, the title lyrics, the most memorable music, and the main narrative are split between two core sections: the verse and the chorus.

Verse-chorus form is so named because the two most important sections are the verse and the chorus. Other possible sections in verse-chorus form are prechorus, bridge, and postchorus.

As an example, look at the form of Bon Jovi's song "Livin' on a Prayer," given in **Example 1**.



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timestamp	section	notes
0:00	intro	
0:47	verse	
1:18	prechorus	
1:34	chorus	
1:48	interlude	
1:53	verse	
2:23	prechorus	
2:39	chorus	
2:56	postchorus	
2:59	bridge (guitar solo)	
3:16	prechorus	
3:24	chorus	modulation, repeat and fade out to end

Example 1. "Livin' on a Prayer" is in verse-chorus form, and uses many types of core and auxiliary sections in a typical way.

"Livin' on a Prayer" follows a typical verse-chorus form. It also illustrates common usage of five core sections in verse-chorus forms (and a bonus [truck driver's modulation](#)!).

Cycles

Notice that the sections used in "Livin' on a Prayer" recur and seem to follow a pattern. Sections within a verse-chorus form have certain prototypical orderings and groupings. The verse, prechorus, chorus, and postchorus sections, for example, always progress in this order (though they don't all need to be present). These groupings are referred to as cycles. In "Livin' on a Prayer":

- After an extended intro, the first cycle begins with a verse at 0:47.
- Then at 1:18, a prechorus increases energy and tension...
- ...into the chorus at 1:34.
- After a brief interlude, this cycle is repeated beginning at 1:54, with the addition of a postchorus at 2:56.
- A final cycle at 3:00 is atypical and abbreviated, and it's followed by a repetition of its final chorus multiple times, during which a fadeout ends the song.

A prototypical verse-chorus form song is illustrated in [Example 2](#).



Example 2. A prototypical verse-chorus form, not referencing a specific song. Click to enlarge.

Sections within Verse-Chorus Form

Terms, concepts, definitions, and notational guidelines are taken from common convention and a combination of the resources listed below under [Further Reading](#).

Verse (V)

- Verse sections are lyric-variant and often contain lyrics that advance the narrative.
- Until the 1960s, verse sections tended to be harmonically closed.
- Beginning in the 1960s, verse sections became more and more likely to be harmonically open (Summach 2012, 114).
- Verses (like strophes) tend to begin on-tonic.

Prechorus (P)

- Prechorus sections can be recognized most easily by energy gain.
- They bear many of the functional characteristics of the *d* phrase in *srdc*—fragmentation, acceleration of harmonic rhythm, movement away from tonic harmony, and harmonic openness.¹

Chorus (C)

- Chorus sections are lyric-invariant and contain the primary lyrical material of the song (the title lyrics and/or lyrical hook).
- Chorus function is also typified by heightened musical intensity relative to the verse, including features like “a more dense or active instrumental texture; prominent background vocals; and/or a higher register melody” (Summach 2012, 106).

1. This is because prechorus sections originate historically in the *d* section of an *srdc* pattern. Think of an *srdc* strophe becoming longer until *sr* forms its own two-part verse section, *d* forms its own prechorus section, and *c* forms its own chorus section.

- Choruses most frequently (but not exclusively) begin on-tonic.
- Although the terms chorus and refrain are often used interchangeably when speaking colloquially, take care to keep them separate when discussing music theory. Chorus sections are distinct from refrains because choruses constitute an entire section by themselves, whereas refrains are *contained within* a section (as described [below](#)).

Postchorus (Z)

- A postchorus is a short section that follows a chorus and serves only to close the cycle (not to introduce or transition to the beginning of the next cycle) (Spicer 2011, para. 9).
- A clear postchorus can be heard in [“Independent Women, Pt. 1” by Destiny’s Child](#) at 1:18, beginning with the lyric “Girl, I didn’t know you could get down like that.”

Bridge (B)

Bridge sections are a flexible section type in verse-chorus form.

- In verse-chorus form songs, the bridge tends to appear once, followed by the last chorus (or the last prechorus and chorus) of the song.
- Within a cycle, bridges will replace the verse and/or prechorus sections instead of being added in as an extra element. Thus, you will not usually see all five core section types in a single cycle.
- A verse-chorus song may not have a bridge at all.

Each of these points contrasts with [the way bridges are used in AABA form](#).

Standout Lyrics within Sections

Refrain

While refrains are primarily associated with **AABA** form and strophic form, they can occasionally be used within sections of a verse-chorus form song. However, take note that refrains are distinct from choruses—refrains are a lyric *within* a section, whereas a chorus is an entire standalone section.

Climb

A climb is a phrase with prechorus function. Like the refrain, because it is only one phrase long, a climb is too short to be its own section. The climb is always the last phrase of a strophe or verse.

An example of a climb is in [“Come On Eileen”](#) by Dexys Midnight Runners (1982): listen for the one-phrase climb at the end of its verses and bridge (“Tu-ra-lu-ra...”), as heard at 1:13.

Further Reading

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 - Covach, John. 2005. “Form in Rock Music: A Primer.” In *Engaging Music: Essays in Music Analysis*, edited by Deborah Stein, 65–76. New York: Oxford University Press.
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 - Spicer, Mark. 2011. “(Per)Form in(g) Rock: A Response.” *Music Theory Online* 17 (3). <http://www.mtosmt.org/issues/mto.11.17.3/mto.11.17.3.spicer.html>.
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- Reading Guide
- Summach, Jason. 2012. “Form in Top-20 Rock Music, 1955–89.” Ph.D. diss., Yale University.

Assignments

1. Pop Music Form—The Shape of Music Around You ([.pdf](#)). Writing assignment that asks students to find songs on their own; identify them as strophic, AABA, or verse-chorus; name the sections of the song; and justify their analyses using form vocabulary.
2. Listening to Pop Forms ([.pdf](#), [.docx](#)). This worksheet uses two unusual verse-chorus form songs to challenge students’ analytical abilities. Uses [BriFormer web app](#) to create form diagrams of pop songs.

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Footnotes

INTRODUCTION TO HARMONIC SCHEMAS IN POP MUSIC

Bryn Hughes and Megan Lavengood

KEY TAKEAWAYS

- Pop harmony can be understood through harmonic schemas—particularly common chord progressions.
- These schemas can be altered while still maintaining their resemblance to the prototype.

There are a number of common stock chord progressions that recur in many pop/rock songs. These stock progressions, or schemas, will often occur in cyclical patterns in a song; that is, the same progression will repeat multiple times in a row. This is particularly common in choruses of verse-chorus songs, but it also happens in verses, strophes, and bridges. Knowledge of pop schemas is helpful for identifying harmonies by ear, since in addition to listening for bass scale degrees and considering whether the harmonies are in root position or first inversion, you can listen for common patterns that you have heard in other songs.

Example 1 succinctly summarizes the most common forms of each schema.

Schema name	Progression in Roman numerals	Progression in C major	Common variations
12-bar blues	I I I I IV IV I I V IV I I	C C C C F F C C G F C C	• Dominant sevenths in every chord • 16-bar blues, repeating first four measures of I • IV in m. 2 • ii–V in mm. 13–14 instead of V–IV; applied ii–V in m. 8 (jazz blues) • Turnaround in mm. 15–16
Double plagal	♭VII–IV–I	B♭–F–C	• Rotation: I–♭VII–IV
Extended plagal	♭VI–♭III –♭VII–IV–I	A♭–E♭–B♭–F–C	
Doo-wop	I–vi–IV–V	C–Ami–F–G	• Substitute ii for IV: I–vi–ii–V • Rotation: IV–V–I–vi
Singer/ Songwriter	vi–IV–I–V	Ami–F–C–G	• Rotation to start on any chord: I–V–vi–IV; IV–I–V–vi; V–vi–IV–I
Hopscotch	IV–V–vi–I	F–G–Ami–C	• Replacing V (G) with V/vi (E)
Lament	i–♭VII–♭VI–V	Cmi–B♭–A♭–G	• Minor v instead of major • Major I instead of minor • Added passing chords, such as V⁶ between i and ♭VII, or IV⁶ between ♭VII and ♭VI
Circle-of-fifths	i–iv–VII–III etc.	Cmi–Fmi–B♭–E♭	• More chords continuing the fifthwise root motion • Chord quality can be altered to create applied dominants or applied ii–V progressions
Puff	I–iii–IV	C–Emi–F	• Minor version: i–III–iv • "Deceptive" version: I–III♯–IV (III♯ sounds like a V/vi that resolves deceptively by step instead of authentically)
Subtonic shuttle	I–♭VII	C–B♭	• Rotation: ♭VII–I • Aeolian version: i–♭VII
Aeolian shuttle	i–♭VII–♭VI–♭VII	Cmi–B♭–A♭–B♭	
Aeolian cadence	♭VI–♭VII–i	A♭–B♭–Cmi	• Major tonic (picardy third): ♭VI–♭VII–I
Dorian shuttle	i–IV	Cmi–F	
Lydian shuttle	I–II♯	C–D	
Lydian cadence	II♯–IV–I	D–F–C	

Example 1. Summary of common pop harmonic schemas.

A crucial feature of schemas is that they can be altered while still remaining recognizable as a manifestation of that schema. Think of the term “bird.” If someone asks you to imagine a bird without

any extra context, you may not imagine a specific species of bird, but you would probably imagine a bird that looks something like a [sparrow](#) or [robin](#). Your imaginary bird is your mental prototype for the schema “bird.” You can recognize all kinds of birds as being birds even if they do not look exactly like your imaginary bird—ostriches, penguins, flamingos, and swans are all clearly birds, despite their significant differences in appearance, behavior, and habitat. In the same way, you can and should recognize harmonic schemas as manifestations of the schemas listed here, even when they undergo some form of variation. Common variations include chromatic inflection or chord inversion, and are summarized in the final column of **Example 1**.

The following chapters group together certain schemas that share several qualities, and go into detail about each individual schema and its most common variations.

- [Blues-based schemas](#)
 - [12-bar blues](#)
 - [16-bar blues](#)
 - [double plagal](#)
 - [extended plagal](#)
- [Four-chord schemas](#)
 - [doo-wop](#)
 - [singer/songwriter](#)
 - [hopscotch](#)
- [Classical schemas](#)
 - [lament](#)
 - [circle-of-fifths](#)
- [Puff schemas](#)
- [Modal schemas](#)

BLUES-BASED SCHEMAS

Bryn Hughes

KEY TAKEAWAYS

Blues-based schemas all include some kind of plagal motion.

- Many songs simply use the two-chord vamp I–IV (very common in R&B and soul music).
- The “plagal sigh” schema, IV–iv–I, includes the scale-degree voice-leading *la–le–sol* ($\hat{6} - \downarrow \hat{6} - \hat{5}$) and can often be found at phrase endings.
- “Applied” IV chords can be used to create a double-plagal schema: $\flat\text{VII}-\text{IV}-\text{I}$.
- These applied IV chords can be used to create extended plagal progressions such as $\flat\text{VI}-\flat\text{III}-\flat\text{VII}-\text{IV}-\text{I}$.

CHAPTER PLAYLIST

Blues-based schemas, or “flat-side” schemas, are those that mostly employ harmonies found on the “flat side” of the circle of fifths. We draw the connection to the blues here because of its propensity for using the IV chord (the first chord found in the flat-wise direction on the circle of fifths), and for the general ubiquity of the flattened seventh scale degree in blues music.

Plagal Motion

The IV chord, while certainly an extremely frequent predominant/subdominant chord in common-practice repertoire, has an even more prominent place in pop/rock music. Perhaps borne out of the 5–6 neighboring motion found in shuffle-blues guitar accompaniment patterns ([Example 1](#)), an alternation between I and IV is a common occurrence in numerous genres ([Example 2](#)).



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Example 1. The 5–6 shuffle pattern.



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Example 2. The plagal IV–I pattern.

In “Soul Man” by Sam and Dave, the chord progression used in the verse (**Example 3**) consists of an alternation of I and IV—listen carefully to the bass.



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Example 3. Sam and Dave, *“Soul Man”* (1967).

A similar oscillation between I and IV can be found in the verse to “In the Midnight Hour” by Wilson Pickett (**Example 4**). Perhaps unsurprisingly, this track features the same guitarist and bassist as “Soul Man” (Steve Cropper and Donald “Duck” Dunn, respectively).



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Example 4. Wilson Pickett, *“In the Midnight Hour”* (1965).

This kind of chord progression isn’t limited to soul and R&B, of course. The beginning of “After the

Gold Rush” by Neil Young (**Example 5**) features a similar progression (it deviates after the the words “...drummers drummin’...”; also, note the discrepancy between the melody notes and the chords throughout).



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Example 5. Neil Young, “*After the Gold Rush*” (1970).

Minor iv

A very common plagal schema in rock and popular music is the use of the minor iv chord as a kind of cadential gesture. It is most commonly found as part of the three-chord schema IV–iv–I. The schema is typically accompanied by the descending melody *la–le–sol* ($\hat{6} - \downarrow \hat{6} - \hat{5}$), which is found in the guitar part in **Example 6**. The semitone descent creates an especially strong pull to the tonic.

This descent has been referred to by J. Kent Williams and Frank Lehman as a “plagal sigh” in Golden Era American popular song and Classic Hollywood film scores, respectively.¹ Both authors consider this gesture to invoke a sense of nostalgia and sentimentality. Indeed, even in pop music, musicians typically use this progression in conjunction with lyrics that suggest sentimentality.

“Wake Me Up When September Ends” by Green Day (**Example 6**) exhibits both of the tendencies discussed above: motion from IV–iv–I and a sense of nostalgia and sentimentality in the lyrics.



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Example 6. Green Day, “*Wake Me Up When September Ends*” (2005).

1. [reference]

Double-Plagal

The “double-plagal” progression (Walter Everett’s term) is an expansion of the plagal progression discussed above to include the IV/IV chord prior to the IV chord.² This is perhaps more simply explained as ♭VII–IV–I. The most famous instance of the double-plagal progression is likely the coda from “Hey Jude” by the Beatles (**Example 7**).



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Example 7. The Beatles, “Hey Jude” (1968).

Extended Plagal

The “applied IV” chord can be used in sequence, similar to the descending-fifths progression in common-practice music. In the version of “Hey Joe” by Jimi Hendrix (1966), the verse consists of three iterations of the plagal motion in a descending-fourths pattern, which results in the progression ♭VI–♭III–♭VII–IV–I, in the key of E major.



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Example 8. Jimi Hendrix, “Hey Joe” (1966).

Recognizing Blues-Based Schemas

In all of these examples, the sense of forward motion is created by the harmonic motion from IV to I. The

2. [citation]

other alterations, such as IV/IV ($\flat$ VII) or minor iv, are extra embellishments on this essential plagal motion.

Further reading

- Williams
- Lehman
- Everett

Assignments

1. Listening for blues-based schemas ([.pdf](#), [.docx](#)). Asks students to identify blues-based schemas, their use, and any variations in three pop songs. [Worksheet playlist](#)

Footnotes

FOUR-CHORD SCHEMAS

Megan Lavengood and Bryn Hughes

KEY TAKEAWAYS

I, IV, V, and vi are the most common harmonies in pop music, and they can be arranged into several schemas, each with a distinct sound. Each schema can have variations, such as chord substitution or rotation, while still remaining recognizable as that schema.

- The doo-wop schema is **I–vi–IV–V**, and it was common in 1960s pop music. Common variations:
 - I–vi–ii–V (ii substitutes for IV)
 - IV–V–I–vi (rotation)
- The singer/songwriter schema is **vi–IV–I–V** or **I–V–vi–IV**, and it was common in 1990s singer/songwriter music. It can also be understood in its relative minor: **i–VI–III–VII**. A common variation is IV–I–V–vi (rotation).
- The hopscotch schema is **IV–V–vi–I**, and it is common in recent pop music (since 2010). It can also be understood in its relative minor: **VI–VII–i–III**. A common variation is VI–V–i–III (V substitutes for VII in minor).

CHAPTER PLAYLIST

The progressions discussed in this chapter all have something in common. They use the same four chords: I, IV, V, and vi, which are probably the most common chords in all of pop music. Because of this, they all sound somewhat similar; the difference is in the order of the chords.

Doo-wop

Example 1 shows music notation, chord symbols, and Roman numerals for the doo-wop schema: **I–vi–IV–V**, or **C–Ami–F–G** in C major.



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Example 1. The doo-wop schema (left) and a common variation of it that replaces IV with ii (right).

The name for this cyclical chord progression comes from its common use in rock ballads from the 1950s and early 1960s, such as [“Duke of Earl” by Gene Chandler](#) (1962). However, it has continued to be used frequently ever since: examples include the verse and chorus of [“Friday” by Rebecca Black](#) (2011) and the chorus of [“Total Eclipse of the Heart” by Bonnie Tyler](#) (1983) (starts at 0:49).

Substituting ii for IV

Because ii and IV share the same function in this chord progression, ii can be swapped out for IV, as in [Otis Redding’s “Try a Little Tenderness”](#) (1966).

Rotation

Because the doo-wop schema is typically employed in cycles, it can also start on a different chord in the cycle and then proceed through the same succession of chords (rotation). For example, [“Viva la Vida” by Coldplay](#) (2008) works through a cyclical repetition of the same succession of chords, but the phrases begin on IV rather than I (**Example 2**).



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Example 2. Rotated doo-wop progression in Coldplay, “Viva la Vida.”

Singer/Songwriter

The singer/songwriter schema may be the best known of all the four-chord schemas. A common Roman numeral analysis for this schema is **vi–IV–I–V**, or **Ami–F–C–G** in C major, but the rotation starting with I is also exceedingly common. On top of that, either rotation may be understood as having either the major tonic or the relative minor tonic. This is best understood through **Example 3**.



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Example 3. The singer/songwriter schema in its two common rotations.

Like the 1950s doo-wop, this is a four-chord cyclical progression. It has been around for some time and can be found in a variety of musical styles, but it became increasingly common beginning in the mid-1990s with singer/songwriters such as [Sarah McLachlan](#), [Jewel](#), and [Joan Osborne](#),

Tonal ambiguity

One important feature of this progression is that it does not, on its own, clearly communicate a definitive tonic chord. This property is known as tonal ambiguity. An example is “[Despacito](#)” by [Luis Fonsi and Daddy Yankee](#) (2017). The chord progression, Bmi–G–D–A, can sound like vi–IV–I–V in D major or like i–VI–III–VII in B minor to different listeners (**Example 4**). One reason the singer/songwriter schema is ambiguous is because there is no authentic cadence: the two potential cadential motions are either plagal (IV–I) or stepwise (VII–i). Without a strong harmonic cadence, listeners might only be able to determine the tonic chord—if at all—by the progressions before and after the singer/songwriter schema, which chords in the cycle begin and end it, and the important pitches of the melody.



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Example 4. Both D major and B minor are plausible tonic chords for “[Despacito](#)” because of its use of the tonally ambiguous singer/songwriter schema.

In fact, some songwriters take advantage of this duality in songs that modulate back and forth between relative major and minor keys, as well as in songs with some parallel ambiguity in the text (hence its usefulness for those mid-1990s songwriters). An example is “What About Love” by Heart (1982), which has an obvious D minor intro, a D minor/F major verse (begins at 0:23) using the singer/songwriter progression, and a chorus obviously in F major (begins at 1:10)—listen while following along with the chart below (**Example 5**).



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timestamp	section	progression (chord symbols)	progression (Roman numerals)	implied key
0:00	intro	Dmi–C–B♭–C over D pedal	i–VII–VI–VII over tonic pedal	D minor
0:23	verse	Dmi–B♭–F–C	vi–IV–I–V or i–VI–III–VII	ambiguous between D minor and F major
1:10	chorus	F/A–B♭–C	I6–IV–V	F major
1:33	interlude	Dmi–C–B♭–C over D pedal	i–VII–VI–VII over tonic pedal	D minor
1:44	verse	Dmi–B♭–F–C	vi–IV–I–V or i–VI–III–VII	ambiguous between D minor and F major
2:08	chorus	F/A–B♭–C	I6–IV–V	F major
2:29	bridge (guitar solo)	B♭–C	IV–V	F major
2:53	chorus	F/A–B♭–C	I6–IV–V	F major
3:11	coda	B♭–C–D over D pedal	♭VI–♭VII–I over tonic pedal	D major

Example 5. “What about Love” by Heart exploits the singer/songwriter schema’s tonal ambiguity to link between a minor-mode intro and a major-mode chorus.

Rotations

As discussed above, this schema has two equally common rotations that start the progression on I and vi. From time to time, the singer/songwriter progression might also begin on the IV chord, resulting in a “deceptive” variant of this progression that ends with V–vi—a deceptive cadence (**IV–I–V–vi**). The chorus (starts at 1:11) of [“Alejandro” by Lady Gaga](#) (2009) uses this rotation of the singer/songwriter schema.

Hopscotch

In recent years (since about 2010), another type of four-chord schema has become increasingly common: **IV–V–vi–I**, or **VI–VII–i–III in minor**. Examples include [“Dancing with a Stranger” by Sam Smith](#) (2019) and [“No Brainer” by DJ Khaled, Justin Bieber, and Quavo](#) (2018). We will refer to this as the hopscotch schema because of its root motion: step, step, skip.

Like the singer/songwriter schema, the hopscotch schema can be tonally ambiguous. In other words, in the progression **F–G–Ami–C**, either Ami or C might sound like tonic (**Example 6**). There is often no definitive cadential motion, especially moving into the C chord.



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Example 6. The hopscotch schema, with annotations showing the “step-step-skip” pattern.

Replacing VII in minor with V

An especially common harmonic substitution that encourages a minor-mode interpretation of the hopscotch schema is to replace the subtonic VII chord with the major V chord, so that VI–VII–i–III becomes VI–V–i–III. One song that does this is [“Nightmare” by Halsey](#) (2019). Although these chords have the same harmonic function, the two chords have quite distinct colors, since the major V chord in minor uses *ti* ($\hat{7}$) while VII uses *te* ($\downarrow \hat{7}$). Some songs, like [“Mixed Personalities” by YNW Melly](#), invert this V chord, which allows the bass motion of the hopscotch schema to stay the same (step-step-skip) even though the root motion has changed (**Example 7**).



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Example 7. The hopscotch schema with V replacing VII, meaning the G of the VII is replaced with the G $\sharp$ of the V chord.

Recognizing by Ear

All of these four-chord schemas sound similar to one another, since they all use I, IV, V, and vi. All the schemas can be rotated, so it's not simply a matter of seeing where the progression begins and ends! Instead, try listening to *how the major tonic is approached* (**Example 8**).



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Example 8. Each schema approaches the major tonic from a different chord.

- In the doo-wop schema, the tonic is approached with very traditional authentic motion, as in classical music.
- In the singer/songwriter schema, the major tonic is approached with plagal motion.
- In the hopscotch schema, the major tonic is approached by a skip (not related to any traditional cadence).

Even if you think the real tonic is the minor tonic, listening to the approach to the major tonic will help distinguish among these four-chord schema options. Listening to the approach to the minor tonic may not be helpful, since both the singer/songwriter and the hopscotch schemas approach the minor tonic by step.

Further reading

- Axis of Awesome. 2011. *4 Chords*. YouTube. <https://www.youtube.com/channel/UCb4jjgJb5rtQqQN5GcypFow>.
- Doll, Christopher. 2017. *Hearing Harmony: Toward a Tonal Theory for the Rock Era*. Ann Arbor: University of Michigan Press.
- Richards, Mark. 2017. “Tonal Ambiguity in Popular Music’s Axis Progressions.” *Music Theory Online* 23 (3). <http://mtosmt.org/issues/mto.17.23.3/mto.17.23.3.richards.html>.

Assignments

1. Identifying Four-Chord Schemas ([.pdf](#), [.docx](#)). Students must identify which schema is used in a number of songs, each of which clearly presents the schema. [Worksheet playlist](#)
2. Variations on Four-Chord Schemas ([.pdf](#), [.docx](#)). Using songs that put slight variations on the schemas discussed in this chapter, asks students to identify schemas and variations on the schemas.

[Worksheet playlist](#)

CLASSICAL SCHEMAS (IN A POP CONTEXT)

Bryn Hughes and Kris Shaffer

KEY TAKEAWAYS

The schemas discussed in this chapter are all based on those often found in common-practice music.

- The lament schema is a four-chord schema that descends down the minor tetrachord from the tonic to the dominant: *do-te-le-sol* ($\hat{1} - \downarrow \hat{7} - \downarrow \hat{6} - \hat{5}$). Most typically, this is harmonized by $I - \flat VII - \flat VI - V$, however, *te* ($\downarrow \hat{7}$) can be harmonized in numerous ways.
- The circle-of-fifths schema is at least four chords in length, and it consists of chords whose roots descend by perfect fifth. This schema has many possible variations and does not necessarily start on the tonic.

CHAPTER PLAYLIST

Lament

The “lament” progression is so named because in early classical music, this chord progression (almost always in minor) was used as the ground bass for songs of lament. Examples include [“Dido’s Lament” by Henry Purcell](#), from the opera *Dido and Aeneas*, and [J.S. Bach’s “Crucifixus,”](#) from his Mass in B Minor. For more on those classical cases, see the [Ground Bass](#) chapter.

Dire Straits’ “Sultans of Swing” provides a classic example of the lament in a pop/rock setting ([Example 1](#)). The phrase descends through the minor tetrachord *do-te-le-sol* ($\hat{1} - \downarrow \hat{7} - \downarrow \hat{6} - \hat{5}$) and is harmonized with diatonic triads: $I - \flat VII - \flat VI - V$. The middle two chords are syncopated and given less

duration in order to make room for the seventh to be added to the dominant chord at the end of the phrase, which provides a turnaround to repeat the chord progression.



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Example 1. *Dire Straits, Sultans of Swing* (1978)

Example 2 shows the opening of the verse in Muse's "Thoughts of a Dying Atheist." Importantly, note that *te* ($\downarrow \hat{7}$) is harmonized by a B $\flat$ major chord in second inversion. One may interpret this as a III chord in second inversion or, as is shown in the transcription, a VII chord embellished with two upper neighbor notes.



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Example 2. *Muse, "Thoughts of a Dying Atheist"* (2004)

Circle-of-Fifths

In this schema, each chord's root moves down by fifth to the next root. This progression often happens in minor, beginning on *i* and ending on the relative major. Like the "singer/songwriter" progression, there is some key ambiguity in this progression, as the starting chord is easily considered tonic, but the motion from VII to III can easily be heard as V–I in the relative major key. And indeed, it can be used to move from the relative minor to the relative major.

The chorus of Aqua's "Barbie Girl" provides a somewhat tonally ambiguous example of the circle-of-fifths schema (see **Example 3**).





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Example 3. *Aqua, “Barbie Girl” (1997).*

The verse of Muse’s “Thoughts of a Dying Atheist” also includes a four-chord circle-of-fifths schema, immediately following the lament discussed above. This progression immediately repeats, returning to the initial minor key. However, the second time through, this lament–circle-of-fifths pattern leads to a chorus in the relative major (taking the III chord as the new tonic).

Longer examples of the circle-of-fifths schema can be found in pop/rock music, too.

Radiohead’s “You and Whose Army?” (**Example 5**) presents a slightly more complex instance of a circle-of-fifths schema. Here we get a chromatic sequence of the schema, in which each pair of fifth-related chords functions locally as an applied ii–V progression of the following chord, much like the [applied ii–V progressions found in jazz](#). Like “Barbie Girl,” “You and Whose Army?” is tonally ambiguous. The circle-of-fifths schema propels the music forward, without ever strongly confirming the tonic. Both E major and C♯ minor are viable interpretations, and thus have both been provided in the analysis below.



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Example 5. *Radiohead, “You and Whose Army?” (2004).*

Assignments

1. Worksheet on classical schemas ([.pdf](#), [.docx](#)). Asks students to identify the chord progressions of various songs that use classical schemas.

Worksheet playlist

PUFF SCHEMAS

Megan Lavengood and Bryn Hughes

KEY TAKEAWAYS

- Puff schemas are based on a I–iii–IV progression.
- Common variations:
 - I–III♯–IV
 - i–III–iv

CHAPTER PLAYLIST

While many of the schemas discussed in other chapters are commonly used as repeating chord loops, others are more often used as a building block within a goal-oriented phrase. Puff schemas, which use the mediant triad (iii), are one such schema. The name comes from its use at the outset of phrases in the song “Puff, the Magic Dragon” by Peter, Paul and Mary (1963).

Lead sheet	A	C♯mi	D	A
Lyrics	Puff, the magic	dragon,	lived by the	sea.
Roman numerals	I	iii	IV	I

Example 1. The puff schema begins most of the phrases in “Puff, the Magic Dragon.”

The puff schema is typically found in the opening of phrases, as it is here (**Example 1**). Again, the puff schema is not typically looped, so the chords that come after the IV chord can vary. In “Puff,” the fourth chord is I. But in “Let’s Get It On” by Marvin Gaye, the IV chord progresses to V (**Example 2**). “House of the Rising Sun” by the Animals (1964) is an example of the puff schema in a minor-key song

(**Example 3**); here, a major IV progresses to VI, demonstrating how the puff schema can involve varied chord quality.

Lead sheet	E♭ Gmi7	A♭ A♭/B♭
Lyrics	I've been really	tryin, baby
Roman numerals	I iii ⁷	IV V ¹¹

Example 2. The phrases in “Let’s Get It On” begin with a puff schema before finishing with a V–I motion.

Lead sheet	Ami	C	D	F	Ami	C	E
Lyrics	There is	a house	in New Orleans	they call	the Rising	Sun	
Roman numerals	i	III	IV	VI	i	III	V

Example 3. “House of the Rising Sun” uses the puff schema in minor. The IV chord is also major instead of the typical minor.

I–III♯–IV

One particularly common chromatic variant of the puff schema raises the third of the iii chord to make it a major III♯ chord: I–III♯–IV. This progression is prominently featured in Radiohead’s debut single, “Creep” (1993). It combines the puff schema with a [plagal schema with mode mixture](#) (**Example 4**).

Lead sheet		G	B	C	Cmi
Lyrics	When you were here before	couldn’t look you in the	eye. You’re just like an	angel, your skin makes me	cry.
Roman numerals		I	III♯	IV	iv

Example 4. “Creep” by Radiohead uses the puff schema with a major III♯ chord. (Each column = two measures.)

The raised third in the major III♯ chord creates a nice chromatic line, *sol–si–la* ($\hat{5} - \hat{\sharp 5} - \hat{6}$), as shown in **Example 5**.

—



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Example 5. Chromatic line in I–III $\sharp$ –IV.

III $\sharp$ –IV as Deceptive Motion

In many cases, a III $\sharp$ chord should be interpreted as an applied chord: a V/vi. The III $\sharp$ chord, acting as V/vi, does sound good when followed by vi. A progression like C–E–Ami–F can be understood as a variation on the singer/songwriter schema, in which a V/vi replaces the V chord.

Especially in a song that uses a progression like C–E–Ami–F, moving from E straight to F in another progression could be understood as deceptively resolving the III $\sharp$ chord:

- E–Ami is a V–i progression in the key of A minor.
- Ami is vi in the key of C major, so in C major, we can analyze E–Ami as V/vi–vi.
- E–F is a V–VI progression in the key of A minor, a deceptive resolution of the V chord.
- In C major, E–F may still sound like a deceptive resolution of the V/vi chord.

The play between deceptive and authentic resolutions of III $\sharp$ as a V/vi chord is a remarkable feature of the progressions used in “Weekend Wars” by MGMT (2007). Setting up the puff schema with an authentic V/vi–vi progression prepares the listener to experience the puff progression as a deceptive resolution (**Example 6**).

	authentic resolution	puff schema: deceptive resolution
Lead sheet	A/C $\sharp$ Dmi C/E F	A B $\flat$
Lyrics	... Instant battle plans	written on the sidewalk
Roman numerals	V ⁶ /vi vi V ⁶ I	V/vi vi/vi (or III $\sharp$ IV)

Example 6. “Weekend Wars” by MGMT.

Further Reading

- Doll, Christopher. 2017. *Hearing Harmony: Toward a Tonal Theory for the Rock Era*. Ann Arbor: University of Michigan Press.

Assignments

1. Puff schemas ([.pdf](#), [.docx](#)). Asks students to identify the chord progressions of various songs that use the puff schema. [Worksheet playlist](#)

MODAL SCHEMAS

Megan Lavengood

KEY TAKEAWAYS

- Many pop songs use harmonic progressions that imply modes other than major/minor.
- A modal schema may be used without the entire song being strictly within that mode.
- Modes may be compared to major and natural minor to understand what characterizes their sound (their color notes)
- Mixolydian schemas:
 - **Double plagal** ♭VII–IV–I
 - **Subtonic shuttle** I–♭VII
- Aeolian schemas:
 - **Subtonic shuttle** i–♭VII (same as mixolydian, but with a minor tonic)
 - **Aeolian shuttle** i–♭VII–♭VI–♭VII
 - **Aeolian cadence** ♭VI–♭VII–i (or I)
 - **Lament** i–♭VII–♭VI–v
- Dorian schemas:
 - **Dorian shuttle** i–IV
- Lydian schemas:
 - **Lydian shuttle** I–II♯
 - **Lydian cadence** II♯–IV–I

This book covers modes from many different angles. For more information on modes, check [Introduction to Diatonic Modes \(general\)](#), [Chord-Scale Theory \(jazz\)](#), [Diatonic Modes \(20th/21st-c.\)](#), and [Analyzing with Modes, Scales, and Collections \(20th-/21st-c.\)](#).

CHAPTER PLAYLIST

“Mode” is a really complicated term. The article on mode in *Grove Music Online* (Powers et al. 2001), which is the standard academic encyclopedia for musicology, is 238 pages long and has nine authors. This means that, even if you think you already know about modes, you may want to set that knowledge aside before learning how modes are used in pop music.

This chapter discusses modes as they appear in certain schematic chord progressions in pop and rock music. Most of this information is based on the work of Nicole Biamonte (2010) and Philip Tagg (2011). After showing the function of modal harmonies as they compare to diatonic harmonies, common modal schemas will be introduced, grouped by the mode they borrow from.

Grouping modes by whether the tonic is major or minor helps with aural identification of modal passages. This grouping is represented in **Example 1**. The top line shows modes whose $\hat{3}$ is a major third above tonic (*mi*): major, mixolydian, and lydian. The bottom line shows modes whose $\hat{3}$ is a minor third above tonic (*me*): aeolian, dorian, and phrygian. **Example 1** also illustrates what differentiates certain modes from major or minor. Each mode has exactly one pitch shown in a lighter color; this pitch is inflected when compared to major/minor. These special pitches are referred to as the color note of each mode.¹ These relationships are shown with the dotted slurs.



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Example 1. Modes grouped by major vs. minor tonic, with dotted slurs connecting the distinctive color pitch of each mode with its major/minor counterpart.

Function of Modal Harmonies

You may already have learned about tonic, subdominant, and dominant function in diatonic harmony. Modal harmonies basically align in function with their diatonic counterparts, although the additional modal inflections create greater overlap between these functions. This is summarized in **Example 2**.

1. Vincent Persichetti (1961) referred to these pitches as "characteristic notes."

Tonic function

Diatonic harmony

C: I iii vi

Modal harmony

C: I i iii bIII vi bVI

Subdominant function

Diatonic harmony

C: IV ii vi vii°

Modal harmony

C: IV iv ii ii° bII II# vi bVI bVII bvii

Dominant function

Diatonic harmony

C: V vii° iii ii

Modal harmony

C: V v vii° bVII bvii iii bIII II# bII

Example 2. Modal harmony allows many more “flavors” of the same chord to be implemented without changing the function of the chord.

This illustration of harmonic function may help you to understand why certain modal progressions seem as goal-oriented as diatonic progressions.

Mixolydian: bVII

Mixolydian’s color note is *te* ($\downarrow \hat{7}$), as shown in **Example 3**. In major-mode pop songs, the bVII chord is borrowed from the mixolydian mode. bVII typically has dominant function, and you might think of it as a substitute for the traditional major-mode V chord in both the double plagal and mixolydian cadence schemas (**Example 4**).

C major

C mixolydian

Example 3. $\downarrow \hat{7}$ (te) is the color note of the mixolydian mode. Important mixolydian harmonies have that color note in them: v and $bVII$. (iii° is not used.)



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Example 4. The double plagal schema and the mixolydian cadence schema are two especially common mixolydian chord progressions.

Double plagal

The double plagal schema, $bVII-IV-I$, which is discussed further in the [blues-based schemas chapter](#), is also a mixolydian schema, due to the major tonic and the $\downarrow \hat{7}$ (te).

Subtonic shuttle

The most distinctive chord progression in mixolydian is the subtonic shuttle, $bVII-I$, or $Bb-C$ in C major (**Example 4** above). The subtonic shuttle is used continuously throughout the intro and first verse of “Tired of Waiting for You” by the Kinks (1965), where the instrumental parts shuttle between I and $bVII$ throughout, while the melody emphasizes $\downarrow \hat{7}$ (te) as an embellishment and melodic goal (**Example 5**).

Example 5. “Tired of Waiting for You” by the Kinks uses the subtonic shuttle in its intro and verses. Transcription begins at 0:07.

Aeolian: $\flat$ VII and $\flat$ VI

You may think of aeolian as equivalent to the [natural minor scale](#). As a key or collection, though, aeolian and minor are different, because aeolian (as used in pop music) will prominently feature *le* and *te* ($\downarrow \hat{6}$, $\downarrow \hat{7}$). These color note scale degrees give us the $\flat$ VI and $\flat$ VII chords, which are the signature chords of the aeolian mode. (Note the use of flat signs in label of $\flat$ VI and $\flat$ VII, even though they are diatonic in minor/aeolian—this is to prevent confusion with vii^0 .) Aeolian schemas use one or both of these harmonies (**Example 6**). The $\flat$ VI chord has subdominant function, and the $\flat$ VII chord has dominant function.



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Example 6. The subtonic shuttle, aeolian shuttle, aeolian cadence, and lament schemas are four common aeolian chord progressions.

Subtonic shuttle

The subtonic shuttle was introduced as a [mixolydian](#) progression, but the same progression can be used in aeolian. The difference is only in the quality of the tonic chord. If it's major, then the subtonic shuttle implies mixolydian; if it's minor, then the subtonic shuttle implies aeolian. In other words, $\flat$ VII–i, or $\text{B}\flat$ –Cmi in C minor, is the minor version of the subtonic shuttle. This subtonic shuttle is used in the intro and verses of “[Somebody That I Used to Know](#)” by Gotye (2011, **Example 7**).

The image displays two musical staves for the song "Somebody That I Used to Know" by Gotye. The top staff is labeled "Intro (0:04)" and shows a progression of chords: D $\flat$ mi, C, D $\flat$ mi, C, D $\flat$ mi, C, D $\flat$ mi, C. The bottom staff is labeled "Chorus (1:32)" and shows a progression of chords: D $\flat$ mi, C, B $\flat$, C, D $\flat$ mi, C, B $\flat$, C, D $\flat$ mi. The subtonic shuttle is indicated in the intro, and the aeolian shuttle is indicated in the chorus.

Example 7. “Somebody That I Used to Know” by Gotye features the subtonic shuttle in its intro/verses and the aeolian shuttle in its choruses. The Intro transcription begins at 0:04, and the Chorus transcription begins at 1:32.

Aeolian shuttle

Another common shuttle in aeolian is $\text{i}-\flat\text{VII}-\flat\text{VI}-\flat\text{VII}$. This progression can be understood as a shuttle between i and $\flat$ VI, with a passing $\flat$ VII chord along the way. This progression is featured clearly in the chorus of “[Somebody That I Used to Know](#)” by Gotye (2011, **Example 7**).

Aeolian cadence

In the aeolian shuttle schema, the consistent shuttling back and forth between I and $\flat$ VI makes it difficult for a true cadence to be implied—a cadence means that a goal has been reached, but a circular progression like the aeolian shuttle doesn't seem to have a goal. The aeolian cadence $\flat$ VI– $\flat$ VII–i, or $A\flat$ – $B\flat$ – Cmi , is similar to the aeolian shuttle, but it's goal-oriented: it cadences on the tonic chord, and it does not tend to be used as a loop. The aeolian cadence very frequently uses a picardy third, which means all the chords are major: $\flat$ VI– $\flat$ VII–I, or $A\flat$ – $B\flat$ – C .

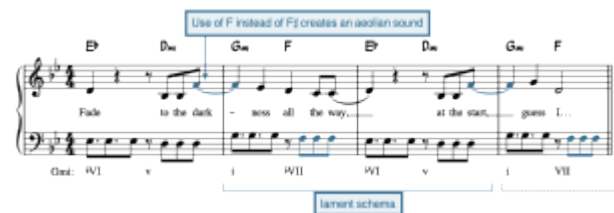


Example 8. *The Fellowship Theme from the Lord of the Rings soundtrack by Howard Shore concludes its phrases with an aeolian cadence. Transcription begins at 0:27.*

The aeolian cadence has a lot of cultural associations for many people and is typically associated with success and heroism. This cadence concludes the phrases of the [Fellowship Theme from Lord of the Rings](#) (**Example 8**, begins at 0:27). The aeolian cadence has also been called the [Mario cadence](#), since the well-known fanfare at the end of each level of Super Mario Bros. uses this progression; the progression is often heard as a fanfare in other video games, such as [Final Fantasy](#). In all of these examples, the cadence concludes with a picardy third.

Lament

The lament schema has many variations, as discussed [in the chapter addressing that schema](#). One particular flavor, i– $\flat$ VII– $\flat$ VI–v, strongly implies the aeolian mode due to the absence of a leading tone, which would imply a minor tonality, in favor of *te* ($\downarrow \hat{7}$), a color note of aeolian. This variation of the lament schema is heard in [“I Don’t Like You” by Eva Simons](#) (2012, **Example 9**).



Example 9. *“I Don’t Like You” by Eva Simons uses a lament schema with $\flat$ VII and minor v.*

Dorian: IV with a Minor Tonic

Dorian is a mode that sounds like minor, but with *la* instead of *le* ($\hat{6}$ instead of $\downarrow \hat{6}$), which produces altered harmonies including a major IV chord (compared to the minor iv in minor), shown in **Example 10**. Using a major IV chord in songs with a minor tonic is the primary marker of a dorian song, which would otherwise sound like it was minor/aeolian. The major IV chord in dorian usually has a subdominant function.

natural minor

dorian

Example 10. Dorian is distinguished from the natural minor scale by its $\uparrow \hat{6}$ (*la*), which alters the quality of the IV and ii chords. (*vi°* is not used.)

The dorian mode is especially associated with funk, disco, and its derivative genres, where the dorian shuttle is especially pervasive. One example of many is “Dance, Dance, Dance” by CHIC (1979). Some people who haven’t listened to much music from these genres have trouble aurally recognizing the dorian shuttle and hear it instead as ii–V. Listening to a lot of funk and disco should help you learn to hear that “ii chord” as a i chord, even in more ambiguously dorian songs like Daft Punk’s “Get Lucky” (2013, **Example 11**).

Example 11. “Get Lucky” is in B dorian and features a characteristic IV–i motion every four bars (shown here by the arrows) to emphasize Bmi as tonic.

Dorian shuttle

The dorian shuttle alternates between a major IV chord and a minor i chord (**Example 12**). The overall effect of this progression is one of tonic prolongation. The upper notes of the IV harmony often form a neighboring motion that emphasizes *la* ($\uparrow \hat{6}$). A common variation on the dorian shuttle is expanded to $i\text{--}IV\text{--}i^7\text{--}IV$. This further expands the neighboring effect in the upper voices.



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Example 12. The dorian shuttle uses minor i and major IV. It can be expanded to arch up to i^7 .

Lydian: II♯

Fi ($\uparrow \hat{4}$) is the color note of the lydian mode, which results in a major II chord instead of the minor ii found in major (**Example 13**). This text refers to this chord as II♯ for clarity, with the sharp sign representing the raised third of the chord.

Example 13. Lydian is like major with $\uparrow \hat{4}$ (fi). This results in a major II chord. (iv° and vii are not used.)

If II♯ goes to V, as it typically does in classical music, the chord should be understood as as a secondary dominant V/V instead. But in pop tunes, II♯ often leads elsewhere, necessitating the II♯ label.



Example 13: Lydian is like major with a raised scale-degree 4. This results in a major II chord. (iv° and vii are not used.)

Very few pop songs are truly in the lydian mode all the way through the song, but many major-mode pop songs use a major II♯ chord in place of the typical minor ii, giving a brief lydian flavor while remaining overall in the major mode.

II♯ can have either subdominant or dominant function, and each is used in the following two schemas (**Example 14**).



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Example 14. The II♯ chord is the characteristic chord of lydian and is used in both of these schemas.

Lydian shuttle

The most basic lydian chord progression is a simple shuttle between II♯ and I. Identifying this chord progression correctly can be tricky: because few pop songs are truly in lydian throughout, this II♯ chord is often neutralized later in the chord progression with a IV chord or a ii chord, which means the song is overall in major, but with a brief II♯ chord. This progression can be heard with some alterations in the opening of “Sara” by Fleetwood Mac (1979). “Sara” expands the lydian shuttle to include a Ima⁷ chord to harmonize an arching melody, and it also uses a tonic pedal underneath the II♯ chord. Later on in the song, the II♯ is neutralized by the use of a doo-wop schema. [This is illustrated by Mark Spicer.](#)

If the $\text{II}\sharp$ chord is never neutralized, it's possible that the chord progression isn't really $\text{I}-\text{II}\sharp$, but another shuttle that relates roots by step. For example, [Taylor Swift's "Starlight"](#) (2012) has verses that alternate between A and B major chords (begins at 0:26), but they are $\text{IV}-\text{V}$ in E major, *not* a lydian shuttle. This becomes clear in the chorus (0:56), which is harmonized with a rotation of the doo-wop schema. The subtonic shuttle discussed earlier in this chapter is another chord progression that relates two major chords by step. Remember that lydian is rare in pop music, and be careful when identifying this progression!

In this progression, $\text{II}\sharp$ functions as a dominant chord, leading back into the tonic with the half step between *fi* ($\uparrow \hat{4} - \hat{5}$).

Lydian cadence

The most popular progression using $\text{II}\sharp$ is the lydian cadence $\text{II}\sharp-\text{IV}-\text{I}$, or $\text{D}-\text{F}-\text{C}$ in C major. Notice that the lydian *fi* ($\uparrow \hat{4}$) is immediately neutralized by the regular IV chord, replacing it with *fa* ($\hat{4}$). This schema also features smooth chromatic voice leading, which may partially explain the appeal of this progression.

The clearest example of this schema may be [Cee Lo Green's "Forget You"](#) (2010, [Example 15](#)).²

Background vocals (written up one octave for clarity) clearly outline the characteristic chromaticism of the lydian cadence.

Example 15: "Forget You" loops a lydian cadence throughout the song. The background vocals always have the characteristic chromatic line.

Identifying Modes by Ear

If you are not used to playing in and listening to modes, it can be daunting to identify and distinguish modes by ear. Here is a step-by-step process for aurally distinguishing all the modes discussed here, illustrated as a flowchart in [Example 16](#).

2. "Forget You" is the classroom-friendly version of the more explicit original.

1. Identify the quality of tonic.



EXAMPLE

16. Flowchart illustrating the process of identifying modes by ear.

Listen for the tonic pitch. Then, listen for the whole tonic chord. Is the third of that chord major or minor? This distinguishes the major-ish modes (major, mixolydian, lydian) from the minor-ish modes (minor, aeolian, dorian).

2. Listen for $\hat{7}$ (*ti* or *te*).

Compare the $\hat{7}$ to the leading tone (*ti*) a half step below tonic that we typically hear in minor and major songs. If $\hat{7}$ is a *whole step* below tonic (*te*), then it's lowered, which means that the song is (at least temporarily) in a mode.

If you heard a major tonic and $\hat{7}$ is lowered (*te*), then you are in **mixolydian**.

If you heard a minor tonic and $\hat{7}$ is raised (*ti*), then you are in **minor**.

If your mode is not already identified, proceed to step 3.

3. Listen for other raised color notes—*fi* ($\uparrow \hat{4}$) in major, and *la* ($\uparrow \hat{6}$) in minor.

If $\hat{7}$ did not identify the mode for you, listen for other raised color notes.

If $\hat{4}$ is raised (*fi*) in a major-tonic mode, you are in **lydian**. If it is not, you are in **major**.

If $\hat{6}$ is raised (*la*) in a minor-tonic mode, you are in **dorian**. If not, you are in **aeolian**.

Further reading

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Assignments

1. Identifying Modal Schemas ([.docx](#), [.pdf](#)). Asks students to aurally identify various modal schemas.

Worksheet playlist
2. Modal reharmonization composition exercise ([.mscz](#), [.pdf](#)). Asks students to reharmonize [Rihanna’s “Desperado”](#) (2016) with modal schemas.

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Footnotes

PENTATONIC HARMONY

Bryn Hughes

Rock music, and popular music more generally, owes a great debt to the blues tradition. One of the most pervasive pitch collections in pop and rock music is the pentatonic collection, a five-note collection also firmly rooted in the blues. The pentatonic scale is related to the blues scale and the diatonic scale (it is a subset of both), but it contains no semitones. In popular music, the pentatonic scale is typically found in one of two rotations: the major pentatonic and the minor pentatonic scale (**Example 1**).



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Example 1. Pentatonic scales.

Though the two listed above are the most common, you can build five different versions of the pentatonic scale by simply rotating the notes in the scale.

In rock music, a harmonic system based on the pentatonic scale is typically created by using the scale as chord roots of major triads or power chords (chords with a root and fifth but no third). This leads to collections of chords that don't belong to any mode or scale (**Example 2**). Note that in both of the collections of chords in the example below, there is a scale degree "conflict." The first collection includes both *te* and *ti* ($\downarrow \hat{7}, \hat{7}$); the second collection includes both *le* and *la* ($\downarrow \hat{6}, \hat{6}$).



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Example 2. *Pentatonic harmony derived from two different rotations of the pentatonic scale.*

Though many of the chord progressions drawn from the pentatonic chord families listed above could be accounted for by other schemas, it is helpful to relate them back to the pentatonic scale in this way, due to the scale's inextricable link to the guitar itself, and especially to guitar solos that are performed in combination with these chord progressions.

Example 3 shows an excerpt from “[Higher Ground](#)” by Stevie Wonder (1973), in which the pervasive harmonic loop can be understood as derived from the pentatonic scale.



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Example 3. *Stevie Wonder, “Higher Ground” (1973).*

Assignments

1. Coming soon!

FRAGILE, ABSENT, AND EMERGENT TONICS

Megan Lavengood

KEY TAKEAWAYS

- Most songs have a clear tonic.
- Tonal ambiguity arises when there is not enough information to confidently assign a tonic chord.
- Tonal ambiguity occurs in pop songs in one of three ways:
 - Fragile tonic: the tonic chord is used in the song but is weakened through inversion or another similar technique.
 - Emergent tonic: the tonic chord is withheld until a triumphant moment, such as the chorus.
 - Absent tonic: the tonic chord is implied through melodic and harmonic conventions, yet never explicitly stated.

CHAPTER PLAYLIST

Although many pop songs are harmonically simple, using only a handful of chords in root position, this simplicity can sometimes lead to tonal ambiguity. One way that tonal ambiguity is created is through de-emphasizing the tonic chord. According to pop theorist Mark Spicer (2017), whose work is the basis of this chapter, much tonal ambiguity in pop music occurs through one of three techniques: fragile, absent, and emergent tonics.

Fragile tonic

The fragile tonic technique is one in which the tonic chord is used in the song, but is weakened through inversion or another similar technique. Fragile tonics can be found in music by artists who seem to have composed at the piano, as in [Sufjan Stevens’s “Oh God Where Are You Now”](#) (2003). The tonic chord, G $\flat$, is most often in first inversion; it only appears in root position as an incomplete passing chord in the midst of a contrapuntal series of parallel tenths in the C phrase (**Example 1**). Otherwise, first-inversion E $\flat$ minor chords are found where tonic chords may otherwise be expected.



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Example 1. *“Oh God Where Are You Now? (In Pickerel Lake? Pigeon? Marquette? Mackinaw?)” by Sufjan Stevens uses a fragile tonic.*

Fragile tonics usually connect to a theme in the lyrics of loneliness, vulnerability, and sensitivity. The Sufjan Stevens song in **Example 1** follows this principle: the narrator in the lyrics seems to be desperate for comfort from God, and thus in a vulnerable state. Another example of a song that uses a fragile tonic to emphasize vulnerability is [Elton John, “Somebody Saved My Life Tonight”](#) (1975) (see Spicer 2017).

Emergent Tonics

Songs with emergent tonics withhold the tonic chord until a triumphant moment, such as the chorus. The song will begin by using other chords, especially the relative major/minor, some of which may sound like tonic at first; but later in the song, the true tonic is revealed to be another chord that either did not sound like tonic initially or was not present at all.

Emergent tonics often accompany lyrical themes of triumph and overcoming, and this is just what happens in “Let It Go” from the movie *Frozen*. Listen to the song while following the form chart below (**Example 2**), which explains how the tonic emerges. The emergent tonic here emphasizes the theme of Elsa overcoming her self-doubt and owning her identity.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=850#oembed-1>

timestamp	section	chord progression	notes
0:00–0:14	intro		At this point in the song, the tonality sounds like F aeolian (i–VI–VII–iv).
0:15–0:42	verse	Fmi–D♭–E♭–B♭(mi)	The B♭ chord alternates between minor and major in subsequent repetitions of this progression, and the third time this happens, it's used to lead into the next section. Now the tonality has shifted: E♭ sounds like tonic, which implies a key of E♭ mixolydian (I–♭VII). The B♭ chord that closed the previous verse, in retrospect, sounds like it was a V in E♭ mixolydian.
0:43–0:58	prechorus	E♭–D♭	But this progression also gets turned around! The closing D♭ chord is prolonged at the end of the prechorus to lead into the next section. A♭ major is triumphantly revealed as the emergent tonic. This means, in retrospect, that the ending D♭ of the prechorus was really a IV chord, leading into the singer/songwriter progression of the chorus (I–V–vi–IV).
0:59–1:26	chorus	A♭–E♭–Fmi–D♭	(The end of the chorus also features a little chromatic diversion—after the last repetition of the singer/songwriter schema, the next chord is A♭/C followed by C♭ major, before resolving back up to the D♭).
1:27–1:31	interlude	A♭–E♭/G	A brief instrumental connects to the verse with a I–V progression...
1:32–1:44	verse	Fmi–D♭–E♭–B♭mi	Although this verse has the same progression as the first verse, because we've now heard the emergent tonic, the chords now sound more like vi–IV–V–ii instead. Similarly, the prechorus now sounds like a V–IV progression, building up energy toward the cadence by withholding the tonic (a classic prechorus function).
1:45–1:59	prechorus	E♭–D♭	The major tonality from the chorus still governs the song, even when the A♭ chord is missing.
2:00–2:25	chorus	A♭–E♭–Fmi–D♭	
2:26–3:01	bridge	D♭——— E♭——— Fmi–D♭–E♭–B♭mi D♭	The bridge lets D♭, E♭, and Fmi sound like tonic for a brief moment, but they are ultimately subsumed within the A♭ major tonality in the following chorus repeats.
3:02–end	chorus	A♭–E♭–Fmi–D♭	(Notice how "I'm never going back" accompanies the verse progression heard at the outset of the song—"going back" to the opening progression!)

Example 2. Form chart of “Let It Go.”

You could also understand this song as using a different key for each section—F aeolian for the verses, E $\flat$ mixolydian for the prechoruses, and A $\flat$ major for the choruses. This is certainly what seems to be going on when first listening to the intro and prechorus.

While that is a perfectly acceptable analysis, notice how analyzing this song as belonging entirely to A $\flat$ major allows for a nice narrative parallel between the chord progression and the lyrics: In the first verse, Elsa (the singer) begins the song describing a bleak, cold night, accompanied in the harmony by chords that emphasize the vi chord instead of tonic. In the prechorus, as Elsa wrestles with a choice between pleasing society (“be the good girl”) or letting it go, she is accompanied by repeating IV and V chords increasingly demanding a resolution. Right when Elsa makes up her mind—she decides to “let it go”—A $\flat$ major, the tonic, finally brings resolution to the oscillation between IV and V in the prechorus, underscoring Elsa’s inner transformation.

Another example of an emergent tonic is “[Little Red Corvette](#)” by Prince (1982), which seems to be in B $\flat$ minor until D $\flat$ emerges as the true tonic chord in the chorus (see Spicer 2017).

Absent Tonics

The most extreme manipulation of our sense of tonic occurs when a song has an absent tonic. An absent tonic never actually materializes as a heard harmony in the song, but instead is established only melodically and by using familiar harmonic progressions that do not involve the tonic.

“Last Friday Night” by Katy Perry (2012) is an example of a song with an absent tonic. The progression is very conventional—**IV–ii–vi–V**—but I never sounds. The melody, as can be seen in [Example 3](#), strongly outlines F $\sharp$ major in the chorus, with repeated descending $\hat{3}-\hat{2}-\hat{1}$ (*mi-re-do*) lines. This melody, combined with the familiarity of the chord progression, allows F $\sharp$ to sound like tonic even when it never occurs in the accompaniment.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=850>

Example 3. The chorus of “[Last Friday Night](#)” by Katy Perry.

As with fragile and emergent tonics, absent tonics can also be interpreted as representations of lyrical themes. In the case of “Last Friday Night,” the absent tonic may depict the disconnect between constant partying and a need to function in the real world.

Further reading

- Spicer, Mark. 2017. “Fragile, Emergent, and Absent Tonics in Pop and Rock Songs.” *Music Theory Online* 23 (2). <http://mtosmt.org/issues/mto.17.23.2/mto.17.23.2.spicer.html>

Assignments

1. Reharmonizing to avoid tonic (.pdf, .mscz). Asks students to reharmonize a song that uses the [singer/songwriter schema](#) to instead use fragile, absent, or emergent tonic techniques.

VIII. 20TH- AND 21ST-CENTURY TECHNIQUES

This section introduces some common methodologies for the analysis of 20th- and 21st-century music, including set theory.

Prerequisites

This section assumes a familiarity with the topics covered in [Fundamentals](#).

Organization

The first five chapters introduce students to the building blocks of set theory: integer notation, [pitches vs. pitch classes](#), [intervals and interval classes](#), [sets](#) and [set classes](#), [operations](#), and [interval class vectors](#).

The chapter [Analyzing with Set Theory \(or not!\)](#) is an important conclusion to these earlier chapters: it discusses the philosophy of segmentation and also turns a critical eye to set theory as a methodology. What makes us group notes together and call them sets? What are we ignoring when we use set theory?

20TH- AND 21ST-CENTURY TECHNIQUES CHAPTERS

- Pitch and Pitch Class
- Intervals in Integer Notation
- Pitch Class Sets, Normal Order, and Transformations
- Set Class and Prime Form
- Interval Class Vectors
- Analyzing with Set Theory (or not!)
- Diatonic Modes
- Collections
- Analyzing with Modes, Scales, and Collections

The final three chapters discuss collections, including modes, the octatonic collection, and others.

Students are also taught here how tonic pitches can be heard within a composition using these collections.

PITCH AND PITCH CLASS

Megan Lavengood

KEY TAKEAWAYS

- Set theory often relies on the distinction between pitch versus pitch class.
- Pitch classes are best represented with integer notation, where $C=0$.

Pitch

Pitches are discrete tones with individual frequencies.

The concept of pitch, then, does not imply octave equivalence. C_4 is a pitch, and it is not the same pitch as C_3 .

Pitch Class

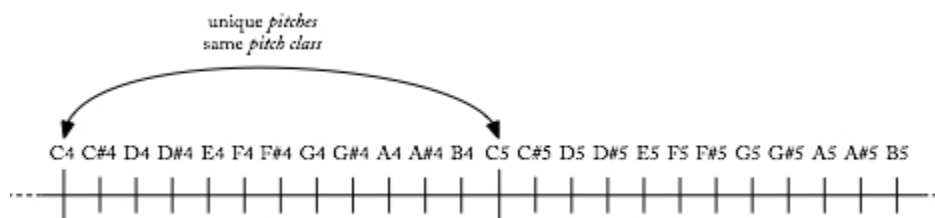
Throughout set theory, the word “class” means “group.” So a pitch class is a group of pitches—all pitches related by octave equivalence and enharmonic equivalence. You have probably encountered both of these concepts before, even if not by name.

Our system of letter names for notes implies octave equivalence: equivalence between pitches that are spelled the same but are any number of octaves apart. C_4 is the same as C_3 is the same as C_9 , and so on, because they are all Cs ([Example 1](#)).

When someone says “there are twelve notes,” they are implying enharmonic equivalence. Two notes are enharmonically equivalent if you would press the same key on the piano to play them—even if the

spelling is different. Enharmonic equivalence is the sense in which $A\flat$ and $G\sharp$ are “the same.” While tonal music nearly always distinguishes between enharmonic pitches— $A\flat$ as *le* ($\downarrow \hat{6}$) leads to G, but $G\sharp$ as *si* ($\uparrow \hat{5}$) leads to A—post-tonal music is often different.¹ Because many composers no longer felt constrained by a tonal center, the relationships among scale degrees and spellings aren’t important.

In summary, pitch classes are groups of pitches related by octave and enharmonic equivalence. $A\flat_4$, $A\flat_3$, $G\sharp_2$, etc. are all members of the same pitch class.



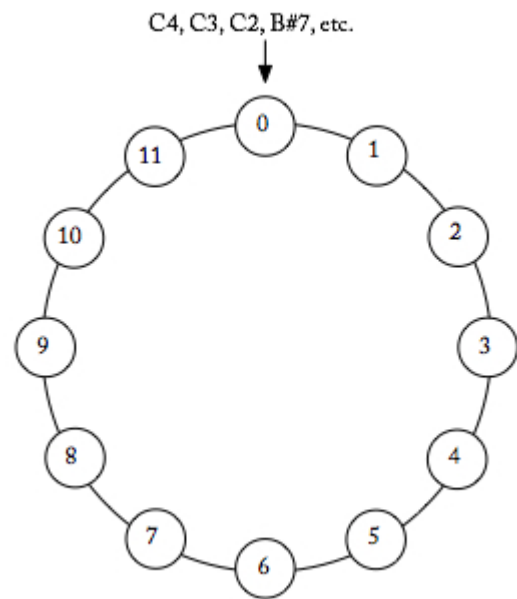
Example 1. *Pitch versus pitch class.*

1. Post-tonal music is extremely various. Composers have individual compositional styles, aesthetic goals, and unique conceptions of pitch. All this is to say that you must approach a composition with flexibility. For example: because it is quasi-tonal, Debussy’s music often benefits from a view that does not assume enharmonic equivalence. But sometimes it does. You must rely on your musical intuitions when analyzing this music, and you should also be willing to approach pitch in these compositions from multiple perspectives until you find one that seems most appropriate.

Integer Notation

If notes are enharmonically equivalent, then the system of seven letter names does not work well to describe the twelve pitch classes. Instead, in set theory, we use integer notation, which assigns a number between 0 and 11 to each pitch class (**Example 2**). All Cs, and any notes that are enharmonically equivalent to C (B $\sharp$, for example), are pitch class 0. All C $\sharp$ s, and any notes that are enharmonically equivalent to C $\sharp$ (D $\flat$, for example) are pitch class 1, and so on. To summarize with a few of the most common note names:

0. C (B $\sharp$, etc.)
1. C $\sharp$, D $\flat$
2. D (C $\times$, etc.)
3. D $\sharp$, E $\flat$
4. E (F $\flat$, etc.)
5. F (E $\sharp$, etc.)
6. F $\sharp$, G $\flat$
7. G (F $\times$, etc.)
8. G $\sharp$, A $\flat$
9. A (G $\times$, etc.)
10. A $\sharp$, B $\flat$
11. B (C $\flat$, etc.)



Example 2. The twelve pitch classes represented as a clock face.

PRACTICE

Test your recall of integer names by filling in the blanks.



An interactive H5P element has been excluded from this version of the text. You can view it online



here:

<https://viva.pressbooks.pub/openmusictheory/?p=495#h5p-14>

Further reading

- Straus, Joseph N. 2016. *Introduction to Post-Tonal Theory*. 4th ed. Upper Saddle River, NJ: Prentice Hall.

Resources

- [Blank clock faces \(integer notation\)](#)
- [Blank clock faces \(letter names\)](#)
- [Set Theory Quick Reference Sheet](#): summarizes the definitions of pitch vs. pitch class, intervals vs. interval classes, and sets vs. set classes.

Assignments

1. Pitch and pitch class ([.pdf](#), [.mscz](#)). Asks students to translate between pitch class integers, note names, and staff notation.

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Footnotes

INTERVALS IN INTEGER NOTATION

Brian Moseley and Megan Lavengood

KEY TAKEAWAYS

- When analyzing atonal music, intervals may be better understood as a number of semitones, rather than using tonal interval names.
- There are four types of interval: ordered pitch intervals, unordered pitch intervals, ordered pitch class intervals, and interval classes (unordered pitch class intervals).
- Ordered pitch intervals are as specific as possible: they measure specific pitches (in specific octaves) and represent the directionality of the interval.
- Interval classes are the most abstract type of interval: they represent the smallest possible distance between two pitch classes.

In tonal music, because intervals are dependent upon the pitches that create them, the consonance and dissonance of intervals is determined *by tonality itself*. Imagine the interval created by G and B $\flat$, a minor third. In the context of G minor, this is a consonant interval. Respelled as G and A $\sharp$, perhaps in the context of B minor, it creates a dissonant augmented second. From a tonal perspective, then, the two intervals are different even though they are the same in isolation (**Example 1**).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=509>

Example 1. Even though B $\flat$ and A $\sharp$ are the same key on the keyboard, the intervals of a minor third and an augmented second are distinct in tonal theory.

Contrast this with atonal music. Because atonal music has no tonality, the distinction between B $\flat$ and A $\sharp$ no longer matters. In this context, the intervals G–B $\flat$ and G–A $\sharp$ *are* the same. For this reason, we will not use tonal interval names like “minor third.” Instead, we will measure the intervals by the number of semitones between the pitches or pitch classes.

We can describe intervals according to two types of information: **pitches vs. pitch classes**, and **ordered vs. unordered** intervals. Combined, this makes four types of intervals, summarized in **Example 2**. Each of these interval types is explained below.

	pitch intervals	pitch-class intervals
ordered intervals	ordered pitch intervals	ordered pitch-class intervals
unordered intervals	unordered pitch intervals	unordered pitch-class intervals / interval classes (IC)

Example 2. Four interval types in atonal theory.

Pitch Intervals (ordered and unordered)

Pitch intervals are the distance between pitches as measured in half steps, which is to say that octave is taken into consideration. Thus, the interval C₄–E₄ is 4: four half steps are between these notes. But if that E is moved up an octave (C₄–E₅), the interval becomes 16: four half steps between C and E, plus an octave (twelve half steps) between the lower E and the higher E.

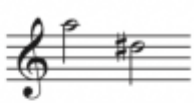
Within pitch intervals, there are ordered and unordered variants. To create an ordered pitch interval, simply add a plus or minus sign to indicate whether the interval is ascending or descending. Unordered pitch intervals, by contrast, do not indicate which direction the pitches move in—they are thus more suitable for harmonic intervals. The differences between ordered and unordered pitch intervals are summarized in **Example 3**.



ordered pitch interval: +19



unordered pitch interval: 19



ordered pitch interval: -6



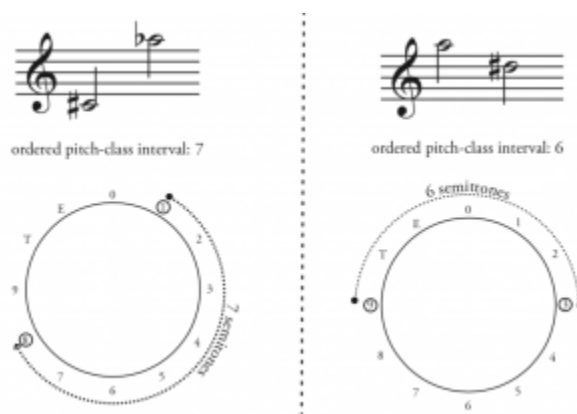
unordered pitch interval: 6

Example 3. The top row of examples shows ordered pitch intervals: the number of semitones between the pitches, with a plus or minus sign to indicate direction. The bottom row shows unordered intervals, which simply disregard the direction and thus drop the plus or minus sign.

Ordered Pitch-Class Intervals

Pitch-class intervals are the distance between pitch classes as measured in semitones in pitch class space—that is, around the clock face. Returning to our C₄–E₅ interval, we are now interested just in the pitch classes C and E, without reference to a specific octave

Ordered pitch-class intervals measure the distance between pitch classes, always ascending. This is visualized most easily by picturing the twelve tones around a clock face, then measuring the interval by going around the circle clockwise. Thus, from C to E = 4, but E to C = 8 (**Example 4**).

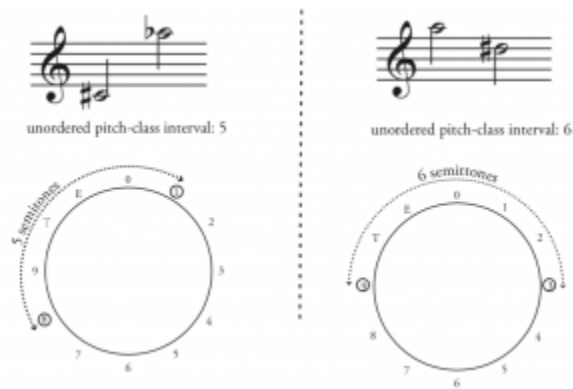


Example 4. Ordered pitch class intervals always travel clockwise around the clock face.

Interval Classes (IC)

Unordered pitch-class intervals are usually called interval classes. Interval class is the smallest possible distance between two pitch classes. On the clock face, this means traveling either clockwise or counter-clockwise, whichever is shortest. Interval class is a useful concept because it relates intervals, their inversions, and any compound versions of those intervals. You should be able to connect this concept to the concept of pitch vs. pitch class: a pitch class is a pitch, its enharmonic respelling(s), and any octave displacements of those spellings.

This means that there are only six interval classes: 1, 2, 3, 4, 5, and 6. If you reach the pitch class interval of 7, it becomes shorter to move counter-clockwise, and 7 becomes 5. For the same reason, 8 becomes 4, 9 becomes 3, and so on. Both C–E and E–C are interval class 4 (**Example 5**).



Example 5. Unordered pitch class intervals are also known as interval classes. Interval classes measure the smallest possible distance between pitch classes.

Summary

Using various combinations of pitch interval, pitch-class interval, ordered, and unordered, we arrive at four different conceptions of interval. To wrap your mind around each of these and begin to understand their various analytical uses, think of them on a sliding scale of most concrete (the ordered pitch interval) to most abstract (the unordered pitch-class interval). You can find this related to other concepts in the [Set Theory Quick Reference Sheet](#).

In tonal music, it's useful to distinguish between a thirteenth and a sixth in some situations, but not others. In the same way, as you analyze atonal music, you will find that different types of intervals are useful for describing different types of phenomena.

Further reading

- Straus, Joseph N. 2016. *Introduction to Post-Tonal Theory*. 4th ed. Upper Saddle River, NJ: Prentice Hall.

Resources

- [Blank clock faces \(integer notation\)](#)

- [Blank clock faces \(letter names\)](#)
- [Set Theory Quick Reference Sheet](#): summarizes the definitions of pitch vs. pitch class, intervals vs. interval classes, and sets vs. set classes.

Assignments

1. Intervals ([.pdf](#), [.docx](#)). Asks students to identify interval types (integer notation) within pieces of music. [Worksheet playlist](#)

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PITCH-CLASS SETS, NORMAL ORDER, AND TRANSFORMATIONS

Brian Moseley and Megan Lavengood

KEY TAKEAWAYS

- A pitch-class set (pc set) is a group of pitch classes.
- The standard way of naming a pitch class set is by its normal order: the smallest possible arrangement of pitch classes, in ascending order.
- To transpose a set (T_n), add n to each integer of the set.
- To invert a set (I_n), first invert the set (take each integer's complement mod 12), then transpose by n . Alternately, subtract each integer of the set from n ($n-x=y$).
- The clock face may help you perform any of these tasks.

Pitch-Class Sets

When we talk about a group of pitch classes as a unit, we call that group a pitch-class set, often abbreviated “pc set.” Any group of pitch classes can be a pitch-class set.

Normal Order

Normal order is the most compressed way to write a given collection of pitch classes, in ascending order. Normal order has a lot in common with the concept of root position. Root position is a standard way to order the pitch classes of triads and seventh chords so that we can classify and compare them easily. Normal order does the same, but in a more generalized way so as to apply to chords containing a variety of notes and intervals.

Following are a mathematical and a visual method for determining normal order.

Mathematical method

Process	Example set: G $\sharp$ ₄ , A ₂ , D $\sharp$ ₃ , A ₄
1. Write as a collection of pitch classes (eliminating duplicates) such that they would fit within a single octave if played in ascending order. There are multiple possible options.	8,9,3
2. Duplicate the first pitch class at the end.	8,9,3,8
3. Find the largest ordered pitch-class interval between adjacent pitch classes.	8 to 9: 1 9 to 3: 6 3 to 8: 5 9 to 3 is the biggest interval.
4. Rewrite the collection beginning with the pitch class to the right of the largest interval and write your answer in square brackets.	[3,8,9]

Occasionally you'll have a tie for largest interval in step 3. In these cases, the ordering that is most closely packed to one side or the other is the normal form. If there is still a tie, choose the set most closely packed to the bottom.

Visual method (clock face method)

If you don't like the process described above, the video in [Example 1](#) clearly explains how to use the clock face to quickly find normal order.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=559>

***Example 1.** Using the clock face to find normal form.*

Transposition

In post-tonal music, transposition is often associated with motion: take a chord, motive, melody, and when it is transposed, the aural effect is of *moving* that chord, motive, or melody in some direction. In two disconnected passages from Claude Debussy's *La cathédrale engloutie*, the opening motive <D, E, B> or <2, 4, 11> is transposed four semitones higher to <F#, G#, D#> or <6, 8, 3> in m. 18 (both in blue in **Example 2**), representing the cathedral's slow ascent above the water. When we hear the passage at m. 18, we recognize its relationship to the passage in m. 1 because the same set of ordered intervals return, but starting on a different pitch. Transposition preserves intervallic content, and not only that, it preserves the specific arrangement of the intervals.



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Example 2. Transposition of a motive, ordered and unordered.

The same motive is preserved in a more obscured fashion going from m. 18 into m. 19 (in red in **Example 2**). Here, the unordered pitch class set is transposed, but not the ordered set from before. This may not look as much like a transposition as the first two sets of motives, but if the pitches are put into normal order, the transposed intervallic relationship becomes clear.

Transposition is often abbreviated T_n , where n , the index number of a transformation, represents the ordered pitch-class interval between the two sets. Transposition is an operation—something that is *done* to a pitch, pitch class, or collection of these things. Alternatively, transposition can also be a *measurement*—representing the distance between things.

Transposing a set

To transpose a set by T_n , add n to every integer in that set (mod 12, meaning numbers wrap around after reaching 12, like on a clock face).

Given the collection of pitch classes in m. 1 above and transposition by T_4 :

$$\begin{array}{l} \begin{array}{c} \backslash \text{begin}\{\text{alignat*}\}\{2\} \&\& [11, 2, 4] \setminus \{\} + \&\& 4 \setminus 4 \setminus 4 \setminus \hline \&\& [3, 6, \\ 8] \setminus \end{array} \end{array} \end{array}$$

The result is the pitch classes in m. 18.

$$T_4 [11, 2, 4] = [3, 6, 8]$$

Identifying transpositions and calculating the index number

To determine the transpositional relationship *between* two sets, subtract the first set from the second. If the numbers that result are all the same, the two sets are related by that T_n . For example, to label the arrows in **Example 1**, an analyst would “subtract” the pitch class integers of m. 1 from the pitch-class integers in m. 18. Note that both sets should be in normal order.

$$\begin{array}{r} [3, 6, 8] \\ - [11, 2, 4] \\ \hline 4\ 4\ 4 \end{array}$$

[3, 6, 8] and [11, 2, 4] are related by T_4 .

Inversion

Inversion, like transposition, is often associated with motion that connects similar objects. The passage in **Example 3** from Chen Yi's *Duo Ye* (2000) is an example: just as in the transpositionally related passages, these two gestures have the same intervallic content, so our ears recognize them as very similar. Unlike transposition, however, the interval content of these two gestures is not *arranged* in the same way: both have the same intervals, but the [1, 4, 6] set has the interval 3 on the bottom instead of on the top (**Example 4**).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=559>

Example 3. [2, 4, 7] is inverted to become [1, 4, 6].



Example 4. These two sets both have the same intervals (a 2, a 3, and a 5), but the intervals are arranged differently.

General inversion

If you are asked to invert a set and are not given an index number, assume you are inverting the set mod 12. This means taking the complement of each number mod 12. The complement of each integer x mod 12 is the number y that is the difference between x and 12. For example, the complement of 4 is 8: $4+8=12$. The complement of 6 is 6: $6+6=12$. The complement of 0 is 0: $0+0=0$, which is 12 mod 12.

Inverting [2, 4, 7] in this way would yield [5, 8, 10].

I_n : Invert-then-transpose method

Sometimes, sets are inverted and then transposed, as in **Example 3**. The abbreviation for this is I_n .

In **Example 3**, the first set [2, 4, 7] is inverted by I_8 . To invert a set by I_8 , follow this process, in this order:

1. **Invert:** [2, 4, 7] becomes [5, 8, 10].
2. **Transpose:** adding 8 to every number in [5, 8, 10] yields [1, 4, 6].

I_n : Subtraction method

You can calculate the new set created by I_n by subtracting all the pitch classes of your first set from n .

What is I_8 of $[2, 4, 7]$?

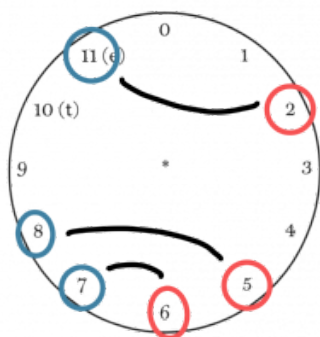
$$\begin{array}{ccc} & & 8 \\ \begin{array}{c} \{2\} \\ \{4\} \\ \{7\} \end{array} & \text{---} & \begin{array}{c} [2, 4, 7] \\ \hline [6, 4, 1] \end{array} \end{array}$$

$$I_8 [2, 4, 7] = [1, 4, 6].$$

Identifying inversions and their index numbers

Any two pitches related by inversion can be added together to form the index number. This makes sense as a logical extension of the subtraction method above: if the inverted pitch y is the result of $n - x$, then it is also true that $n = x + y$.

Another way to visualize this is on the clock face. If you have two sets that are 1) both in normal order and 2) related by inversion, the notes within each set will map onto one another in reverse order, as shown in [Example 5](#) below. Write the two sets in normal form on top of one another, then add the opposing integers of each set together as illustrated in [Example 6](#) to yield the index number of the I relation. If the sum of each number pair is 12 or more, subtract 12 so that your n is in mod 12.



Example 5. Two inversionally related sets have integers that pair together in reverse order to form a mirror-like relationship. These paired intervals always sum to the same number, which is the index number of the inversion.

$$\begin{array}{c} [7, 8, 11] \\ \times \\ [2, 5, 6] \end{array}$$

$$\begin{array}{c} 13, 13, 13 \\ 1, 1, 1 \end{array}$$

Example 6. For two 3-note sets, the leftmost integer in one set is added to the rightmost of the second, the middle numbers are added together, and the rightmost element of the first set is added to the leftmost of the second. This is the cross-addition method for finding the index number of inversions.

Using the Clock Face to Transpose and Invert

If you prefer a more visual method for transposing and inverting, watch the video lesson in **Example 7**.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=559>

Example 7. Using the clock face for transposition and inversion of pitch class sets.

Further reading

- Straus, Joseph N. 2016. *Introduction to Post-Tonal Theory*. 4th ed. Upper Saddle River, NJ: Prentice Hall.

Resources

- [Blank clock faces \(integer notation\)](#)
- [Blank clock faces \(letter names\)](#)
- [Set Theory Quick Reference Sheet](#): summarizes the definitions of pitch vs. pitch class, intervals vs. interval classes, and sets vs. set classes.

Assignments

1. Normal form and transformations ([.pdf](#), [.docx](#)). Asks students to find normal form of various sets, calculate transformations of sets, and identify T_n/I_n relationships in “Nacht” by Arnold Schoenberg.
2. Composition prep worksheet ([.pdf](#), [.docx](#)). Prepares students for the [set class composition](#) by asking them to find sets and transformations.

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Inversional pairs © Megan Lavengood

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SET CLASS AND PRIME FORM

Brian Moseley and Megan Lavengood

KEY TAKEAWAYS

- A set class is a group of pitch-class sets related by transposition or inversion.
- Set classes are named by their prime form: the version of the set that is transposed to zero and is most compact to the left (compared with its inversion).
- You can find prime form mathematically or by using the clock face.
- All possible set classes are summarized in the set class table, and are [available on Wikipedia](#) and many other websites.

The simplest way to define set class is “a group of pitch-class sets related by transposition or inversion.” This may initially seem confusing, but it’s just another kind of class. As you have learned in other chapters, “class” is another name for “group.” Recall the other kinds of classes you have already learned about.

- [Pitch vs. pitch class](#): A pitch occurs at a specific octave, and often we conceive of it with a specific spelling. A pitch class is a *group of pitches* that is related by transposition or inversion.
- [Interval vs. interval class](#): An interval has a specific distance in semitones, while an interval class is a *group of intervals* that are inversions of each other or related by octaves.

Introduction

Pitch-class set vs. set class (pitch-class set class) is the topic of this chapter. The reason the definition of “set class” may seem more confusing is that it involves two kinds of groups: classes and sets.

- A class is a group that is related in some way.
- A set is a group that is not necessarily related in any specific way.

As an analogy, consider biology and the way different living things are categorized. Plants in the same class are all biologically related in a specific way: *Angiospermae* is a class of plants that produce flowers. But we can group together plants for other reasons: the group of plants in someone's front yard, for example. That would be a set of plants, but not a class of plants.

So a pitch-class set is a group of pitches that the analyst decides to put together for some reason. The pitch-class set class—a term that is very unwieldy, so theorists have agreed to shorten it to the last two words, set class—is the group of groups of pitches that are all related by transposition or inversion.

Why transposition and inversion?

One way of analyzing a lot of post-tonal music is by studying the [transpositional and inversional relationships](#) between pitch-class sets. Take the short example below: two passages from Béla Bartók's "Subject and Reflection" (**Example 1**). Comparing across the two passages, the two sets that comprise the right hand, [10, 0, 2, 3, 5] and [3, 5, 7, 8, 10], are related by T_5 . The two left-hand sets are also related in the same way. Now looking within each passage, the right and left hands are related to each other by inversion. In the first passage, they are related by I_8 ; in the second, by I_6 .



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Example 1. T_n and I_n relationships between passages in "Subject and Reflection."

To quickly explain why these snippets of notes all sound the same, we can say **they are all members of the same set class**.

Major and minor triads may be a helpful and more familiar example. Major and minor triads all sound "the same" compared to tone clusters, quartal harmonies, or even augmented or diminished triads. The reason for that is that all major and minor triads are transpositionally or inversionally related to one another.

- Triads of the same quality are transpositionally related.

- T_2 of a C major triad [0, 4, 7] is a D major triad [2, 6, 9]
- T_2 of an A minor triad [9, 0, 4] is a B minor triad [11, 2, 6].
- Triads of opposite quality (major vs. minor) are inversionally related.
 - I_0 of a C major triad [0, 4, 7] is an F minor triad [5, 8, 0].
 - I_2 of a C major triad [0, 4, 7] is a G minor triad [7, 10, 2].

Prime Form

Just as [pitch class sets are named by their normal form](#), set classes are named by their prime form: the version of the set that is transposed to zero and is most compact to the left (compared with its inversion).

Set classes are named by their prime form, just as.

Note that prime form is just a label for a set class. It does not have any special status—it’s not significant if a composer uses [0, 1, 4] as a pitch-class set just because it shares the same integers as the prime form (014).

Mathematical process

Here is the process to put a pitch-class set in prime form, with an example using the motive from [Example 1](#).

Step	Example
1. Put the pitch class set in normal order.	[10, 0, 2, 3, 5]
2. Transpose the set so that the first pitch class is 0.	$T_2 = [0, 2, 4, 5, 7]$
3. Invert the results from Step 2 and put the result in normal order.	$I_0 = [5, 7, 8, 10, 0]$
4. Transpose the set from Step 3 so that the first pitch class is 0.	$T_7 = [0, 2, 3, 5, 7]$
5. Compare the sets in Step 2 and Step 4. Whichever set is most compact to the left is the prime form. Write the prime form in parentheses with no commas.	(02357) is the prime form (Example 1).

Using the clock face

The video in [Example 2](#) explains the differences between normal form and prime form and reviews how to find each by using the clock face.



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Example 2. Video lesson on prime form.

The Set Class Table

There are a finite number of set classes and prime forms. [Many resources, such as Wikipedia, have tables of these set classes](#), arranged by the cardinality of the set classes. You'll notice another number-based name for each set class in the format X–X; this is the Forte number of the set. Set class tables also pair sets together by their complements (the set which, together with the original set, will complete the twelve-tone collection). Other features of the set class table, such as the [interval class vector](#), are discussed in later chapters.

Further reading

- Straus, Joseph N. 2016. *Introduction to Post-Tonal Theory*. 4th ed. Upper Saddle River, NJ: Prentice Hall.

Resources

- [Blank clock faces \(integer notation\)](#)
- [Blank clock faces \(letter names\)](#)
- [Set Theory Quick Reference Sheet](#): summarizes the definitions of pitch vs. pitch class, intervals vs. interval classes, and sets vs. set classes.

Assignments

1. Set Class Composition prep worksheet ([.pdf](#), [.docx](#)). Prepares students for the set class composition by asking them to find sets and transformations.
2. Set Class Composition ([.pdf](#), [.docx](#)). Builds on the prep worksheet. Asks students to compose and analyze a 24-bar ABA form piece for unaccompanied solo instrument using set classes.

ANALYZING WITH SET THEORY (OR NOT!)

Mark Gotham and Megan Lavengood

KEY TAKEAWAYS

- Be aware of why you are grouping some sets together and not others (segmentation).
- Create analytical unity by relating sets to one another.
- Remember that composers wrote free atonal music before set theory was invented.
- Be aware of the limitations of set theory: it does not discuss any non-pitch aspects of the music, and it even neglects to address many pitched aspects.

There are many issues with the analysis of music using pitch-class sets—some generic to many forms of analysis, some more specifically relevant to set theory.

The flexibility of set theory is a double-edged sword. Because any group of pitches can be a set, analysts can move beyond triadic harmony and analyze music based on any sort of pitch organization. But by the same token, because any group of pitches can be a set, analysts could “prove” anything they want to. For instance, consider a motivic analysis in which the motive is a single interval. By locating this one interval wherever possible, an analyst could claim that a work has motivic unity. While that interval may indeed be found throughout the piece, the frequency of the interval’s appearance is unlikely to be meaningful on its own, so it’s up to the analyst to set out how and why it assumes musical meaning for them in the given context. In short, analysts should always be aware of the basis, significance, and perceptibility of their observations.

Following are several potential pitfalls of using set theory, along with ways to bolster any claims you make using set theory.

Segmentation

The emphasis on numbers (via pc integers) can make set theory seem more “scientific” than it really is. And because set theory relationships are factual—for example, a pitch-class set is related transpositionally to another set, or it isn’t—it’s easy to end up with an unfalsifiable analysis that may still be ineffective in describing the music. For example, every single piece with notes in it could be described in terms of one-note “sets,” all of which are equivalent to each other. Clearly this is not a helpful analytical statement!

The best way to ensure that your set theory claims are useful is to be aware of your process of segmentation: how you’ve divided up the piece into pitch-class sets. Here are just some of the reasons why an analyst might group notes together:

- The contiguity of the grouping. There’s a strong case for grouping together notes that are simultaneous or that happen in direct succession. You could make a case for uniting notes that are far away from each other and excluding many other notes in between, but it will take more explaining.
- Shared rhythmic profile. It’s common to segment sets based on what is set off by rests, or based on a shared rhythmic motive, or any other number of rhythmic connections.
- Shared metric placement
- Shared timbre and texture
- Shared articulation
- Shared register (high range, low range)

Joseph Straus (2016, 70) summarizes the importance of segmentation eloquently:

In all of your musical segmentations, strive for a balance between imaginative seeking and musical common sense. On the one hand, do not restrict yourself to the obvious groupings (although these are often a good place to start). Interesting relationships may not be apparent the first, second, or third time through, and you need to be thorough and persistent in your investigations. On the other hand, you have to stay within the boundaries of what can be meaningfully heard. You can’t pluck notes out in some random way, just because they form a set that you are interested in.

Relationships Between Sets

Simply identifying sets is not analytically interesting on its own. Here are some ways to relate sets to one another and create a sense of unity among them.

- Find multiple instances of the same set class, and then relate them to each other by [transposition and](#)

inversion. You might calculate transpositional/inversional relationships from one set to the following set, or from the first set to all the others, or any other configuration. Your relationships should all involve notes that actually appear in the score—don't bother relating sets to the normal form that corresponds to the prime form, for example, unless that normal form actually appears in the piece.

- See if different sets belong to the same superset. That superset might be a familiar mode or collection.
- Relate pairs of notes across sets by symmetry across an axis of inversion or emphasis on a pitch class center.

Theory Following Practice

On a broader level, much if not most music theory is retrospective: the terms and techniques for dealing with a repertoire emerge after the fact; they exist to make sense of music that exists. This is by no means always true: many composer-theorists have developed ideas about how music might be organized, and then implemented those ideas. A significant example of this is serialism. But set theory is a retrospective theory, popularized by Allen Forte decades after the repertoire it is meant for was composed. As such, we should take care to separate set theory from the compositional acts and intentions of those composers. Arnold Schoenberg (1950), for instance, felt that a structure for free atonal music was impossible, hence his subsequent development of the serial technique.

Just because a theory was developed after the fact does not make the theory any more or less valid (composers historically have been at least as active in obfuscating their methods as clarifying them!), but it's worth keeping in mind.

What Set Theory Won't Tell You

Be sure to consider all the things that set theory does not address in any capacity:

- History and context
- Any non-pitch parameters (though this depends on how the analyst approaches questions like segmentations)
- Pitch parameters like voice leading, spacing, or order (again, depending on the analytical approach)

This list includes many aspects of music that are important to listeners and performers. You may want to take care to address these issues in your analysis through other means, because a set theory analysis will often ignore them.

Further reading

- Buchler, Michael. 2017. “A Case Against Teaching Set Classes to Undergraduates.” *Engaging Students: Essays in Music Pedagogy* 5. <http://flipcamp.org/engagingstudents5/essays/buchler.html>.
- Schoenberg, Arnold. 1950. *Style and Idea*. New York: Philosophical Library.
- Straus, Joseph N. *Introduction to Post-Tonal Theory*. 4th ed. Upper Saddle River, NJ: Prentice Hall, 2016.

Assignments

1. Guided analysis of “Wie bin ich Froh!” by Anton Webern ([.pdf](#), [.docx](#)). Recording
2. Segmentation worksheet ([.pdf](#), [.docx](#)). Asks students to justify the given segmentations by explaining what the grouped pitches have in common.
3. Atonal analysis using pc sets ([.pdf](#), [.mscx](#)). Open-ended prompt asks students to use set theory to analyze an excerpt.

DIATONIC MODES

Mark Gotham and Megan Lavengood

KEY TAKEAWAYS

- Church modes originated in the medieval era, and are classified by their use of the diatonic collection, their final, the relationships of other pitches to that final, and their range.
- In the 20th and 21st centuries, diatonic modes are also understood as rotations of the major scale, without range requirements, but with the concept of a pitch-class center or tonic.
- Non-Western musical cultures have their own methods of organizing pitch into modes. These “modes” are usually more than simple pitch collections and can include characteristic gestures, embellishments, and protocols for use. Examples include Indian raga, Arabic maqam, Balinese pelog and slendro, Jewish prayer modes, Persian dastgah, and Japanese scales.
- Modes, conceived in terms of parallel relationships, with an emphasis on the color notes of each mode:
 - Ionian: Identical to major
 - Mixolydian: Like major with a $\downarrow \hat{7}$
 - Lydian: Like major with a $\uparrow \hat{4}$
 - Aeolian: Identical to natural minor; no raised leading tone
 - Dorian: Like natural minor with a $\uparrow \hat{6}$
 - Phrygian: Like natural minor with a $\downarrow \hat{2}$
- Modes, conceived in terms of relative relationships:
 - Ionian: White notes starting on C
 - Dorian: White notes starting on D
 - Phrygian: ...starting on E
 - Lydian: ...starting on F
 - Mixolydian: ...starting on G
 - Aeolian: ...starting on A

This book covers modes from many different angles. For more information on modes, check [Introduction to](#)

Diatonic Modes (general), Chord-Scale Theory (jazz), Modal Schemas (pop), and Analyzing with Modes, Scales, and Collections (20th-/21st-c.).

At the turn of the 20th century, many composers were rethinking the materials of music. This is one reason the term “common practice” is used to distinguish the major-minor music that dominated Western classical music for the 200 years or so prior—something changed around 1900. You’ll also hear talk of the “emancipation of the dissonance” connected to this, and the emergence of atonality out of ever-more-radical chromatic maneuvers. The history of music is much more complex than this simple take, but there is some truth to it: a lot of composers were interested in reinventing what and how they composed, similar to the emergence of abstract art around the same time.

The use of modes has a place in all of this, encapsulating many of the ways in which one can broaden the compositional palette. In this chapter, we’ll go through some of the most interesting, famous, and significant options, starting, as many composers did, by looking back to what came before.

Church Modes

The dominance of major and minor in Western classical music emerged out of an earlier practice centered on the use of modes. This collection of modes is often called church, white-note, or Gregorian modes. These modes correspond to rotations of the C major scale, using the same collection of pitches but a different tonic (more properly referred to as a final in this context).

This already introduces us to a fundamental tenet of what a mode generally comprises: both a diatonic collection of pitches and a final. These are the first two items on the list below, followed by two other particularly useful concepts for understanding church modes:

1. The diatonic collection and the intervallic relationships between those pitches
2. The final, which acts as a referential point
3. Further hierarchical levels between the pitch in the mode and its final
4. Melodic shapes and range

1–3 will be familiar from tonal music, but 4 may not be. Range is a defining characteristic of the church modes, as each mode has an authentic and a plagal version.

Example 1 summarizes the modes by their final, their tenor, and their range. Authentic modes are on the left, while plagal modes (those beginning with “hypo-”) are on the right. Tenors are usually a fifth

above the final in authentic modes and a third above the final in plagal modes (except where noted with an exclamation point). **Example 2** provides the same summary, but in notation.

Authentic mode	Final	Tenor	Range	Plagal mode	Final	Tenor	Range
Dorian	D	A	D–D	Hypodorian	D	F	G–A
Phrygian	E	C!	E–E	Hypophrygian	E	A!	B–B
Lydian	F	C	F–F	Hypolydian	F	A	C–C
Mixolydian	G	D	G–G	Hypomixolydian	G	C!	D–D
+							
Aeolian	A	E	A–A	Hypoaolian	A	C	E–E
Ionian	C	G	C–C	Hypoionian	C	E	G–G

Example 1. The historical church modes summarized.



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Example 2. The historical church modes summarized in notation.

Diatonic Modes in the 20th and 21st centuries

Another summary of diatonic modes (and assignments on them) can be found in [Introduction to Diatonic Modes and the Chromatic “Scale.”](#)

When modes were revisited as a compositional concept in the 20th century, many concepts from church modes were maintained, while other distinctions were erased. The notion of authentic/plagal modes (“hypo-” modes) was dropped, as the range of many pieces spans more than one octave. Additionally, Glarean’s later modes, aeolian and ionian, were just as important as the original authentic church modes.

Color notes

As a listener, you may experience modes as sounding similar to major or minor, but with certain inflected

notes—color notes.¹ Modes will sound major-ish or minor-ish based on the quality of the third above the tonic. The major-ish modes are mixolydian and lydian; the minor-ish modes are aeolian, dorian, and phrygian.

Example 3 lists each mode, the quality of the third above the tonic, its color note that distinguishes it from major/natural minor, and its pitches parallel and relative to C major.

Mode name	Major tonic or minor tonic?	Color note	Mode, parallel to C major	Mode, relative to C major
Ionian (major)	Major	n/a	C D E F G A B C	C D E F G A B C
Dorian	Minor	$\hat{6}$	C D E $\flat$ F G A B $\flat$ C	D E F G A B C D
Phrygian	Minor	$\hat{2}$	C D $\flat$ E $\flat$ F G A $\flat$ B $\flat$ C	E F G A B C D E
Lydian	Major	$\hat{4}$	C D E F $\sharp$ G A B C	F G A B C D E F
Mixolydian	Major	$\hat{7}$	C D E F G A B $\flat$ C	G A B C D E F G
Aeolian (natural minor)	Minor	$\hat{7}$ —no raised leading tone	C D E $\flat$ F G A $\flat$ B $\flat$ C	A B C D E F G A

Example 3. Important characteristics of each mode.

Example 4 provides a brief summary of this information using notation. The modes are grouped by whether the tonic is major or minor, which helps with aural identification of modal passages (as discussed further below). The top line shows modes whose $\hat{3}$ is a major third above tonic (*mi*): major, mixolydian, and lydian. The bottom line shows modes whose $\hat{3}$ is a minor third above tonic (*me*): aeolian, dorian, and phrygian. The dotted slurs connect the distinctive **color note** of each mode with its major/minor counterpart.



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1. Vincent Persichetti (1961) referred to these notes as "characteristic notes."

Example 4. Modes grouped by major vs. minor tonic, with color notes shown in blue.

Hearing modal tonics

Because many listeners are so enculturated to hear all music as being major or minor, 20th and 21st century composers who wish to create a modal sound will often spend extra energy on emphasizing the tonic pitch of their chosen mode. (Note that this may or may not involve emphasizing a tonic *chord*!) Following are several ways in which composers may create a sense of tonic in modal music.

- repeating the tonic pitch
- agogic accents (using longer note values) on the tonic pitch, including using a drone of the tonic pitch
- metrical accents on the tonic pitch
- using the tonic pitch as the lowest pitch
- cadencing on the tonic pitch

Identifying modes

If you are not used to playing in and listening to modes, it can be daunting to identify and distinguish modes. Here is a step-by-step process for distinguishing all the modes discussed here, illustrated as a flowchart in **Example 5**.



Example 5. Flowchart illustrating the process of identifying modes.

1. Identify the quality of tonic.

Listen for the tonic pitch. Then, listen for the whole tonic chord. Is the third of that chord major or minor? This distinguishes the major-ish modes (major, mixolydian, lydian) from the minor-ish modes (minor, aeolian, dorian).

2. Listen and look for $\hat{\gamma}$ (*ti* or *te*).

Compare the $\hat{\gamma}$ to the leading tone (*ti*) a half step below tonic that we typically hear in minor and major pieces. If $\hat{\gamma}$ is a *whole step* below tonic (*te*), then it's lowered, which means that the piece is (at least temporarily) in a mode.

If you heard a major tonic and $\hat{\gamma}$ is lowered (*te*), then you are in **mixolydian**.

If you heard a minor tonic and $\hat{\gamma}$ is raised (*ti*), then you are in **minor**.

If your mode is not already identified, proceed to step 3.

3. Listen and look for other color notes— *fi* ($\uparrow \hat{4}$) in major, *la* ($\uparrow \hat{6}$) in minor, or *ra* ($\downarrow \hat{2}$) in minor.

If $\hat{4}$ did not identify the mode for you, listen and look for other raised color notes.

If $\hat{4}$ is raised (*fi*) in a major-tonic mode, you are in **lydian**. If it is not, you are in **major**.

If $\hat{2}$ is lowered (*ra*) in a minor-tonic mode, you are in **phrygian**. If $\hat{6}$ is raised (*la*) in a minor-tonic mode, you are in **dorian**. If neither $\hat{7}$, $\hat{6}$, nor $\hat{2}$ is altered (*te*, *le*, *re*), you are in **aeolian**.

Modes in a Global Context

Almost all cultures in any place and time have had music, and the vast majority of them have organized pitch into what Western music theory considers types of modes. So, as you might imagine, there are a lot of options for composers prepared to look out beyond the Western tradition to explore. Around 1900, composers in Europe and North America began to do just that. Composers drew on music of the African diaspora (which would come to exert a huge influence over all forms of music making in the 20th century), the ancient ragas of India, China, the Balkans, and many more besides. Clearly, there's no way we can do justice to such a huge topic here—nor indeed could 20th-century Western classical music, which often flattened out nuances of these complex systems. Following is an incomplete list of non-European sources of mode-like pitch collections:

- Indian raga
- Arabic maqam and Turkish makam
- Balinese pelog and slendro
- Jewish prayer modes
- Persian dastgah
- Japanese scales

Each of these systems of pitch organization is related to the concept of mode discussed here, but each has nuances and practices that distinguish them from the diatonic modes, even if the pitches are identical.

Further Reading

- Persichetti, Vincent. 1961. *Twentieth-Century Harmony*. New York: W. W. Norton.

Assignments

1. Identifying modes ([.pdf](#), [.mscz](#)). Asks students to identify 20th-century modes versus major/minor, circle inflected pitches, and explain how a pitch center is articulated. Music examples are transcribed from the TV show *Great British Bake Off* (music by Tom Howe, © Accorder Music Publishing, used with permission). [Worksheet playlist](#)
2. Additional beginner's worksheets can be found in [Introduction to Diatonic Modes and the Chromatic "Scale."](#)

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Identifying Modes flowchart with Phrygian © Sarah Louden and Megan Lavengood is licensed under a [CC BY-SA \(Attribution ShareAlike\)](#) license

Footnotes

COLLECTIONS

Mark Gotham; Megan Lavengood; Brian Moseley; and Kris Shaffer

KEY TAKEAWAYS

This chapter introduces a number of pitch collections that appealed to many composers in the 20th century:

- diatonic collection, as separate from [major/minor scales](#) or [diatonic modes](#)
- pentatonic collection: a five-note collection that corresponds to the black keys of the piano; can also be generated as a stack of five perfect fifths or through the pitch interval pattern 2–2–3–2–3
- whole-tone collection: a six-note collection that is made up entirely of notes separated by whole steps
- octatonic collection: an eight-note collection that is formed by alternating whole- and half steps
- hexatonic collection: a six-note collection generated with the pitch interval pattern 1–3–1–3–1–3
- acoustic collection: a seven-note collection similar to the mixolydian mode but with a $\uparrow \hat{4}$; corresponds roughly to the lowest partials of the harmonic series

Other pitch collections introduced include:

- Olivier Messiaen’s “modes of limited transposition”: a group of scales that cannot be transposed in 12 unique ways
- The “distance model” of generating collections with a repeating pattern of pitch intervals

CHAPTER PLAYLIST

Beyond the use of major/minor and the diatonic modes, there are four new(ish) collections that occupy a special place in the 20th century: the pentatonic, whole-tone, octatonic, and acoustic collections. This chapter discusses these collections along with some important questions of modal properties and extra-musical meaning.

Diatonic Collection and Pandiatonicism

You have probably encountered the concept of the diatonic collection many times already, especially in the chapters on [modes in pop](#) and in [20th-/21st-century music](#), or even when you first learned about [major](#) and [minor](#) keys. The diatonic collection is the basis of much Western music.

In the 20th and 21st centuries, composers sometimes used the diatonic collection, but without making any attempt to make a specific pitch sound like the the pitch center. Such examples are not tonal, nor are they modal; instead, they are considered pandiatonic. Igor Stravinsky often wrote pandiatonic passages; many can be heard [throughout the opening of his ballet *Petrushka*](#).

Pentatonic Collection

The pentatonic collection is prevalent in music across the globe. It is a collection built with the [interval](#) pattern ma2–ma2–mi3–ma2–mi3. The pentatonic collection can be described with reference to the diatonic modes in multiple different ways ([Example 1](#)).

- Using the scale degrees of a major scale, a pentatonic scale can be formed with $\hat{1}$, $\hat{2}$, $\hat{3}$, $\hat{5}$, and $\hat{6}$.
- If you think of the diatonic collection as a stack of perfect fifths (F, C, G, D, A, E, B), then the pentatonic is a narrower form of the same collection: C, G, D, A, E.
- Finally, if you visualize the piano, note that the complement of C, D, E, F, G, A, B, C (the white notes) is $G\flat$, $A\flat$, $B\flat$, $D\flat$, $E\flat$ (the black notes). The black-note collection is, once again, the pentatonic.



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Example 1. (a–c) Three ways of generating a pentatonic collection, and (d) a rotation of the pentatonic collection.

What the pentatonic collection removes from the diatonic is the two notes that create half steps ($\hat{4}$ and $\hat{7}$, if you are thinking in terms of major scale degrees). The absence of semitones arguably makes the pentatonic more readily rotatable and considered as a collection, without a strong emphasis on a particular note as tonic. Any member of the collection easily functions as a tonal center. For example, there are five

unique modes of the collection given in (a) of **Example 1**, formed by rotating the collection so that each pitch class becomes tonic: C pentatonic (C, D, E, G, A), D pentatonic (D, E, G, A, C), E pentatonic (E, G, A, C, D), and so on. Letter (d) of **Example 1** gives an especially common rotation of the pentatonic collection that is referred to as the minor pentatonic.

The pentatonic scale is especially common as a basis for melodic composition. One example can be heard during [the first movement of Chen Yi's percussion concerto](#), at the entrance of the strings at 2:13. Notice that the pentatonic melody is sometimes accompanied by atonal-sounding chords in the brass. Pentatonic melodies don't need to be harmonized within the pentatonic collection, and in fact often aren't; after all, there are only two possible triads in the pentatonic collection (C major and A minor, for example, in the collection C–D–E–G–A).

Whole-Tone Collection

The whole-tone collection is exactly what it sounds like: a scale made up entirely of six whole steps. Similar to the pentatonic scale, the whole-tone scale is rotationally ambiguous, since there is only one size of step. Composers often exploit this ambiguity by using the whole-tone collection to produce an unsettled feeling in the listener ([in film and TV, one famous trope is to use the whole-tone scale to accompany a dream sequence](#)).

There are only two unique whole-tone collections: one that contains the even-numbered pitch classes [0, 2, 4, 6, 8, 10] and one that contains the odd-numbered pitch classes [1, 3, 5, 7, 9, 11]. If you need to distinguish between these two collections in an analysis, you can use the abbreviations WT_0 and WT_1 : “WT” stands for “whole tone,” and the subscript number indicates the pitch C (0) or $C\sharp$ (1) (**Example 2**).



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Example 2. There are only two whole-tone collections. Transposing WT_1 up a half step would yield WT_0 again.

Octatonic Collection

The octatonic collection is built with an alternation of whole steps and half steps, leading to a total of eight distinct pitches (**Example 3**). Jazz musicians refer to this as the diminished scale, as it fits well with a [fully diminished seventh chord](#). (Of course, there can be other scales that have eight distinct pitches, but this is the one called the octatonic scale.)



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Example 3. *There are only three octatonic collections.*

The interval content of this collection is very homogeneous, and this intervallic consistency leads to one of its most interesting properties. As shown in **Example 3**, there are only three possible octatonic collections. When we transpose the first collection above ($OCT_{0,1}$) by 3—adding 3 to each of the integers in the collection— $\langle 0, 1, 3, 4, 6, 7, 9, 10 \rangle$ becomes $\langle 3, 4, 6, 7, 9, 10, 0, 1 \rangle$, which is the same as the first collection, just starting on a different pitch. If you need to distinguish between these two collections in an analysis, you can use the abbreviations $OCT_{0,1}$, $OCT_{1,2}$, and $OCT_{2,3}$: “OCT” is an abbreviation of “octatonic,” and the subscript numbers represent pitches that create a half step unique to that scale ($C, C\sharp$; $C\sharp, D$; and $D, E\flat$, respectively).

Joan Tower frequently uses the octatonic collection, and it is particularly audible in the opening of her piece [Silver Ladders](#).

Unlike the other collections discussed here, the octatonic collection appears with some frequency prior to the 20th century, especially in Russia.¹ The octatonic collection can produce several familiar triadic harmonies, as shown in **Example 4**: eight major/minor triads (and four diminished triads, not shown), and four each of every type of seventh chord except the major seventh chord. However, there are no chords related by root motion by fifth, so no tonic/dominant motion is possible. Instead, there is a plethora of root motion by third. Frédéric Chopin uses the octatonic over a $B\flat^7$ chord in his Ballade in G minor (**Example 5**). Thanks to all those triadic harmonies, it’s a versatile mode that can imply tonal

1. Agmon (1990) even sees it in a Scarlatti sonata (K. 319 b.62ff).

associations while also inviting a freer movement among tonalities not traditionally regarded as being closely related.



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Example 4. The octatonic collection contains many triadic harmonies.



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Example 5. Octatonic collections in Chopin's Ballade in G minor (1836).

Hexatonic Collection

The hexatonic collection is a six-note collection that is formed by alternating minor seconds and minor thirds. The name “hexatonic” refers to its six notes, and while there are other possible scales with six notes (for example, [the blues scale](#)), the name “hexatonic collection” always refers to this particular group of notes. Like octatonic collections, hexatonic collections can only be transposed four times before returning to the same group of notes again (**Example 6**), and they are similarly named according to their lowest semitone (e.g., HEX_{0,1} is the hexatonic collection containing C–C♯).



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Example 6. Four possible hexatonic collections.

Again like octatonic collections, hexatonic collections contain triads but do not suggest a particular tonic chord or home key. As shown in **Example 7**, each collection contains three major triads, three minor

triads, and two augmented triads. Juxtaposing two augmented triads that are one semitone apart is another way of generating the hexatonic scale.



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Example 7. Triads present in a hexatonic collection.

Acoustic Collection

The acoustic collection is based on the lowest intervals of [the overtone series](#). This is significant because there has long been an association between those lowest intervals and the notion of musical consonance. The result is a mode that resembles the major scale but with a $\uparrow \hat{4}$ and $\downarrow \hat{7}$ (**Example 8**).



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Example 8. The acoustic scale is derived from the notes of [the overtone series](#).

New Ways of Organizing Pitch

Many composers of the 20th and 21st centuries have looked for new ways of generating pitch collections for their music.

Messiaen's modes of limited transposition

Olivier Messiaen was interested in composing with collections that can only be transposed a few times before they repeat themselves, such as the octatonic collection. Messiaen's "modes of limited

transposition,” as he called them, are shown in the table in **Example 9** and in notation in **Example 10**. The numbers in parentheses refer to pitch intervals in semitones.

Messiaen Mode Number	Interval pattern (in half-steps)	Number of unique transpositions	Number of unique rotations	Misc.
1	2, 2, 2, 2, 2, 2	2	1	Corresponds to the whole-tone scale
2	(1, 2), (1, 2), (1, 2), (1, 2)	3	2	Corresponds to the octatonic scale
3	(2, 1, 1), (2, 1, 1), (2, 1, 1)	4	3	
4	(1, 1, 3, 1), (1, 1, 3, 1)	6	4	
5	(1, 4, 1), (1, 4, 1)	6	3	
6	(2, 2, 1, 1), (2, 2, 1, 1)	6	4	
7	(1, 1, 1, 2, 1), (1, 1, 1, 2, 1)	6	5	

Example 9. *Messiaen's Modes of Limited Transposition.*



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=3946>

Example 10. *Messiaen's modes of limited transposition, beginning on C.*

These are not the only collections that have limited transpositions: other subsets/supersets of these collections may also have this property. Even within this set, Mode 1 is a subset of Modes 3 and 6.²

Distance model modes

Distance model modes involve a more restricted set of modes of limited transposition. These modes are formed with an alternation between two intervals, such as:

2. The acoustic scale does not have this property, so it does not appear.

- 1:2 = alternating semi and whole tones (the octatonic mode again)
- 1:3 = semitones and minor thirds, sometimes called the hexatonic mode/collection, or in pitch-class set parlance, the “magic” hexachord
- 1:5 = semitones and perfect fourths

This style of organization is strongly associated with Béla Bartók, as we’ll see in the [next chapter](#).

Other modes

This is just the tip of the iceberg, even for 20th-century classical music. Among the other main areas to explore are:

- Microtonal modes, beloved of Ligeti and the spectral school, which focus on alternate tuning systems and avoid any assumption of the equal-tempered 12.
- Synthetic modes, derived by alteration of diatonic, as in the non-standard key signatures of certain movements in Bartók’s *Mikrokosmos*.
- One-off cases like the “scala enigmatica” of Verdi’s *Ave Maria* (which is hardly used as a scale/mode in any other case).

Important Considerations with Collections

Why do some of these modes keep cropping up in different contexts? Again, that’s a big issue that has attracted a great deal of theoretical attention. Here are some highlights:

- **Correspondence to the natural overtone series.** One hypothesis is that people like modes that see the important pitches align with those low down in the harmonic series, and thus with what are conventionally called consonances (octaves, fifths, etc.). Clearly the acoustic collection is a particularly literal implementation of this idea.
- **Symmetry** is a key preoccupation of 20th-century composers. One reason for this is the desire to create a new kind of order not rooted (pun intended...) in the “from-the-bass-up” world of the overtone series and fundamental bass harmony. Symmetry can be internal to scale, as in the rotational symmetry of the modes of limited transposition, or else between scales, as in Bartók’s *Cantata Profana*.
- **Maximal evenness.** A prominent theory of modal construction emphasizes the even distribution of pitches in the space.³ Think of the [diatonic modes](#) again. The diatonic collection is made up of mostly whole tones, with only two semitones that are as far away from each other as possible. This

maximized spacing between the semitones means that the pitches of the diatonic collection are maximally even.

Further reading

- Agmon, Eytan. 1990. “Equal Divisions of the Octave in a Scarlatti Sonata.” *In Theory Only* 11 (5): 1–8.
- Clough, John, and Jack Douthett. 1991. “Maximally Even Sets.” *Journal of Music Theory* 35, no. 1–2 (Spring–Autumn): 93–173.

Assignments

1. Worksheet on collections ([.pdf](#), [.mscz](#)). Asks students to spell one example of each of the collections from this chapter.
2. Analyze Lili Boulanger’s resplendent *Hymne au Soleil*. Identify modes and collections used, along with related techniques. Scores can be found on [IMSLP](#) and [MuseScore](#). Both include the original French text and an English translation in the underlay.

Footnotes

3. This emerges primarily from Clough and Douthett 1991.

ANALYZING WITH MODES, SCALES, AND COLLECTIONS

Mark Gotham

KEY TAKEAWAYS

So far, most of our discussion has focused on defining modes, collections, and their properties. As always, there is much more to analyzing with these materials than simply knowing terms. This chapter provides some guidance on how to go from theory to practice.

Please note that this book covers modes from many different angles. For more information on modes, check [Introduction to Diatonic Modes \(general\)](#), [Chord-Scale Theory \(jazz\)](#), [Modal Schemas \(pop\)](#), and [Diatonic Modes \(20th/21st-c.\)](#).

CHAPTER PLAYLIST

In Theory

So, you're faced with a new piece of music, and you get the sense that it might be worth considering a modal view. It sure isn't "tonal" in the common-practice sense, but neither does it seem "atonal," "serial," or the like. How do you go about identifying the modes used, and making analytical observations on that basis? 20th-century music has a wider range of possible modes and may not have a key signature or any other notational shortcut for identifying the mode. As such, it's especially important to be able to identify modes from musical cues.

Firstly, let's review some of the different considerations that can go into the definition of a mode:

1. A collection of pitches in a particular intervallic relationship (e.g., C, D, E, F, G, A, B)
2. A tonic or final that acts as a primary or referential point (e.g., C)
3. Further hierarchical levels of importance (such as the dominant/subdominant)
4. Melodic shapes and ranges

No. 1 reminds us that modes can be transposed. While we often present the early modes in their “white-note” transposition (with dorian on D, for instance), in 20th-century music, you can just as easily have them on other pitches such as dorian on E and phrygian on D. This leads to the frankly confusing terminology “D mode on G.” Don’t forget that you can also have chromatic notes in modal music—not every pitch used needs to be in the scale. So the question is, how many exceptions are too many?

No. 2 helps to separate all the possibilities that No. 1 throws into the mix. If you only have white notes, which of those white notes is the modal final? Any and all musical parameters might contribute to the case for one of those pitches as tonic; for a useful starting point, try the widely applicable “first, last, loudest, longest” maxim (Cohn 2012, 47, after Harrison 1994, 75ff.). Pitches that dominate in those ways tend to be more salient. Do phrases tend to start and/or end on a certain pitch, or do they emphasize that pitch in other ways, perhaps with strong metrical positions or by reserving it for the top of the melodic contour?

No. 3 also speaks to this difficulty. For instance, in tonal music, you may find more instances of *sol* ($\hat{5}$) than *do* ($\hat{1}$), since it fits in both the tonic and dominant chords. 20th-century modes complicate this with a more diverse set of candidates for hierarchical importance, but this can also help us to unpick the different roles. “First” and “last” might be your tonic, while the dominant may be “loudest” and “longest.” We might also use a less loaded term than “dominant” here. For instance, the church modes ([discussed in a previous chapter](#)) had a “tenor” or “reciting tone” in an analogous role.

There are many reasons for emphasizing specific pitches in this way. One reason relevant to 20th-century music is the notion of color notes, like *fi* ($\uparrow \hat{4}$) in lydian or *ra* ($\downarrow \hat{2}$) in phrygian. Another reason is to establish a pitch class center. For listeners accustomed to common-practice tonality, the lydian fourth (e.g., F $\sharp$ in C major) can very easily become a leading tone in the dominant (G major). Otherwise tonal works written “in the lydian mode” can be highly ambiguous in this respect. Consider what you make of [Ludwig van Beethoven’s “Heiliger Dankgesang” from the Op. 132 quartet \(1825\)](#) and [Anton Bruckner’s *Os Justi* \(1879\)](#) to this effect.

Range considerations were fundamental to the definition of church modes in terms of authentic vs. plagal forms, and this has been a key consideration for defining modes in many other types of music, as have melodic shapes.

In Practice

The above considerations have to do with identifying a prevailing mode, but how does an analyst use this information to create a compelling interpretation of the piece? Well, the challenge of coming up with a modal reading can become part of that interpretation. Here are some starting points for pivoting from identification to interpretation:

- Firstly, how easy was it to come up with a tonal reading? Is this a piece with its structure on display or deeply hidden? What might that say about the emotional valence of the work?
- Can you characterize the mode in general and its use in this piece? Is the raised lydian fourth “exciting” or even “aspirational”; is the phrygian second perhaps “lamenting”?
- How clearly and separately are these modes set out? When we move from one mode to another, are there common tones, or even a common final? Just like in tonality, “modulations” among modes can be regarded as close or remote, partly on this basis.
- How are the properties and distribution of modes related to wider considerations? Do mode changes align with moments that seem like section boundaries for other reasons?

Consider the three moments below, which come from Béla Bartók’s *From the Island of Bali*. Is the same mode in operation throughout, or does it change? What pitches are in/out of the mode(s)? Does a modal final present itself? Are there any moments where two modes are combined? Some suggestions follow the images, so decide on what you think before scrolling down to compare notes.

Andante ♩ = 134

p dolce

1 2 4

*Bartók's From the
Island of Bali:
Extract 1*

Risoluto ♩ = 96

f

5

*Bartók's From the
Island of Bali:
Extract 2*



*Bartók's From the
Island of Bali:
Extract 3*

The first case is wonderfully ambiguous in relation to both mode and final. If you put the hands together, the pitches constitute a neat octatonic mode, but if you keep them apart, then it's the 1:5 [distance model mode](#) often associated with Bartók, also known as set class (0167). There's good Bartókian symmetry in all of this, and very little sense of a single modal final emerging.

In the latter two cases, there is a strong tonic arrival on the first downbeat, suggesting $G\flat$ and $E\flat$ as the respective tonics for these sections. However, notice how closely the pitches relate to the opening. First we have $[B, C, F, G\flat]$, which were the exact pitches of the right hand at the start. (Do you spot the one “chromatic” note in this reading? $A\flat$ could be interpreted as a chromatic upper neighbor that doesn't really fit the mode.)

Later we have $[A, B\flat, D, E\flat]$, which are a close variant on those of the left hand. This change indicates a move from that opening ambiguity to a passage quite neatly redolent of $E\flat$ major, which is swiftly undone as the piece goes back to the technical and emotional place where it started.

So we have a balance between unity and variety, as well as trajectory for the piece overall.

Modes, Collections and Musical Meaning

All of these modes come with extramusical interpretive associations.

For instance, we've been focusing on 20th-century instances of modal writing, but they do appear in common-practice tonal music, often with associations back to the pre-tonal music from which those modes came: for example, Beethoven's use of dorian in the [“Credo” of his Missa Solemnis \(1824\)](#).

In addition to looking back, composers have also looked out, deliberately invoking folk and/or foreign musics in the concert hall by the use of their mode. As always, this can be indicative of cultural appreciation or appropriation. The mania for the exotic, Hispano-Arabic topic around the turn of the 20th century (rarely more sophisticated than the use of the phrygian *ra* ($\downarrow \hat{2}$) errs on the side of the latter.

Likewise, we can observe the nominally Hungarian music by composers like [Brahms](#) (looking at that culture from outside), [Liszt](#) (keen to emphasize his own Hungarian roots as part of his brand), and [Ligeti](#) (drawing on his own culture).

Specific modes also attract meanings from their inherent properties. We have already seen the whole-tone modes' un-rootedness, which lends itself most naturally to certain extramusical associations, as showcased in [Claude Debussy's "Voiles" \(1909\)](#). Likewise the octatonic is often invoked as some kind of exotic, timeless, magical topic, as in the celesta arpeggios of "[Dance of the Sugar Plum Fairy](#)" from Pyotr Ilyich Tchaikovsky's *The Nutcracker* (1892).

Finally, and as always with meaning, apart from the materials itself and the composers' intentions, it ultimately comes down to your associations and inferences.

Further Reading

- Cohn, Richard. 2012. *Audacious Euphony: Chromaticism and the Consonant Triad's Second Nature*. New York: Oxford University Press.
- Harrison, Daniel. 1994. *Harmonic Function in Tonal Music*. Chicago: University of Chicago Press.
- Persichetti, Vincent. 1961. *Twentieth-Century Harmony*. New York: W. W. Norton.

Assignments

1. Analyze Lili Boulanger's resplendent *Hymne au Soleil*. Identify [modes](#) and collections used, along with related techniques and materials, and linking these (where you consider it appropriate) to possible "meanings" of the work. Scores can be found on [IMSLP](#) and [MuseScore](#). Both include the original French text and an English translation in the underlay.

Media Attributions

Bartok1

Bartok2

Bartok3

IX. TWELVE-TONE MUSIC

This section introduces “twelve-tone” music and the related concept of serialism. We will explore the core technical details of rows, transformations, matrices, and more, but also consider this repertoire as real music through analysis and composition.

Prerequisites

To make the most of this section, it will be useful to have a working familiarity with [Pitch Class Sets](#). This section (and that chapter) also assume a familiarity with the topics covered in [Fundamentals](#).

Organization

The chapters are organized as follows:

- [Basics](#) begins this section with some core definitions and ideas.
- [Naming Conventions](#) then deals in detail with the different conventions for naming rows and transformations (including matrices). This is an important preparation for students preparing to read other writings on twelve-tone music.
- [Row Properties](#) looks at some of the “special” rows that have attracted composers. It’s worth looking at the [Twelve-Tone Anthology](#) in combination with this.
- [Analysis Examples – Webern op. 21 and 24](#) turns to a more thorough kind of analysis, considering two of the early “classics” both in terms of their technical details and in a wider, more contextual

TWELVE-TONE MUSIC CHAPTERS

- Basics of Twelve-Tone Theory
- Naming Conventions for Rows
- Row Properties
- Analysis Examples – Webern op. 21 and 24
- Composing with Twelve Tones
- History and Context of Serialism

sense.

- [Composing with Twelve Tones](#) invites students to “learn by doing.” As we have emphasized elsewhere in the textbook, it’s often helpful to get to know a topic by approaching it in different ways: theoretical, analytical, and practical. Twelve-tone music is no different.
- [History and Context](#) concludes this section by “zooming out” to consider some of the wider context around this music, and the motivations for writing it.

Anthology

The [Anthology](#) part of the textbook includes a dedicated [Twelve-Tone Anthology](#) that sets out hundreds of examples of rows used in the repertoire according to their properties and discusses their relative rarity.

BASICS OF TWELVE-TONE THEORY

Mark Gotham and Brian Moseley

KEY TAKEAWAYS

- Twelve-tone composition involves using all twelve pitch classes roughly equally. That means it (usually) isn't appropriate to look for a key, mode, tonic pitch, or other tonal elements.
- Composers often use a fixed ordering of the twelve pitch classes called a row, but also adapt it in various ways, notably through:
 - Transposition (T)
 - Inversion (I)
 - Retrograde (R)
 - Retrograde inversion (RI)
- In practice, there is a great variety of how composers approach the task of composing with twelve tones.

CHAPTER PLAYLIST

Twelve-tone music is most often associated with a compositional technique, or style, called serialism, though these terms are not equivalent:

- “Serialism” is a broad designator referring to the ordering of things. In television, for instance, a serialized show is one in which the episodes are aired in a specific order to tell a continuous story. Serialism in music involves putting musical elements in some kind of order, whether they are pitches, durations, dynamics, or something else. So note that not all serial pieces use a twelve-tone row.
- “Twelve-tone composition” refers more specifically to music based on orderings of the twelve pitch classes.

This style of composition is commonly associated with a group of composers (sometimes called the “Second Viennese School”) whose members included Arnold Schoenberg, Anton Webern, and Alban Berg.¹ But twelve-tone compositional techniques and the ideas associated with them have been influential for many composers, and serial and twelve-tone music is still being written today. Much of this music shares similar axioms, which we outline in the following chapters, but it’s important to stress that composers have used these basic ideas to cultivate a wide range of different approaches, and that the emphasis for most composers is on the music, with the technique as an important but subsidiary consideration.

Rows

Twelve-tone music is based on a series (sometimes called a row) that contains all twelve pitch classes in a particular order. This order is not the same in each piece—in fact, there are 479,001,600 rows to choose from!² Some of these row forms have been used in multiple works, as they contain properties that several composers may favor, while many others have never been used at all.

Operations

There are four main ways in which composers move a row around without fundamentally changing it. We call these “operations” (in the mathematical sense rather than the medical one).

- **Transposition (T).** Take all the pitches and move them up or down by a specified number of semitones. Transposition is a familiar process from tonal music, but note that (as in [set theory](#)) we’re always working in transposition by semi-tones here and never diatonic steps.
- **Inversion (I).** Reverse the direction of the intervals: rising intervals becoming falling intervals, and vice versa. Again, this is just like melodic inversion in other contexts, and once again, we’re only dealing with exact inversion, preserving the interval size in terms of semitones (not using diatonic inversion or generic intervals here).
- **Retrograde (R).** Reverse the order of pitches so the last comes first, and vice versa. This, too, has a precedent in tonal music with the “retrograde” (also known as the “crab” or “cancrizans”) canon, for instance, though it’s a lot rarer in tonal music than transposition and inversion.
- **Retrograde inversion (RI).** As the name suggests, this really involves combining two of the

1. The “First Viennese School” (by this logic) centers on Haydn, Mozart, and Beethoven.

2. This number comes from the mathematical expression $12!$ (read: “12 factorial”), which means $12 \times 11 \times 10 \dots \times 2 \times 1$.

operations described above: the retrograde and the inversion. The order in which you do those operations does matter, but we'll return to that later on.

Twelve-tone rows that can be related to each other by transposition, inversion, and/or retrograde operations are considered to be forms of the same row. Unless a row has certain properties that allow it to map onto itself when transposed, inverted, or retrograded, there will be 48 forms of the row: the four types—prime (P), inversion (I), retrograde (R), and retrograde inversion (RI)—each transposed to begin on all of the twelve pitch classes. As such, a row produces a collection of 48 forms in what is called a row class.

A fake example

To get a sense of the basic operations the composers perform on tone rows, let's start with a fake example: an ascending chromatic scale starting on C (**Example 1**). Composers tend to prefer more interesting tone rows, but we'll start with this simple case for illustration. Row forms also don't usually commit to placing pitches in a specific octave, but we'll set it out in musical notation and with treble and bass clefs to show the inversions nice and clearly.



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Example 1. A chromatic scale in four forms: prime, retrograde, inversion, and retrograde inversion.

Prime form

The prime form of the row (top left in **Example 1** above) is the main form to which all other forms are related. In some pieces, one form of the row will clearly dominate the texture. If that is not the case, we generally choose the most salient row at the beginning of the work and label it **P** (for “prime”). If more than one row seems equally prominent at the beginning, then simply choose one (flip a coin!). The decision of which to call “prime” is not always important, but it's useful to allocate a single row form to serve as a point of reference.

Any row form that is the same as, or a strict transposition of, that opening prime form is also a prime form. Once you have labeled the main prime form at the beginning of the piece, any subsequent row that

is an exact transposition of that row is prime. Likewise, any row that exhibits the same succession of ordered pitch-class intervals is also a prime form.

Since **P** can be transposed to any pitch-class level, we distinguish them with subscripts. There are multiple common systems for deciding the numbering. The simplest, which we will follow in this book, is to number the row by its starting pitch class. If the prime form begins on G (pitch class 7), it is **P₇**; on B (pitch class 11) it is **P₁₁**. The [Naming Conventions chapter](#) has more on this subject.

Retrograde form

A retrograde form of the row takes a prime form and exactly reverses the pitch classes. Its interval content, then, is the reverse of the prime forms. Retrograde forms are labeled **R** followed by a subscript denoting the last pitch class in the row. This will ensure that if two row forms are exact retrogrades of each other, they will have the same subscript.

For example, if a row has the exact reverse interval structure of the prime forms and ends on F $\sharp$ (6), it is **R₆**, regardless of its first pitch.

Inversion form

A row form that exactly inverts the interval structure of the prime form (for example, 3 semitones up becomes 3 semitones down)³ is in inversion form. Inversion forms are labeled according to the first pitch class of the row form. An inversion-form row that begins on E $\flat$ (3) is **I₃**.

Note that this label is not always the same as the inversion operation that produces it. If you begin with **P₀**, the inversion operation and the resulting row form will have the same subscript. Otherwise, they will be different. Take care not to confuse them.

Retrograde inversion form

The relationship of the retrograde inversion (**RI**) to the inversion (**I**) is the same as that between retrograde (**R**) and prime (**P**). Retrograde inversion forms reverse the pitch classes of inversion forms and are named for the last pitch class in the row form.

3. Or, equivalently, or 9 semitones up, [pb_glossary id="4000"]modulo 12[/pb_glossary].

A real example

Now that we've got the basic idea, let's see how this works in a real musical context, using the same layout and taking as our example the row form in Elisabeth Lutyens's *Motet (Excerpta Tractati Logico-Philosophici)*, Op. 27.⁴



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=623>

Example 2. The row form in *Elisabeth Lutyens, Motet (Excerpta Tractati Logico-Philosophici)*, Op. 27.

Enter the Matrix

As one final piece of technical, terminological preamble, we introduce the matrix (plural: matrices). This is a neat, compact way of setting out all of the 48 rows in a row class on one 12-by-12 grid. By convention:

- A prime form of the row (**P_n**) always appears along the top row *left to right*. For this explanation, let's assume we are beginning with **P₀**.
- Because **R₀** is exactly the same as P₀ in reverse, you already have R₀ also on that top row, by reading from *right to left*.
- **I₀** begins on the same pitch as P₀, so we set that out in the other direction: down along the first column, *top to bottom*.
- **RI₀** is to I₀ as R₀ is to P₀, so again, we read RI forms along the same axis as I, in the opposite direction: *bottom to top*.

Example 3 is the row matrix for the Lutyens *Motet* from **Example 2**. We'll take another look at matrices in the [Naming Conventions chapter](#).

4. This is the row form given by Lutyens in the BL Add. Ms. 64789. manuscript (f.48b). Credit and thanks to Laurel Parsons for providing this.

	I ₀	I ₁₁	I ₃	I ₇	I ₈	I ₄	I ₂	I ₆	I ₅	I ₁	I ₉	I ₁₀	
P ₀	0	11	3	7	8	4	2	6	5	1	9	10	R ₁₀
P ₁	1	0	4	8	9	5	3	7	6	2	10	11	R ₁₁
P ₉	9	8	0	4	5	1	11	3	2	10	6	7	R ₇
P ₅	5	4	8	0	1	9	7	11	10	6	2	3	R ₃
P ₄	4	3	7	11	0	8	6	10	9	5	1	2	R ₂
P ₈	8	7	11	3	4	0	10	2	1	9	5	6	R ₆
P ₁₀	10	9	1	5	6	2	0	4	3	11	7	8	R ₈
P ₆	6	5	9	1	2	10	8	0	11	7	3	4	R ₄
P ₇	7	6	10	2	3	11	9	1	0	8	4	5	R ₅
P ₁₁	11	10	2	6	7	3	1	5	4	0	8	9	R ₉
P ₃	3	2	6	10	11	7	5	9	8	4	0	1	R ₁
P ₂	2	1	5	9	10	6	4	8	7	3	11	0	R ₁₀
	RI ₂	RI ₁	RI ₅	RI ₉	RI ₁₀	RI ₆	RI ₄	RI ₈	RI ₇	RI ₃	RI ₁₁	RI ₀	

Example 3. Row matrix for Lutyens, Motet.

From Theory to Practice

In general, then, the basics of twelve-tone technique stipulate that:

1. Pitch classes are played **in the order specified** by the row.
2. Once a pitch class has been played, **it isn't repeated** until the next row.

Those are the basic “rules” of which all twelve-tone composers are at least aware, but as we said at the outset, composers vary widely in what they actually do with this technique in practice. To that effect, let's take some “exceptional” examples right from the beginning.

Twelve-tone serial, but not so strict

Luigi Dallapiccola's *Piccola Musica Notturna* (literally “little night music,” 1954) certainly features in the canon of well-known twelve-tone works, but note how right from the beginning, and throughout, there is a free and easy attitude to repeating pitches and even motivic figures. There is a row, but it unfolds

gradually, undogmatically. This is key to Dallapiccola's style, to the luxuriant atmosphere of this piece, and to much "serial" music in which some form of deviation from strict practice is extremely common. All told, to my ears at least, this piece has as much to do with the world of Claude Debussy (as a "night time" complement to Debussy's *Prélude à l'après-midi d'un faune*, perhaps?) as to the "strict" serialists.

Serial but not twelve-tone

Likewise, we also get music that's clearly not twelve-tone serial, but that uses strict serial techniques. Listen to [The Lamb](#) by John Tavener. The pitch classes in the soprano melody at the beginning ("Little lamb, who made thee?") are G, B, A, F $\sharp$, G. The soprano then repeats that melody for the second line ("Dost thou know who made thee?"), while the altos sing the inversion:

- Soprano (prime): G–B–A–F $\sharp$ –G
- Alto (inversion): G–E $\flat$ –F–A $\flat$ –G

Then the soprano sings a longer tune ("Gave thee life and bid thee feed / By the stream and o'er the mead") with the second half as a strict retrograde of the first:

- "Gave thee life and bid thee feed" (prime): G–B–A–F $\sharp$ –E $\flat$ –F–A $\flat$
- "By the stream and o'er the mead" (retrograde): A $\flat$ –F–E $\flat$ –F $\sharp$ –A–B–G

Again, we get this melody a second time ("Gave thee clothing of delight / Softest clothing wooly bright") with the altos now singing the inversion:

- Soprano (prime then retrograde): G–B–A–F $\sharp$ –E $\flat$ –F–A $\flat$ | A $\flat$ –F–E $\flat$ –F $\sharp$ –A–B–G
- Alto (inversion then retrograde inversion): G–E $\flat$ –F–A $\flat$ –B–A–F $\sharp$ | F $\sharp$ –A–B–A $\flat$ –F–E $\flat$ –G

Clearly this is a highly serial way of writing. Then again, this passage has a very clear modal final on G, and the two parts (soprano and alto separately) can be considered in terms of standard chord modes. (See [Diatonic Modes](#) to review.)

What do we know?

So, there is a wide range of approaches to making music with the basics of the twelve-tone technique, and it's not always clear what counts. Those differences notwithstanding, at a minimum, twelve-tone rows are used somehow in the construction of:

- **Themes.** That said, note that serial themes are not always (or even often) exactly twelve notes in length, or complete row statements.
- **Motives.** This is pertinent, for instance, in cases where the row form includes several iterations of a smaller cell (see the [Row Properties](#) chapter for more information).
- **Chords.** As we're generally not working within tonal constraints (and even when we occasionally are), there are many different chordal configurations possible. The row's properties give rise to the particular construction of chords used.

Assignments

1. Chose any row from the [Twelve-Tone Anthology](#) that interests you and write out:
 - The row matrix with all 48 row forms (i.e., with numbers on the grid as shown above)
 - **P₀, R₀, I₀, RI₀** in musical notation

Footnotes

NAMING CONVENTIONS FOR ROWS

Mark Gotham

KEY TAKEAWAYS

- This chapter goes through the different ways of representing twelve-tone material:
 - pitches by pitch name or pitch class;
 - rows and transformations with P_0 starts on C (fixed zero) or P_0 starts wherever we chose (moveable zero)
 - matrices, setting out these different row conventions.
- When reading other writing on twelve-tone music, be prepared for any of these conventions to be used. But in your own work, simply choose one you feel comfortable with and use it consistently.

In analyzing twelve-tone music, there are different conventions for labeling rows, transformations, and even pitches and intervals. This chapter compares the main approaches that you're most likely to encounter in analytical writings. The focus is on rows and matrices, but before we get to that, let's deal first with the pitches themselves.

Pitch

As we've seen [earlier in the book](#), it is useful in some analytical contexts to use pitch-class notation ([integers](#) from 0 for C to 11 for B) as an alternative to spelling out those pitches (e.g., $C\sharp$ vs $D\flat$). This convention is mostly associated with non-tonal music (including most twelve-tone music), where it can be handy for performing the kinds of mathematical operations we've seen (in both [pitch-class set analysis](#) and [twelve-tone music](#)) and for sidestepping questions of pitch spelling. There's often still a logic to the pitch spellings used in a twelve-tone piece, but that logic is often of a different and perhaps less

generalizable kind. For instance, using specific pitch spellings in a row-form representation usually doesn't reflect a hierarchy or tonality in the same way that the pitches of a scale do in tonal music.

Rows

For rows, the main difference in notation and labeling centers on a single choice about which pitch to organize our rows around:

1. the **same pitch** in all contexts (conventionally, that pitch is C)
2. a pitch that's **important to the musical context** in question

For instance, in the [Basics of Twelve-Tone Theory chapter](#), we set out the row of Elisabeth Lutyens's *Motet* starting on C, which gave us the twelve-tone row 0–11–3–7–8–4–2–6–5–1–9–10. Alternatively, we could set out the P_0 starting on D, as the first voice to enter (alto) starts on D₄ and proceeds to sing the first hexachord of this prime-form row on that pitch level.¹ That would give us a P_0 of 2–1–5–9–10–6–4–8–7–3–11–0.

Option 1: P_0 starts on C (fixed zero)

In this convention, whatever you decide the prime form to be, the transposition of that form starting on C is P_0 . This is probably the most common convention today, and sometimes called “zero-centered” or “fixed-zero” (by analogy to tonal solfège systems).

As we have set P_0 to begin on C, I_0 also begins on C, and R_0 and RI_0 will *end* on C. This separation of P_0 and I_0 from R_0 and RI_0 makes sense because we prefer P_0 and R_0 to be exact retrogrades of one other (and likewise I_0 and RI_0). We could theoretically have an even more consistently “zero-centered” system in which all of P_0 , I_0 , R_0 and RI_0 begin on C, but that's not a convention that people have widely adopted.

In summary:

- P_0 starts with C
- I_0 starts with C (same pitch class as P_0)
- R_0 starts with the last note of P_0 (by definition, not C)
- RI_0 starts with the last note of I_0 (by definition, not C)

1. The actual row distribution is a bit more complicated. See Parsons 1999 for an analysis and discussion.

Option 2: P_0 starts wherever we chose (moveable zero)

In the alternative method, the P_0 form is assigned to either the first form of the row or the one that is most meaningful—regardless of what pitch class begins the row. Depending on the context, this may be evident from the piece, deduced from the analysis, or allocated semi-arbitrarily. Transpositions and other operations are then worked out in the same way, in relation to that P_0 form. This convention is sometimes called “original-centered” or “movable-zero” (to continue the solfège analogy).

In summary:

- P_0 takes a transposition (and thus starts with a pitch) chosen by the analyst
- I_0 still starts with the same note as P_0
- R_0 still starts with the last note of P_0
- RI_0 still starts with the last note of I_0

Same? Different? Better? Worse?

As the two summaries suggest, these naming conventions are actually not so different. It bears repeating that for all naming systems, transposition and the other operations all work in the same way, so it’s mostly just a matter of where you start: which row form you use as the referential form to relate others to.

And as is so often the case when multiple parallel naming conventions emerge, there are both benefits and downsides to each approach. If you’re analyzing music that makes you want to assign P_0 in a musically sensitive way, then the moveable-zero convention may suit your purposes. But if you go down that route, then you’ll probably feel compelled to come up with a “good” reason for the pitch level of P_0 in all your analyses, and that may not always be appropriate. The fixed-zero system has the benefit of clarity and consistency. That’s probably why it’s become more common in recent scholarship, but that doesn’t necessarily make it “better.”

Indeed, in many cases, it won’t even be clear which orientation should be P and which I (or R for that matter). Unfortunately, there isn’t yet a widely recognized system for making such determinations.

Matrices

Before we wrap this up, there’s one final confusion to add to the pile: how to set out these conventions on the row matrix. Here are three types.

Type 1

First, here's a reminder of the matrix we saw for the Lutyens example [in the last chapter](#) (**P₀** starts on C and is in the top row). This is probably the most common and standard form.

	I₀	I₁₁	I₃	I₇	I₈	I₄	I₂	I₆	I₅	I₁	I₉	I₁₀	
P₀	0	11	3	7	8	4	2	6	5	1	9	10	R₁₀
P₁	1	0	4	8	9	5	3	7	6	2	10	11	R₁₁
P₉	9	8	0	4	5	1	11	3	2	10	6	7	R₇
P₅	5	4	8	0	1	9	7	11	10	6	2	3	R₃
P₄	4	3	7	11	0	8	6	10	9	5	1	2	R₂
P₈	8	7	11	3	4	0	10	2	1	9	5	6	R₆
P₁₀	10	9	1	5	6	2	0	4	3	11	7	8	R₈
P₆	6	5	9	1	2	10	8	0	11	7	3	4	R₄
P₇	7	6	10	2	3	11	9	1	0	8	4	5	R₅
P₁₁	11	10	2	6	7	3	1	5	4	0	8	9	R₉
P₃	3	2	6	10	11	7	5	9	8	4	0	1	R₁
P₂	2	1	5	9	10	6	4	8	7	3	11	0	R₁₀
	R₁₂	R₁₁	R₁₅	R₁₉	R₁₀	R₁₆	R₁₄	R₁₈	R₁₇	R₁₃	R₁₁	R₁₀	

Type 2

Now here's the same matrix, with **P₀** still on the top row, but with that **P₀** starting on D. Note how the lists of row forms stay the same (**P₀**, **P₁**, **P₉**...), but the pitches have moved around.

	I₀	I₁₁	I₃	I₇	I₈	I₄	I₂	I₆	I₅	I₁	I₉	I₁₀	
P₀	2	1	5	9	10	6	4	8	7	3	11	0	R₁₀
P₁	3	2	6	10	11	7	5	9	8	4	0	1	R₁₁
P₉	11	10	2	6	7	3	1	5	4	0	8	9	R₇
P₅	7	6	10	2	3	11	9	1	0	8	4	5	R₃
P₄	6	5	9	1	2	10	8	0	11	7	3	4	R₂
P₈	10	9	1	5	6	2	0	4	3	11	7	8	R₆
P₁₀	0	11	3	7	8	4	2	6	5	1	9	10	R₈
P₆	8	7	11	3	4	0	10	2	1	9	5	6	R₄
P₇	9	8	0	4	5	1	11	3	2	10	6	7	R₅
P₁₁	1	0	4	8	9	5	3	7	6	2	10	11	R₉
P₃	5	4	8	0	1	9	7	11	10	6	2	3	R₁
P₂	4	3	7	11	0	8	6	10	9	5	1	2	R₁₀
	R₁₂	R₁₁	R₁₅	R₁₉	R₁₀	R₁₆	R₁₄	R₁₈	R₁₇	R₁₃	R₁₁	R₁₀	

Type 3

Perhaps most confusing of all is a kind of hybrid version where we still have the D version on the top row, but now we label it **P₂**. So:

- We organize the row class around a chosen pitch/transposition (here D).
- We still label the row forms around the alternative option (**P₀** starts on C).

Note how this time, comparing it with the version above, the pitches have stayed the same, but the lists of row forms have changed (**P_x**, **P_y**...).

	I₂	I₁	I₅	I₉	I₁₀	I₆	I₄	I₈	I₇	I₃	I₁₁	I₀	
P₂	2	1	5	9	10	6	4	8	7	3	11	0	R₂
P₃	3	2	6	10	11	7	5	9	8	4	0	1	R₃
P₁₁	11	10	2	6	7	3	1	5	4	0	8	9	R₁₁
P₇	7	6	10	2	3	11	9	1	0	8	4	5	R₇
P₆	6	5	9	1	2	10	8	0	11	7	3	4	R₆
P₁₀	10	9	1	5	6	2	0	4	3	11	7	8	R₁₀
P₀	0	11	3	7	8	4	2	6	5	1	9	10	R₀
P₈	8	7	11	3	4	0	10	2	1	9	5	6	R₈
P₉	9	8	0	4	5	1	11	3	2	10	6	7	R₉
P₁	1	0	4	8	9	5	3	7	6	2	10	11	R₁
P₅	5	4	8	0	1	9	7	11	10	6	2	3	R₅
P₄	4	3	7	11	0	8	6	10	9	5	1	2	R₄
	RI₂	RI₁	RI₅	RI₉	RI₁₀	RI₆	RI₄	RI₈	RI₇	RI₃	RI₁₁	RI₀	

Summary

In summary, the first row can read:

- **P₀**, starting on 0
- **P₀**, starting on n (here 2)
- **P_n**, starting on n

All of these naming and matrix-generating conventions are out there. It's best simply to be aware of these options and check that you have the right convention in mind when you come across one (especially where the matrices neglect to explicitly label the row names).

Further Reading

- Parsons, Laurel, 1999. "Music and Text in Elisabeth Lutyens's Wittgenstein Motet." *Canadian University Music Review* 20 (1): 71–100.

Assignments

1. Chose any row from the [Twelve-Tone Anthology](#) that interests you and write out the row matrix with all 48 row forms (i.e., with numbers on the grid as shown above) in each of the three ways shown above. (Then choose your favorite method and never do this again!)

Footnotes

ROW PROPERTIES

Mark Gotham and Brian Moseley

KEY TAKEAWAYS

- Some rows are used more by composers than others. Often this is because of the row's properties.
- This chapter explains some row properties that are especially common:
 - all interval
 - derived rows
 - Invariance
 - Hexachordal combinatoriality
 - Partially-ordered sets
- The [Twelve-Tone Anthology](#) has more detail on this topic.

Twelve-tone composers may view the notes in a tone row as equal, but they do not appear to feel the same way about different row forms. Instead, rows with certain properties have disproportionately attracted composers' attention. This chapter surveys some of the special types of properties and row forms to look out for. A recurring focus is on the properties of the smaller constituent parts of a row—its internal segments. There are two ways to view these constituent parts: overlapping and discrete.

Overlapping Segments and the “All-Interval” Row

Considering every “overlapping” segment of a row means looking at segments starting at each pitch in turn. For instance, for dyads (two pitches, one interval), we look at pitches 1 and 2, then 2 and 3, followed by 3 and 4, and so on. By considering two pitches at a time and stepping forward by one, there's always one pitch overlapping. That specific approach gives us the interval content of a row and allows us to identify our first notable row type: the all-interval row.

While all standard twelve-tone rows include all twelve distinct pitches, only some also feature all eleven distinct intervals between neighboring pitches (**Example 1**). There are 1,928 distinct row forms with this all interval property, but again, some of them have appealed to composers more than others. One true-by-definition property of these rows is that there is a tritone between each pair of notes around the central pair, i.e., between notes 1 and 12, 2 and 11, 3 and 10, 4 and 9, 5 and 8, and 6 and 7. In **Example 1**, for instance, the row starts with A and ends with D $\sharp$, and so on.



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Example 1. *An all-interval row from Luigi Nono, *Il Canto Sospeso*.*

This example of an all-interval row is a linear layout of the so-called “Grandmother chord” (credited to Nicolas Slonimsky). To produce this succession of pitches, start with a semitone up (interval class 1), then a tone down (interval class 10), and continue to alternate odd and even intervals with the odd intervals getting successively larger and the even ones smaller. As a consequence, the resulting pitch succession can be viewed as two interleaved chromatic scales (as shown in **Example 1**) which is essentially a chromatic wedge and can therefore be seen to have precedents in tonal works such as fugues by Bach (BWV 548) and Shostakovich (24 Preludes and Fugues, Op. 87, no. 15).¹

Discrete Segments and “Derived” Rows

The alternative segmentation method is to look at the discrete (non-overlapping) parts of a row. This is perhaps the most common way of thinking about row forms. Given this constraint, a twelve-tone row can be divided into six dyads, four trichords, three tetrachords, or two hexachords. The fact that there are so many of these options is a property of the number 12 and one of the benefits of having a 12-based system.

In turning from overlapping to discrete segments, we also tend to turn our attention from considerations of “all” to “only.” Specifically, it has been a preoccupation of some serial composers to find and use row forms featuring several instances of only one pitch class set.

1. That the wedge is the subject of a fugue in both these cases, and therefore a central focus, recurring frequently throughout, perhaps strengthens the connection.

Example 2 is a classic example from Anton Webern’s String Quartet, Op. 28. The brackets below the notes indicate the three discrete tetrachords belonging to the same set class: (0123), a chromatic tetrachord. Slurs above show a similar consistency in the discrete dyads, which are all semitones.



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Example 2. A row from Anton Webern’s String Quartet Op. 28, divided into discrete segments. Notice the limited number of set classes and intervals.

Rows with this property are sometimes called derived rows, meaning that the whole row can be considered to be made out of (“derived” from) one pitch-class set. It’s worth also noting the more specific use of the term, where a new row with this property is derived more directly from an existing one with the relevant set as one of its subsegments. For instance, the row above might have been derived from another row that happened to have a (0123) subsegment in it.

From a compositional and listener-oriented perspective, derived rows are very suggestive. Because the set-class content of a row doesn’t change when it’s transposed, inverted, etc., these set classes will circulate constantly throughout a piece, even as different row forms are used. Therefore, a derived row guarantees the regular recurrence of set classes, which can be helpful in cultivating a particular type of unity.

(Segmental) Invariance

Invariance refers to the preservation of something. Any musical attribute (such as a series of intervals, dynamics, rhythms, or pitches) may be kept the same from one context to another. While other parts of the music change, the aspect in question is not varied: hence the term “invariant.” In twelve-tone theory, we are mostly concerned with intervallic invariance and pitch-class segmental invariance. The first type, intervallic invariance, is very common. Any time a row is transposed, the ordered intervallic content of the row is unchanged. (Likewise, retrograde inversion creates retrograde intervallic invariance.)

Segmental invariance is rarer and warrants separate comment here. Where a pitch-class segment of a row remains in place when that row is transformed, we say that the segment is “held invariant” (**Example 3**). The upper staff reproduces the row as we saw it in **Example 2** (with the discrete tetrachords shown), and the lower staff sets out the same row transposed up four semitones (or, equivalently, down eight), i.e.,

as P_4 . Notice that these two different rows (P_0 and P_4) comprise the same tetrachords, not only in terms of set class, but in terms of absolute pitches:

- The first four pitches of P_0 (the first measure in the example) are the last four pitches of P_4 . This is shown in light blue.
- The middle four pitches of P_0 (the second measure in the example) are the first four pitches of P_4 . This is shown in red.
- The last four pitches of P_0 (the final measure in the example) are the middle four pitches of P_4 . This is shown in navy.

We say that these tetrachords are *invariant segments*. These segments are held invariant because they share the same relationship with one another as that shared between the rows: because the tetrachords are related by T_8 , when the whole row is transposed by T_8 , those tetrachords are “held invariant.” Put another way, when the first tetrachord is transposed up four semitones, it *becomes* the last tetrachord, so the same thing happens when the whole row is transposed by that interval.



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Example 3. Segmental invariance in Anton Webern's *String Quartet Op. 28*.

To determine when and if a pitch-class segment of a row will be held invariant:

1. Find an equivalent set-class elsewhere in the row. This may be a dyad, trichord, tetrachord, etc.
2. Determine the transpositional or inversive relationship between them.
3. When the row is transposed or inverted by that *same* relationship a segment will be held invariant.

Hexachords

While discussion of derived rows typically focuses on subsegments of three or four notes, the two discrete hexachords of a row (i.e., the two halves, pitches 1–6 and 7–12) have attracted at least as much attention from theorists and composers over the years, not least in terms of hexachordal combinatoriality.

Hexachordal combinatoriality

For a standard twelve-tone row with each pitch stated exactly once, the first hexachord (half) of P_0 complements the second half: they make up the total chromatic collection together. Since the first hexachord of R_0 has the same pitches as the second hexachord of P_0 by definition, we can also observe that the first hexachords of P_0 and R_0 are complementary—giving you the total chromatic collection. This illustrates that we can also find complementary hexachords by comparing two row forms.

By definition, this relation holds between P_0 and R_0 , and all other P–R and I–RI pairs (e.g., I_4 – RI_4). This “combinatoriality” relation becomes meaningful when it holds between rows related by other transformations, i.e., between a P–P, P–I, or P–RI pair. Using Milton Babbitt’s terminology, we distinguish between two degrees of this relation:

- **Semi-combinatorial** pairs are related by one such transformation: transposition (P–P), inversion (P–I), or retrograde inversion (P–RI).
- **All-combinatorial** pairs are related by each such serial transformation. There are only six distinct rows with this property where this relation holds between the row and transformations of itself. Repertoire examples include the row of Webern’s *Symphonie* (as explored further in [the next chapter](#)).

(014589): The “magic hexachord”

Just as the properties of some rows have attracted composers, so too have some hexachords. We’ll introduce just one “celebrity” hexachord here: set class (014589), the so-called “magic hexachord” (also known as the “hexatonic collection,” “hexatonic set class,” or “Ode-to-Napoleon hexachord”). This hexachord has the following properties:

- Creates all-combinatorial rows unusually readily, for instance, by transposition in three ways (+/-2 and 6 semitones). Only the whole-tone collection (02468t) exceeds this, with combinatoriality by transposition of any odd-numbered interval.
- Related to the 1:3 “distance model” mode discussed in the [Collections](#) chapter.
- Many internal triads: this set contains within it all the pitches of the hexatonic cycle discussed in the [neo-Riemannian](#) chapter.
- Has only one possible five-note subset, set class (01458).
- Has only one possible seven-note superset: (0124589), which is the complement of that five-note subset, (01458).
- Used in many pieces, including Webern’s *Konzert* (as discussed in [the next chapter](#)),

Schoenberg's *Ode to Napoleon* (hence one of its names), and works by Maderna and Nono.

“Partially ordered” sets

When is “serial” music not really serial? Surprising as it might seem, the answer is “often.” In the strict sense that twelve-tone music is supposed to be consistently based on a fixed succession of the twelve pitches in a simple (transposed and/or inverted) version of a referential row, much of what we call “serial” music doesn’t actually work like that.

A key example of this is the idea of a “partially ordered” set (another term borrowed from mathematics), which gives us a more flexible constraint than all twelve pitches being in a fixed order. Derived rows provide a good introduction to this situation. As we’ve seen, derived rows comprise one context in which we focus on the constituent segments (tetrachords, for instance) of a row and their set class. It’s a small step from this to a “row” that is defined more by the content of those segments than by any specific ordering.

Example 4 shows Webern’s Op. 28 row one more time (upper staff), and it creates a new row by reversing each pair of pitches (lower staff). The second case has the same dyadic and tetrachordal segments as the first, but the internal order of those segments has changed. By definition, we still have a row with all twelve pitches, but a different one.



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Example 4. Partially re-ordered row created from Anton Webern’s row in *String Quartet*, Op. 28.

We provide the Webern example for illustration; really, this is a concept introduced later, by Milton Babbitt, and the kinds of re-ordering can get a lot more complex. While this practice clearly deviates from the “strict” definition of twelve pitches in a fixed order, what they share is a constant turning over of the total chromatic collection (aggregate). Moreover, even in “strict” serialism, composers still use chords (several pitches sounding at once), which necessitates thinking more in the partially ordered sense than in the strictly serial sense. In short, at least some form of this thinking is very, very common indeed.

Finally, how significant is it for rows to be related by partial ordering? First, recall that there are hundreds

of millions of different orderings of the twelve pitches. Well, there are fewer when you fix the hexachords in place (and fewer still for smaller subsegments), but still a lot! Here are some numbers:

- Any ordering of the 12 pitches: $12! = 490,001,600$
- Hexachords fixed: $6! \times 6! = 720^2 = 518,400$
- Tetrachords fixed: $4! \times 4! \times 4! = 24^3 = 13,824$
- Trichords fixed: $3! \times 3! \times 3! \times 3! = 6^4 = 1,296$
- Dyads fixed: $2! \times 2! \times 2! \times 2! \times 2! \times 2! = 2^6 = 64$

So this alone might be considered weak grounds for meaningful relation between row forms, especially as the interval content changes with each pitch permutation. As so often in analysis, it all comes down to how the composer actually uses the property in practice.

Other Special Types of Row Forms

This chapter has surveyed only a few of the many row properties that composers have explored. We end simply with a short list of some others, as a nod to the huge range out there.

Symmetrical interval progressions: While a strictly symmetrical succession of *pitches* is obviously not possible (given that we don't repeat pitches within the row), a symmetrical succession of *intervals* is, and rows with this property are popular among some composers.

“Cyclic series” rows (George Perle): This term and property refer to rows in which the pairs of notes separated by one all form the same interval, i.e., the interval between pitches 1 and 3 is the same as that between 2 and 4, and so on.

Rows with more or fewer than twelve notes: Some composers have explored serial processes with tone rows longer or shorter than twelve notes. Clearly this leads to slightly different properties (e.g., repeating notes in the case of rows with more than twelve notes), but the compositional processes and priorities can be the same. And as we noted at the start of this section, “serial” thought is not limited to twelve-tone thinking anyway. Examples include:

Ruth Crawford Seeger, *Diaphonic Suite No. 1*: 7–9–8–11–0–5–1–7 (9 notes)

Ruth Crawford Seeger, String Quartet: 2–4–5–3–6–9–8–7–1–0 (10 notes)

Elizabeth Lutyens, *Requiescat In Memoriam Igor Stravinsky*: 6–8–4–2–11–0–3–1–5–7–10 (11 notes)

Elizabeth Lutyens, *Chamber Concerto*, Op. 8, no. 1, mvmt. I: 3–2–5–6–11–0–7–1–9–10–2–6–8–5–4 (15 notes)

Assignments

1. Head to the [Twelve-Tone Anthology](#) and pick any row listed in the sections on derived rows (e.g., “6x Same Dyad (interval)” or “4x Same Trichord”).
 - Write out the full row in musical notation.
 - Put slur lines over each repeated segment (e.g., 4 x 3 notes in the “4x Same Trichord”).
 - Separately (e.g., below), write out those subsegments as chords.

Footnotes

ANALYSIS EXAMPLES - WEBERN OP. 21 AND 24

Mark Gotham

KEY TAKEAWAYS

- When approaching twelve-tone music, it's easy to get bogged down simply identifying row forms and lose sight of the bigger picture.
 - A list of row forms used in a twelve-tone work is similar to a list of keys in a tonal work—useful, but not enough on its own to be called an analysis.
- This chapter considers two iconic works of early twelve-tone music – Webern's Op. 21 and Op. 24 – with analysis of both the
 - technical details of constructing symmetrical row and composing serial canons, with
 - wider issues about the work to consider, such as the meaning of a “Symphony” and “Concerto” in this context.
- Scores may be found on IMSLP.org ([Op. 21](#); [Op. 24](#))

Webern: *Symphonie* Op. 21 (1928)

Even the title of Anton Webern's *Symphonie* Op. 21 raises questions. Why would Webern choose to call this a symphony? If we think of a symphony as having certain types of key relations, then is an atonal symphony an oxymoron? Commentators have a range of reactions to this question:

- “in choosing the most resonant of classical titles Webern stressed the extent to which it could still be relevant to a work in which only certain structural principles remain valid.” (Whittall 1977, 163).
- “There is little or nothing in its formal procedures to compare with those of the traditional symphony.” (Taruskin 2010, 728).

Keep these questions in mind as we consider the nuts and bolts of the work.

Row form



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Example 1. *The row of Op. 21, along with the trichordal and hexachordal divisions.*

Webern frequently chooses what you might think of as “neat” row forms, and this work is no exception (see **Example 1**). The row breaks up neatly into two equivalent hexachords that are instances not simply of the same pitch-class set but of set 6-1 specifically: half a chromatic scale. In short, each fills the total chromatic collection of half the twelve-tone space.

Further, those hexachords are each set out with one instance of trichord (013) and one of (014). Altogether, the four trichord cells map out as (013), (014), (014), (013). These two trichords are further linked by their shared melodic shape: each involves a third (major or minor) and a semitone.

Here is the row matrix, with the symmetry of P_0 and R_6 highlighted by showing the first six notes of each in bold.¹

1. Note that this is sometimes set out in an alternative format, with P and I the other way around. Bailey (1991, appendix II) after Webern's sketches uses this alternative format. These kinds of decisions are often not clearly "better" one way or the other.

	I ₀	I ₉	I ₁₀	I ₁₁	I ₇	I ₈	I ₂	I ₁	I ₅	I ₄	I ₃	I ₆	
P ₀	9	6	7	8	4	5	11	10	2	1	0	3	R ₀
P ₃	0	9	10	11	7	8	2	1	5	4	3	6	R ₃
P ₂	11	8	9	10	6	7	1	0	4	3	2	5	R ₂
P ₁	10	7	8	9	5	6	0	11	3	2	1	4	R ₁
P ₅	2	11	0	1	9	10	4	3	7	6	5	8	R ₅
P ₄	1	10	11	0	8	9	3	2	6	5	4	7	R ₄
P ₁₀	7	4	5	6	2	3	9	8	0	11	10	1	R ₁₀
P ₁₁	8	5	6	7	3	4	10	9	1	0	11	2	R ₁₁
P ₇	4	1	2	3	11	0	6	5	9	8	7	10	R ₇
P ₈	5	2	3	4	0	1	7	6	10	9	8	11	R ₈
P ₉	6	3	4	5	1	2	8	7	11	10	9	0	R ₉
P ₆	3	0	1	2	10	11	5	4	8	7	6	9	R ₆
	RI ₀	RI ₉	RI ₁₀	RI ₁₁	RI ₇	RI ₈	RI ₂	RI ₁	RI ₅	RI ₄	RI ₃	RI ₆	

Example 2. Row matrix for Op. 21.

Overall, the row is retrograde equivalent, which is to say, if you play it backwards (R), you have a transposed version of the original (P). When we have equivalences of this kind, there are no longer 48 distinct row forms. Here we have pairs of equivalent rows, and so there are 24 distinct forms (48 divided by 2).

Webern brings out this symmetrical row by overlapping the ends of row forms with the beginning of the next.

Movement 1

Webern describes the first movement as a “double canon in contrary motion,” where “contrary motion” means the same thing as “inversion.” You could think of the overall form as $\parallel:A:\parallel:BA':\parallel$ as follows:

- **A:** From m. 1 to the double bar (mm. 23–25).
- **B:** palindromic: m. 35 as the midpoint of mm. 25–43 in the clarinet (or mm. 26–42 in the cello).

- **A'**: “row recapitulation” from m. 43 (rows only, not motivic rhythm, etc.).

Does that remind you of something symphonic? The repeat markings and the material distribution are loosely suggestive of the Exposition and Development–Recapitulation repeats in sonata form works, or at least rounded binary.

So that might be chalked up in favor of the symphonic reading. On the other hand, the extensive symmetry of the row doesn't end there. Bailey (1991, 96) has described the middle section especially as a symmetrical “tour de force.” Recapitulations and cyclic forms are one thing, but for Western classical music, serious adherence to symmetry is a peculiarly 20th-century concept. Speaking about a chordal version of this issue, the British composer Jonathan Harvey once described the symmetrical strategy of moving the bass into the middle as “our revolution” (1982, 2).

Another key consideration at odds with the notion of sonata form is the extensive canons in each section. For instance, in the opening, there's a double canon between pairs of parts (P₀ and I₀; I₈ and P₄) as follows:

	Row form	Instruments
Canon 1	P ₀	Horn 2 → clarinet → cello; elides with cello → clarinet → horn 2
	I ₀	Horn 1 → bass clarinet → viola; elides with viola → bass clarinet → horn 1
Canon 2	I ₈	Harp → cello → violin 2 → harp → horn 2 → harp → horn 2 (...)
	P ₄	Harp → viola → violin 1 → harp → horn 1 → harp (...)

Example 3. *Canons in the beginning of Op. 21.*

Notice the similar timbral sequences in the two pairs. For instance, in the first pair, we have a horn part, then a clarinet part, and finally a lower string instrument before returning symmetrically back the way we came. Breaking up the melodic line in this way is sometimes called *Klangfarbenmelodie* (sound-color melody) and is not unique to the atonalists. Mahler loved to share out melodies this way, for instance (see [Orchestration](#)). Perhaps Webern's most iconic example of this technique is his orchestration of J.S. Bach's Ricercar from the *Musical Offering*.

Movement 2: Variations; a double canon with retrograde

With the second movement, there's no disputing the title: “Variations” is certainly apt, and the structure is brought out in typically Webernian fashion using all the parameters. Here's a brief synopsis in note form of what's going on:

Theme (related to the coda)

- Measures 1–11.
- Phrases divide into two groupings of 5.5 + 5.5 measures; m. 6 is the midpoint.
- Row I₈ is in the clarinet; I₂ in the other parts.
- Uses hexachordal combinatoriality.

Variation 1 (related to variation 7)

- Measures 11–23; beginning elides with the theme.
- A double canon at the quarter note: violin 1 pairs up with cello; violin 2 with viola.
- Across those pairs, violin 1 (I₃) is R-related to violin 2 (I₉); the viola (P₇) is likewise R-related to cello (P₁).
- Phrases divide into 6 + 6 measures; the midpoint is m. 17 for the violins, m. 18 for the viola and cello. The violins swap rows, as do the viola and cello.
- The ending elides with variation 2.

Variation 2 (related to variation 6)

- Measures 23–34.
- Phrases divide into 6 + 6 measures (midpoint at m. 29).
- However, there is a free third part (horn 1). The on-beats play P₈ while the off-beats play I₇, so the eighth notes are alternating between the two rows.
- The ending elides with variation 3.

Variation 3 (related to variation 5)

- Measures 34–44.
- Phrases divide into 1 + 4 + 1 + 4 + 1 measures; midpoint in m. 39.
- Symmetrical melodic figure in each part, and sixteenth-note motion.

Variation 4

- Measures 45–55.
- Webern himself describes this variation as the midpoint of the movement.
- Phrases divide into 5 + 1 + 5; m. 50 is the midpoint.

Variation 5 (related to [variation 3](#))

- Measures 56–67.
- Pitches are presented in four-note cells:
 - Viola, cello: [5, 6, 7, 8]
 - Violins: [11, 0, 1, 2]
 - Harp: [3, 4, 10, 9]
- These four-note cells create a twelve-tone aggregate, but the composition is not row-based.
- Each part has a symmetrical melodic figure.

Variation 6 (related to [variation 2](#))

- Measures 67–77.
- Canon at the quarter note between the bass clarinet and clarinet parts.
- Free third part (horn 1), the retrograde of the free part in Variation 2.
- Midpoint in m. 73.

Variation 7 (related to [variation 1](#))

- Measures 78–88.
- Triple canon: cello/violin 1, viola/violin 2, and clarinet/bass clarinet. Each line of the three canons is distinguished by timbre and rhythm.
- Midpoint in m. 83.

Coda (related to the [theme](#))

- Measures 89–99.
- Phrases are divided into 5.5 + 5.5 measures, with m. 94 as the midpoint.

Issues

You'll have noticed some recurring themes in the analysis above; perhaps the most all-pervasive among them is the symmetry Webern adopts from the internal structure of the row, right up to the organization of whole movements.

Does this make it thoroughly modern? Or does the symmetry contribute to a new kind of goal-directed (teleological) music typical since at least Beethoven? How do we feel about the occasional direct historical precedent like the entirely symmetrical Minuet and Trio in Haydn's 47th symphony?

Most importantly, what is the aural effect of all this symmetry? Did the Harvey quote above make you bristle? There are reasons based in acoustics for why composers have historically tended to build up chords from the actual bass after all. Similarly, we can't really "hear" linear symmetry (hear in reverse) the same way that we can see symmetry in a painting, for instance. That said, Webern has gone to considerable lengths (at least in places) to illuminate the structure of the work. For Cook, "everything [in the *Symphonie*] is designed to make the series audible" (1987, 295).

Perhaps we should consider this alongside other 20th-century "symphonies with a twist." Think of Stravinsky's many "Symphonies" ("in C," "of Psalms," "of Winds"), none of them numbered in the traditional way. If nothing else, these works seem to speak of a conviction to the musical traditions these composers inherited, just as Schoenberg was so keen to locate his apparently radical, modernist works in that tradition, and particularly as heir to the work of Brahms.

Webern: *Konzert* Op. 24 (1934)

Webern's *Konzert* (Concerto) raises many of the same technical and wider musical issues as the *Symphonie*. It has a similarly "neat" row (**Example 4**), and a similarly suggestive title, apparently alluding to a long-standing musical tradition.

The row



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Example 4. *The row of Webern's Konzert (Op. 24) along with the trichordal and hexachordal divisions.*

Once again, we have two equal hexachords of set class (014589) and a meaningful division into four trichords. This time, those trichords are all instances of the same set class: (014). This structural division is made abundantly clear in the first few measures, in which the row is set out in its four parts in separate instruments, pulse values, and registers. This is followed by a rest in all instruments. You couldn't hope to see a clearer row "exposition."

But that's not all. If you permute the order of those trichord cells, you can get other, related row forms:

- Obviously, reversing the order of the cells can give you a P/R pair of rows (P = 1234; R = 4321).
- Additionally in this case, the order 2143 gives you an I row, and so the reverse of that (3412) is an RI row.

That being the case, we have a set of four equivalent rows, and thus only twelve distinct row forms this time. For instance, P₀ is the same as RI₇ starting that rotation from the seventh note, as shown by the bold in the matrix below. This all amounts to a particularly clear and determined level of coherence.

Example 5 gives the row matrix. Again (and perhaps more surprisingly this time) this arrangement does not correspond to the allocation of P₀ by Webern in the sketches.

	I ₀	I ₁₁	I ₃	I ₄	I ₈	I ₇	I ₉	I ₅	I ₆	I ₁	I ₂	I ₁₀	
P ₀	11	8	2	3	7	6	8	4	5	0	1	9	R ₀
P ₁	0	11	3	4	8	7	9	5	6	1	2	10	R ₁
P ₉	8	7	11	0	4	3	5	1	2	9	10	6	R ₉
P ₈	7	6	10	11	3	2	4	0	1	8	9	5	R ₈
P ₄	3	2	6	7	11	10	0	8	9	4	5	1	R ₄
P ₅	4	3	7	8	0	11	1	9	10	5	6	2	R ₅
P ₃	2	1	5	6	10	9	11	7	8	3	4	0	R ₃
P ₇	6	5	9	10	2	1	3	11	0	7	8	4	R ₇
P ₆	5	4	8	9	1	0	2	10	11	6	7	3	R ₆
P ₁₁	10	9	1	2	6	5	7	3	4	11	0	8	R ₁₁
P ₁₀	9	8	0	1	5	4	6	2	3	10	11	7	R ₁₀
P ₂	1	0	4	5	9	8	10	6	7	2	3	11	R ₂
	RI ₀	RI ₁₁	RI ₃	RI ₄	RI ₈	RI ₇	RI ₉	RI ₅	RI ₆	RI ₁	RI ₂	RI ₁₀	

Example 5. Row matrix for Op. 24.

Cell

Each cell can also be understood as an *ordered* trichord, like a miniature three-note row. Each iteration of the cell involves interval class 4 and interval class 1 in opposite directions. Across the four iterations in a

row, we get each of the four ways of setting this out. In the case of P_0 , this involves $\langle -1, +4 \rangle$, $\langle +4, -1 \rangle$, $\langle -4, +1 \rangle$, and $\langle +1, -4 \rangle$.

That being the case (and at the risk of confusing matters), we could think of the P, R, I, and RI versions not just of each row, but of each cell. Continuing to work on the basis of P_0 , we have:

1. P: $\langle -1, +4 \rangle$
2. RI: $\langle +4, -1 \rangle$
3. R: $\langle -4, +1 \rangle$
4. I: $\langle +1, -4 \rangle$

In this way, each cell is related to every other as shown in **Example 6**:

	Trichord 1	Trichord 2	Trichord 3	Trichord 4
Trichord 1	-	RI	R	I
Trichord 2	RI	-	I	R
Trichord 3	R	I	-	RI
Trichord 4	I	R	RI	-

Example 6. Relationships between ordered trichords in the row for Op. 24.

It's hardly surprising given all of this that Webern was a fan of the "Sator Square": a two-dimensional Latin palindrome that can be read in any direction and still make sense (**Example 7**).

That all said, the four-trichord approach is not the only way of using the row. It's focal in the first movement, while the second movement primarily employs cells of two and four notes, highlighting interval class 1 (usually set out as a major seventh).

Discussion

Once again, we have the looming question of a tradition with highly codified expectations. What kind of concerto might this be? The idea of a piano concerto finds some support in the distribution of row forms across the work. For instance, that first exposition of the row falls to instruments other than the piano, and then there's the full-ensemble rest and a second exposition of the row on the piano alone. Conceptually at least,

S	A	T	O	R
A	R	E	P	O
T	E	N	E	T
O	P	E	R	A
R	O	T	A	S

Example 7. The Sator Square.

this is a neat fit for the double exposition of concerto first movements—one of the main hallmarks by which sonata form in concertos differs from other contexts.

Are we clutching at straws on the basis of just two statements of the row? Maybe, but then again, Webern is no stranger to the practice of cultivating comparable processes on the very small and large scale, so it's worth paying attention to these kinds of clues as possible "statements of intention" in the same way that we should take notice of the first highly chromatic event in a Schubert sonata.

In this work, the relationship between piano and orchestra continues to reward analytical attention. After those first few measures, the first major section of the movement moves from that initial clear, *successive* separation of piano from ensemble to a situation where they remain separate in terms of row forms, but sound *simultaneously*. You can analyze the whole work in terms of this relation, and there are many moments where there appears to be both a structural boundary and a change in the relation between piano and ensemble. Examples include the separation in m. 50 and rejoining in m. 63.

Even if you find this line of reasoning compelling, you still face choices at every turn. For instance, you may see the piano's ubiquity in the slower, quieter second movement (highly reminiscent of the traditional second movement) as a lyrical, dominant, soloistic part, or the opposite – in an accompanimental role. Alternatively, if you reject all of this in favor of an equality among the instruments (matching the equality among the tones, perhaps), then you may find more palatable the idea of reading this as a Concerto for Orchestra?

As with all music, there's more than one way to look at this piece, and as with all analysis, we're much more concerned with a view ("a way" of understanding the work) than trying to find comprehensive solution ("the way"). In short, the analysis of twelve-tone music is just like other forms of analysis: understanding the technical elements is necessary but not sufficient, and there's always plenty of room for creative vitality.

Further Reading

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Assignments

- Try your own analysis of another work from this time, such as Webern's *Variations for piano*, Op. 27, using a similar combination of technical row analysis with contextual discussion.

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Footnotes

COMPOSING WITH TWELVE TONES

Mark Gotham

KEY TAKEAWAYS

This chapter goes through the composition of some new twelve-tone music. It can be useful to follow someone else's process closely in this way. It is certainly useful to try something similar yourself.

So far, we've seen some rows and serial properties in the abstract, and their usage in some existing pieces. Now let's complement that by writing a new piece. It's worth reiterating that (like any other musical style or technique) there are infinitely many ways of approaching composition with twelve-tone rows, and so this can only be an example and not representative—indeed no more than a single analysis can be. All the same, an example of writing with rows will be a helpful illustration of how we can navigate between theory and practice. We can aspire to something like Béla Bartók's marvelous *Mikrokosmos* collection: short pieces with a clear compositional “brief” that are also rather interesting as “real” pieces.

Here, we'll start by choosing and examining rows, then go on to write at least the start of some passages that vary in how they approach the same material, especially in terms of how relatively “free” or “strict” they are in their use of serial processes.

Choosing Rows

Let's start by choosing some rows to work with. Among the many possible motivations for choosing rows, I'm inclined to seek out those that:

- Have “interesting” internal properties ...
- ... that are suggestive of some compositional strategies
- And have been relatively under-explored in previous pieces.

For me, the “all-trichord” rows are a great fit for these criteria. Alan Marsden (2012, 162) defines these as “12-note series which, when treated as circular, [contain] in the 12 sets of 3 consecutive pitch classes all the 12 possible classes of trichord.”¹

Marsden has demonstrated that there are exactly four distinct forms of this row:

1. [0, 2, 6, 10, 5, 3, 8, 9, 11, 7, 4, 1],
2. [0, 2, 6, 10, 11, 9, 8, 3, 5, 1, 4, 7],
3. [0, 2, 6, 10, 7, 4, 11, 9, 8, 3, 5, 1],
4. [0, 2, 6, 10, 1, 4, 5, 3, 8, 9, 11, 7]

Here they are as twelve-tone rows starting on C, and also with the corresponding trichords given and labeled below:



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All-trichord rows by FourScoreAndMore

Given that all standard tone rows feature all twelve pitches and the “all-interval” rows featuring all eleven intervals are also familiar and common, you could view the all-trichord rows as a logical extension of these familiar row properties. They are certainly useful insofar as our goal in composing with twelve tones is to pursue maximal variance.

Perhaps most compellingly of all, Marsden concludes that he “never did find a convincing way to make use of this in composition” (2012, 163). To some composers, that kind of comment is irresistible.

1. Note that the term “all-trichord rings” is sometimes used for this topic, with “all-trichord row” referring instead to rows without wrapping around (and therefore omitting two of the trichords). See Robert Morris’s “[Elementary Twelve-Tone Theory](#),” for instance, and note the definition (after Babbitt) of an all-trichord row as “A ten-trichord row that excludes SC 3-10[036] and 3- 12[048].”

Example Compositions

Following are several example compositions and discussions of how a row can be used to generate the pitch material for a musical composition.

A (relatively) free fantasia

Let's begin with the least strict approach. Here we'll consider the use of these rows and the emphasis on overlapping trichords as enough of a constraint, leaving to free creative choice all other matters including:

- Repetition of a note or a trichord (but perhaps not other groupings like dyads and tetrachords).
- The specific rhythms and phrasings (as long as they typically emphasize grouping in threes).
- Registral and timbral variety for expressive range.

That starting premise could be realized in any number of different ways. Here's an example opening for solo viola that moves from the first trichord to the second (the two that are common to the start of all four rows as set out above):



Many composers—serial and otherwise—find it helpful to set initial constraints in this way, partly because it can give you license to approach the more detailed matters freely. The restrictions leave open a wide range of possibilities for how to proceed. For instance, we might like to create an overall contour that works up to a high point and then comes back down from there. Alternatively, we might prefer a static and demonstrably constrained passage. It's wide open.

A process-driven “moto perpetuo”

We could also approach these overlapping trichords in a more vigorous, rhythmic way. For instance, we could have a kind of minimalist moto perpetuo style, insistently repeating each trichord numerous times before moving on to the next one. Let's start with a continuous stream of notes, repeating our trichord in order (so with pitches 1-2-3-1-2-3- ...). To move on to the next trichord, we can simply take the second

pitch as the start of a new cycle for pitches 2-3-4. So if we're repeating pitches 1-2-3-, then at some point we have a 1-2-3-1- and the following 2 marks the beginning of a 2-3-4- cycle.

We can make this change after completing any number of 3-note cycles plus 1 note: that is, after 4 notes (one cycle + 1), or 7 (two cycles), 10, 13, 16, and so on. This should get us thinking about rhythm and meter. Say we put this predominantly 3-grouping pattern into a duple meter like $\frac{2}{2}$. That would lend the music an attractive and familiar 3-against-4 metrical dissonance. Whatever meter we choose, we'll have to make adjustments for some of the cycle lengths: some will "fit" with the meter, and others will disrupt it. For instance, in our duple meter, the 4 cycle could be "one beat" (e.g., four eighth notes as one beat in $\frac{2}{2}$) and 16 could be 2 measures (4 x 4 beats). By contrast, the 10 cycle means breaking up the meter a bit (e.g., with a $\frac{5}{4}$), and the 7 stretches down to another, lower metrical level ($\frac{7}{8}$).

Here's a short passage realizing some of these ideas for string quartet, with each cycle now clearly marked both by viola and cello pizzicato, and by moving the pattern from one violin to the other (which also gives each player a welcome break!). Most of the cycles are 16 notes long, but there are some shorter ones too to break up the flow, and to dwell on some of the trichords more than others. Again, the choice of which is free.

Moto perpetuo. ♩ = 120

The musical score is divided into four systems, each containing four staves (two treble and two bass clefs). The first system is in common time (C) and begins with a tempo marking of 120 beats per minute. It features a variety of dynamics including *f* (forte), *p* (piano), and *pp* (pianissimo), as well as articulation marks like accents and staccato. The second system introduces a 2/4 time signature and includes a *pizz.* (pizzicato) instruction. The third system continues in 2/4 time, with a *New cycle begins (piece continues)* annotation above the staff. The fourth system concludes the piece in 2/4 time, featuring a final *f* dynamic and a double bar line.

A strict, fixed fugue

Finally, let's explore a stricter approach, without note repetitions, and with more than one row at a time. Let's do this in the context of the classic strict polyphonic form: the fugue.² We could make one of the rows directly into a twelve-tone subject and take a countersubject that's hexachord-combinatorial with this subject. The subject and countersubject are going to be played together (by definition), so hexachordal combinatoriality will ensure that we don't repeat a pitch within the half-cycle.

We could also ensure that pitches aren't repeated even when third and fourth voices enter—so, at the trichord level. Our rows aren't trichord-combinatorial, but given our existing hexachord-combinatorial pair, we can get there by swapping the trichords of each row to make a new pair that, combined with the existing two, will see all twelve pitches in each set of trichords.

More precisely, simply swapping trichords would break the ordering of these row and mean losing the defining “all-trichord” property, though there's still a way we can achieve the same thing while retaining a structure consistent with the original row. Note that “swapping trichords of each half” means taking trichords 1,2,3,4 and ending up with 2,1,4,3. To get from one to the other while retaining the same ordering, we can retrograde and rotate by a half-cycle. So, for instance, for an ascending chromatic scale row, we'd get this:

Row	1	2	3	4	5	6	7	8	9	10	11	12
Retrograde and rotate by 6	6	5	4	3	2	1	12	11	10	9	8	7

So, applying this process to the initial row and a hexachord-combinatorial pair, we can get a solution like the following:

1. Initial row (as above)	1	2	3	4	5	6	7	8	9	10	11	12
2. Hexachord-combinatorial pair	7	8	9	10	11	12	1	2	3	4	5	6
3. R-rotation of 1. (as above)	6	5	4	3	2	1	12	11	10	9	8	7
4. R-rotation of 2.	12	11	10	9	8	7	6	5	4	3	2	1

Note that there's no repetition of a pitch within:

- Any of the four rows by themselves (of course, they're twelve-tone rows).

2. Readers unfamiliar with fugal writing may want to try [the High Baroque Fugal Exposition chapter](#) first.

- The first half of the initial row and the hexachord-combinatorial one, the second halves of those two rows, or the first or second halves of the rotated pair.
- Any of the discrete trichord subsets (e.g., pitches 1–3 of all rows combined).

This property is true by definition for any row, so it's worth keeping in the compositional box of tricks.

Combinatoriality in practice

It's all very well deciding that we're going to use combinatorial pairs, but we need to know that at least one of our rows actually has this property. In fact, they all do, though not equally: each row has at least some rotations that are inversion-combinatorial (remember that rotating these rows retains the all-important all-trichord property!), though rows 3 and 4 have slightly more such rotations than 1 and 2. Here's the list for row 3, for instance:

Rotation	Row	Combinatoriality
0	[0, 2, 6, 10, 7, 4, 11, 9, 8, 3, 5, 1]	I3
1	[2, 6, 10, 7, 4, 11, 9, 8, 3, 5, 1, 0]	I5
2	[6, 10, 7, 4, 11, 9, 8, 3, 5, 1, 0, 2]	
3	[10, 7, 4, 11, 9, 8, 3, 5, 1, 0, 2, 6]	
4	[7, 4, 11, 9, 8, 3, 5, 1, 0, 2, 6, 10]	I2
5	[4, 11, 9, 8, 3, 5, 1, 0, 2, 6, 10, 7]	
6	[11, 9, 8, 3, 5, 1, 0, 2, 6, 10, 7, 4]	I4
7	[9, 8, 3, 5, 1, 0, 2, 6, 10, 7, 4, 11]	I10
8	[8, 3, 5, 1, 0, 2, 6, 10, 7, 4, 11, 9]	
9	[3, 5, 1, 0, 2, 6, 10, 7, 4, 11, 9, 8]	
10	[5, 1, 0, 2, 6, 10, 7, 4, 11, 9, 8, 3]	I4
11	[1, 0, 2, 6, 10, 7, 4, 11, 9, 8, 3, 5]	

And here's a demonstration of the rotation starting on the second pitch means we can rotate around the trichords and still have I-combinatoriality (i.e., rotations 1, 4, 7, 10 from the table):

Initial row (no rotation)

Hexachord-combinatorial pair:

Both rows in retrograde and rotated by 6

The initial row consists of four trichords: A, B, C, and D. The retrograde and rotated version consists of four trichords: B(r), A(r), D(r), and C(r). The notation shows the original row and its retrograde/rotated version in two systems, each with a treble and bass staff.

Trichord A	B	C	D
A(i)	B(i)	C(i)	D(i)
B(r)	A(r)	D(r)	C(r)
B(ri)	A(ri)	D(ri)	C(ri)

Rotate +3 (one trichord) and adjust the transpositions for combinatoriality

Now I2

The notation shows the row after a +3 rotation and adjustment for combinatoriality. The original row is B, C, D, A. The retrograde and rotated version is C, B, A, D. The notation shows the original row and its retrograde/rotated version in two systems, each with a treble and bass staff.

B	C	D	A
C	B	A	D

Rotate +/- 6

The notation shows the row after a +/- 6 rotation. The original row is C, D, A, B. The retrograde and rotated version is D, C, B, A. The notation shows the original row and its retrograde/rotated version in two systems, each with a treble and bass staff.

C	D	A	B
D	C	B	A

Rotate +9 (-3)

The notation shows the row after a +9 (-3) rotation. The original row is D, A, B, C. The retrograde and rotated version is A, D, C, B. The notation shows the original row and its retrograde/rotated version in two systems, each with a treble and bass staff.

D	A	B	C
A	D	C	B

We could start on any one of those trichords/rotations for this property. Of those options, let's start on the second pitch, partly because it gives us the augmented triad, which seems like a good place from which to launch: a symmetrical trichord for a fugato with inverse-related subject and countersubject.

Actual music!

All that remains is to write the music! Let's keep the rows separate with different parts, points of entry and rhythms. We begin with an exposition (mm. 1–8) that involves:

- A subject broken up into its four trichords, and with a 3-against-4 pattern similar to the one used in the moto perpetuo.
- Each voice entering with the subject (of course), but transposed up a semitone each time.
- Countersubjects with complementary rhythms progressively filling in the gaps.

After the exposition, we explore the trichord rotation property discussed above: the cello plays the same four trichords in a loop, with the rows overlapping by one trichord each time. This leads to the equivalent rotations of the row in other parts (as shown in the row chart above). Additionally, because the cello has kept the same pitches, the other parts also have to transpose to new pitch levels to preserve the combinatoriality (unlike in the chart above where the top staff stays on the same pitch level and the others adjust).

As is typical (indeed almost inevitable) for a fugato, the passage builds in density. Matching that, this realization also increases the rate of change both through a poco a poco accelerando and by iteratively shortening the phrase spans with this scheme for dropping rests:

Initial version: Cycle length starts @ 12 ♩

First part

Second part

1st compression: 11 ♩

2nd = 10 ♩

3rd = 8 ♩

Final incomplete 'cycle' of 7 ♩ to rotate back one pitch

Rhythmic cycles with progressive compression. Each X identifies the rest that is cut from the following statement.

Next steps

Finally, after rotating around the four trichords, we rotate back one pitch to the original rotation of the row that starts with the [0, 2, 6, 10] pattern common to the “start” of all four rows. This rotation certainly changes things. We’ve been stuck in a particular segmentation of the row up to this point, and thus an emphasis on only four of the twelve trichords. Rotating by one gets us to another set of four. If any of the rows supported hexachordal combinatoriality for all three successive rotations (i.e., the last set of four), then we might have built the passage around the three equally, but none of these rows have that property, so instead we focus on one and use the moment of changing to the other one as a sign that the section is ending. Again, this is simply one approach among many possibilities.

Putting it all together

So there you have it: various possible ways of working with these rows. Next steps might involve picking one of these to extend into a full piece, or else combining the three (and perhaps other sections) into a collection of short movements, perhaps etudes.

To conclude then, here is one realization of this piece. Here we start with the free fantasia (now called simply “solo”), followed by the fugato and moto perpetuo, and end with a short section closer to the more relaxed spirit of the opening. Again, there is a wide range of options at every turn, from the choice of a “free” or “strict” approach to the actual implementation in practice.



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[4x4x4x4](#) by [Mark.Gotham](#)

Further reading

- Marsden, Alan (2012): “Final Response: Ontology, Epistemology, and Some Research Proposals.” *Journal of Mathematics and Music*, 6(2): 161–67. doi:10.1080/17459737.2012.698157

Online Resources

- Robert Morris kindly provides a wealth of resources at [this page](#). This includes the “[Elementary Twelve-Tone Theory](#)” document.

Assignments

1. Try your hand at something similar to the above:
 - Pick one or more rows that appeal to you.

- Compose some music with those properties in mind.
- Think about balancing strict constraints with free writing.

Don't be shy. Whether or not you think of yourself as “a composer,” it's always useful to learn by doing, and composition is a great case in point.

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Rows_and_rotations © Mark Gotham

Rhythmic cycles © Mark Gotham

Footnotes

HISTORY AND CONTEXT OF SERIALISM

Mark Gotham

KEY TAKEAWAYS

Serialism is much discussed and anthologized; in addition to all of the technical and analytical details, it's worth taking a moment at the end of this section to consider:

- where it came from: not only Schoenberg, but also Hauer and others
- what it's "really" about: a new world order, and if so an equalising or totalising one?
- tonal precedents in Bach and Haydn, and "tonal tone rows" in (for example) Alban Berg, Hale Smith, and Benjamin Britten
- "total" or "integral" serialism in (for example) Ruth Crawford Seeger, Milton Babbitt, Olivier Messiaen, Karlheinz Stockhausen, Pierre Boulez.

Why Serialism? What's the Attraction?

Some grand narratives of 20th-century music cast atonality as a logical consequence of a historical trend toward ever more chromaticism, and serialism as a matter of creating a radically different kind of structure out of the total chromatic. It would appear to achieve that end, at least for composers who joined Schoenberg in viewing it as a "method of composing with twelve tones which are related only with one another" (1950, 107)—contrast that with the fundamentally hierarchical tonal system. It may not be coincidental that it emerged in interwar Europe, when there may well have been a desire to start anew.

Equal tones? A new world order? Maybe, but the method has served a wide range of composers with correspondingly diverse aims, so it's not so straightforward to summarize. There's also a totalizing angle here that's rather less utopian. Schoenberg is famously alleged to have described "his" discovery as one "which will ensure the supremacy of German music for the next hundred years" (qtd. in Stuckenschmidt 1977, 277). Schoenberg may or may not have actually said this, but Boulez definitely did later describe

every composer to have remained “outside the serial experiments” since their discovery as “useless” (“Schönberg est mort,” *Score*, 1952, reproduced in *Notes of an Apprenticeship*, 1968, 274).

A Series of Precedents?

There is a great deal of precedent for general forms of musical thinking pertinent to serial technique, from simple melodic inversion to furiously complex crab canons, and certain works like Bach’s *Art of Fugue* are notable partly for the strictness and comprehensiveness of design in general, and the healthy dose of “mirror writing” in particular.

In these cases, the mirror is usually “horizontal,” giving versions of the twelve-tone technique’s I-form. The R-form of retrograde symmetry (given by a “vertical” mirror, if you will) is a primarily 20th-century concern, serial and otherwise. Non-serial 20th-century examples include a great deal of Bartók, the prelude/postlude pair in Hindemith’s *Ludus Tonalis*, and Britten’s *Cantata Academica* mvt. 2 (tellingly titled *Alla rovescio*). There are earlier examples, such as the *Menuet al Roverso* from Haydn’s Symphony no. 47 in G, but they are very rare.

There are (equally rare and also rather dubious) cases of tonal works that are said to exhibit the specifically twelve-tone practice of rotating through all the pitches. Often-cited examples include the choice of keys in the development of the finale to Mozart’s Symphony no. 40.

Conversely, there are 20th-century composers who wrote music that is serially organized in the sense that we would recognize, but in such a way as to embrace the sound world of an extended tonality (**Example 1**). Examples of this include:

- **Alban Berg’s *Violin Concerto***, with its row centered on triads and fifths.
- **Hale Smith’s *Evocation***, which the composer notes to have an “affinity” with jazz. Among the “jazzy” and/or “tonal” elements of this piece is the foregrounding of set [0,2,7], which the scholar Horace J. Maxile Jr. links to “the quartal harmonic and improvisational stylings of bop and post-bop schools” (2004, 125).
- **Benjamin Britten’s *Turn of the Screw***, which adopts a similarly quartal structure in the row from which both the theme and tonal centers for the acts are serially organized.



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Example 1. Tonal Tone Rows by FourScoreAndMore

Speaking of “tonal serialism,” the trappings of tonality are not limited to pitch: what composers do with the other parameters is equally important. It’s often observed (usually critically) that Schoenberg’s early serial works may have used the twelve-tone technique in the pitch domain, but still adopted tonal forms, rhythms, and idioms such as waltzes.

The Emergence and Evolution of the Twelve-Tone Technique

Schoenberg is intimately associated with the twelve-tone technique and was quite content to describe it as “his” discovery (as above), though many people arrived at the idea largely independently around the same time, notably including Josef Matthias Hauer and Herbert Eimert. Schoenberg famously discussed relevant considerations like the “emancipation of the dissonance” early on, but his thoughts on serialism only emerged later, after those two others.

Hauer’s theory as expressed in his *Zwölftontechnik: Die Lehre von den Tropen* (1926) is notable for its early formalization of the twelve-tone technique and for organizing the millions of possibilities into 44 “tropes” (types) of tone rows in four groups based on symmetries among the unordered hexachords (with the prefixes Poly-, Mono-, Endo-, and Exo-).

After the first generation of “classic” serialists, we start to see a wider range of serial practices emerge, including a move toward “integral” or “total” serialism, which applies serial technique to parameters other than pitch, particularly rhythm, dynamics, and articulation. I say “after,” but Ruth Crawford Seeger was already writing what later came to be known as integral or total serialism as early as c. 1930.

The most frequently cited examples came later, in a burst around 1950:

- Milton Babbitt: *Three Compositions for Piano* (1947)
- Olivier Messiaen: *Mode de valeurs et d'intensités for piano* (1949–50)
- Karlheinz Stockhausen: *Kreuzspiel* for oboe, bass clarinet, piano, and two percussion (1951)
- Pierre Boulez: *Structures I* for two pianos (1952)

There were also signs of this mentality already in those “classic” early works. For instance, in the first movement of Webern’s *Symphonie Op.21* ([discussed further in this chapter](#)), the exposition sees pitch classes fixed in specific registers, and his *Op. 27 Variations for Piano* has pitches, durations, and dynamics all aligned (for instance, B and G♯ are always eight notes, legato, and forte).

X. ORCHESTRATION

ORCHESTRATION CHAPTERS

- Core Principles of Orchestration
- Subtle Color Changes
- Transcription from Piano

Orchestration (or instrumentation) is a large and unwieldy topic that not all music theory textbooks cover. Here, in a few short chapters, we provide a very quick introduction to some useful principles for creating orchestral scores. Students can refer to other sources for basics such as multilingual terms and instrumental ranges.

Prerequisites

This section assumes a familiarity with some topics covered in the [Fundamentals](#) and [Diatonic Harmony](#) parts, especially concerning the spacing and voicing of chords.

Organization

The three chapters focus on:

1. [Core principles of orchestration](#), organized into matters of succession (what follows what) and simultaneity (what goes together at the same time).
2. [Subtle color changes](#), taking a closer look at some more detailed aspects of those core principles.
3. [Transcription from piano](#), beginning with a discussion of how to adapt piano music for orchestra in principle, and then turning to four case studies.

Throughout this section, we will also address:

- Skills and techniques associated with writing effective and idiomatic music for orchestra.
- Enhanced familiarity with and understanding of the orchestral repertoire.
- Repertoire from the 18th century to the present day, with a focus on late 19th- and early 20th-century repertoire, and primarily on tonal music.

Repertoire

Each chapter features many examples of repertoire to explore. Images will be included to illustrate short, summative ideas; for longer works, there will be links to the relevant page on IMSLP.org. All works receive a full title except symphonies which are often abbreviated by symphony number (Arabic numeral) and movement number (lowercase Roman numeral): e.g. Beethoven 4/iv.

CORE PRINCIPLES OF ORCHESTRATION

Mark Gotham

KEY TAKEAWAYS

We begin by thinking of orchestration very simply in terms of how to combine elements, both:

- “simultaneously” (or “vertically” if you prefer) for voicing chords, doubling melody lines, and handling texture;
- “successively” (or “horizontally”) for effects like orchestral crescendos.

Simultaneous (Vertical) Combinations

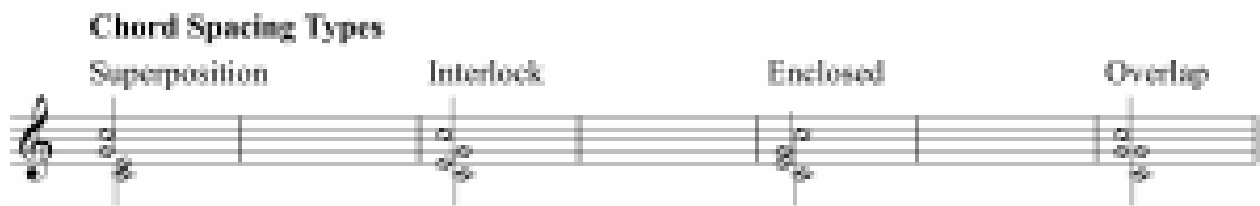
To b(lend) or not to b(lend) ... that is the question ... for “simultaneous” orchestration. For most tonal orchestrators, the default answer is a very clear “yes, blend!”

Voicing chords

As a rule of thumb for tutti orchestration, blend by treating each section as if it were self-contained. This applies to the large sections (winds, brass, strings), and often also to the smaller sub-sections (e.g., flutes) in the case of larger orchestras where there are greater numbers of each. For each section, follow the principles you learned in four-part writing. That’s right, **the principles you’ve already learned about chordal writing still apply**. Specifically, you’ll need to consider:

- The inclusion of all (or at least the most important) harmonic pitches.
- The number and prominence of each pitch, including avoiding the overdoubling of the third in a triad.
- The gaps between voices:
 - We now see the densest packing in the middle.
 - Continue to use larger gaps in the bass register (e.g., the octaves given by cello and double bass notated on the same pitch but sounding an octave apart).
 - Continue to use smaller gaps higher up in the treble clef range.
 - We tend to see more activity in the very highest registers in orchestral scores than in most other contexts; it's usually best to return to wider spacing in those highest registers.

We have terminology for the different types of chord spacing as summarized in **Example 1**:



Example 1. Chord spacing types.

Context determines the best choice among these. For a blended sound, we often use integrated “interlocking” voicing, taking care to balance the different strengths of each instrument according to the register; conversely, to achieve a different color for each note, use wider spacing.¹

Doubling lines

The approach to blending in doubling lines again involves finding a compatible balance of (equally strong) instruments and registers. The second part (m.1 4ff.) of Mozart 40/iii is effectively a two-part invention and an intriguing example of blended, balanced lines. Both of the two parts are played in each of the three octaves, and by both winds and strings.

Mozart 40 iii

As always, this default is not a law like that of gravity in physics; composers will diverge from this blended practice for creative and compositional effect in just the same way that they do with any other

1. For more textbook examples, see Adler (2002, 253); Piston (1955, 396).

parameter. Perhaps the most famous example of an odd doubling is provided by Schubert 8/i. The first theme (m. 13) sees the extraordinary doubling of a single oboe and clarinet in unison. While some commentators have seen this as an error, it's probably deliberate on Schubert's part as a way of creating an unsettled feel that entirely befits the mood of the music. It also contrasts with a second theme (reh. A, m. 42): a cello theme accompanied by the optimally blended viola and clarinet in thirds.

Schubert 8 i

Texture

The choice of instruments, register, and more can help support and define the wider texture. For instance:

- Polyphonic writing: Tends to see instruments and groups balanced and blended. Examples include fugues and the Mozart invention just discussed.
- Melody and accompaniment: Foregrounds the melodic instrument by placing it in its best range, often at the top of the texture (as in other contexts), and with other accompanimental parts contrasting in:
 - Timbre, accompanying a solo woodwind line by full strings, for instance.
 - Register (as discussed).
 - Texture, with less or a different kind of rhythmic activity. This is similar to the kind of complementary rhythmic patterns you often find in polyphonic music: in both cases, we're trying to have more than one element at once, but keep them noticeably distinct.

Successive (Horizontal) Combinations

We'll look here at forms of succession on two timescales: at the level of individual notes (small scale) and of whole sections (large scale).

Firstly, once again, **everything you've learned about voice-leading still applies**. (Yes, this will be a recurring mantra.) Most of the time, it will be eminently possible to reduce apparently complex orchestral scores down to a two-, three-, or four-part texture with clear and consistent doublings and with "correct" voice-leading.

In handling successive sections, antiphony is a highly favored method for distributing material, creating timbral variety, and articulating the form. This can take the form of whole blocks of material being passed from strings to winds (common in early orchestral scores of the Baroque era), or of more subtle

effects. For instance, look at the first page of “In the Hall of the Mountain King” from Grieg’s *Peer Gynt* suite:

Grieg Mountain King

At the repeat of the tune, the only variation is antiphony (strings-to-winds). The material (both tune and accompaniment) and register are identical. Later, this strings-to-winds principle continues to the upper voices as the register expands upward. Let’s take a closer look at that crescendo.

Crescendos

We have a range of tools at our disposal for achieving an effective orchestral crescendo. Apart from mere dynamic markings, we can:

- **Add instruments**, often moving from the “lightest” to “heaviest” instruments: broadly, strings-wind-brass-percussion (e.g., Grieg rehearsal mark A).
- **Expand the overall range**, often upward from the bass or outward from the center (e.g., Grieg rehearsal marks A and B).
- **Diversify the note values used**, adding sustained, longer notes and/or tremolo, shorter ones, perhaps through note repetitions (e.g., Grieg rehearsal mark B).

Take a look at rehearsal mark B in the Grieg, and notice the:

- **Forces and register:** We now have the full orchestral and full register in use except for one instrument, the piccolo, which is reserved for the top C#, four measures later. The piccolo is removed at rehearsal mark C and reintroduced at rehearsal mark D for a similar effect. Likewise, the final page briefly removes the bass for the *piano* passage before the final *fff* chord.
- **Wider range of note values:** The accompanimental figure (16th-16th-8th on the weak beats), first introduced by the viola part at rehearsal mark A, has now become focal, adding rhythmic density to the score. This is further enhanced by the upper strings playing the theme with repeated (sixteenth) notes and the timpani roll. Conversely, the horns introduce longer (half) notes, lending a more sustained sound to the previously staccato accompaniment.

As an aside, it’s worth noting that moving from lightest to heaviest instruments (strings-winds-brass-percussion) is related to overall playing time: the strings generally play the most, the percussion the least. This is partly for pragmatic reasons: brass players would keel over from exhaustion if you had them play the string parts—there’s just too much playing time and not enough resting time in

between. You'll find that the best choices for pragmatic reasons and musical ones often go together in this way.

Holding a timbre back for effect

Percussion parts are the clearest indication of the practice of holding a timbre back for effect. One of the essential skills of the percussionist is being able to count hundreds of measures of rest and then come in with a bang at the crucial, climatic moment. Here's an extract from the triangle part for Mahler 4/iii. At reh. 12, a crash cymbal marks the moment of arrival, and the triangle leads a glorious texture, full of all the rich effects described above (register, texture, sustain, and note density). The triangle is one of those instruments that can be pretty well guaranteed to cut through most any texture and make an impact. The glockenspiel and piccolo are also good in this role.

Mahler 4 iii Triangle

Mahler 4 iii, reh.12

This holding back of a timbre is very often for loud and/or climactic moments, but not always. For instance, reserving an entirely new sound until near the end of a work can be extremely effective. Perhaps the most iconic example is to be found in Debussy's *Prélude à l'après-midi d'un faune*, where the antique cymbal is not used until near the end. (This is a "new" sonority for the piece, and even for Western audiences of the time.) The crucial moment comes at reh. 10, (8'56" in the following recording), but clearly the effect depends on listening to the wider context.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=2237#oembed-1>

Dovetailing parts

Finally, in an approach somewhat complementary to antiphony, orchestrators will often "dovetail" parts: share a continuous line out between different voices. This can be:

- related to antiphony (the melodic line moves from part to part)
- or the opposite: ensuring continuity/cohesion within a line on instruments for which that would be impractical

- tailored in subtle ways to demarcate a rhythm

Take a look at [Smetana's *Vltava*](#) to this effect:

- At the opening, the flutes dovetail, overlapping by one note on the downbeat. This is easy to play, and it allows them to share the long line. It could be more seamless, though, by slurring onto the downbeat, rather than separating that note with a staccato. The resultant effect is of a fluid line, but with the beats clearly demarcated.
- When the clarinets enter, we have dovetailing both within and between those subsections: the flute continues as before, the clarinets follow suit, and this leads to further pairs of Fl.1 + Cl.2 and Cl.1, Fl.2.
- The strings take a different approach at their entrance at m. 36. The line continues to be shared out among the string parts, but the groupings break it up into clear 6+3+3 (2+1+1) rhythms. This follows a period of syncopated accents in the winds.

This gives some sense of how much variety can be achieved within the simple dovetail pattern. It can get even more detailed, as in the following passage from Rachmaninoff 3/ii (reh. 42). The example shows the dense dovetailing among the oboes, bassoons, and violin parts. ([Click here for scores on IMSLP to see this accompaniment in context](#)). This rhythm saturates the four options: every sixteenth sees the entry of one part. It is both:

- *dovetailed within* the wind and string sections without overlap: i.e., one or other part is always playing, but never both (oboes or bassoons; violins 1 or violins 2)
- and *dovetailed between* those sections with winds patterns starting on the 2nd and 4th sixteenths, and violins starting on the 1st and 3rd (after the first beat).

The texture makes great use of the resources at hand, sparkles with detail, and gives the players interesting parts to think about (an important and easily overlooked consideration).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=2237>

[Symphony No.3, Op.44 – Sergei Rachmaninoff](#) by [openmusictheory](#)

Assignments

1. Dovetailing: transcribe the sixteenth-notes part (piano right hand) of Louise Reichardt's *Unruhiger Schlaf* (12 Gesänge, no. 6) for two clarinets, dovetailing regularly every quarter or half note. [A score is available online here](#) and [for download here](#).
2. Look at the extract from Hensel's Overture in C major below. How does the combination of bassoon and 'cello relate to topics discussed in this chapter?



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[Overture in C Major – Fanny Hensel](#) by [openmusictheory](#)

Further Reading

- For a recent article on this topic (even more recent than this chapter!), see McAdams, Stephen, Meghan Goodchild, and Kit Soden. 2022. 'A Taxonomy of Orchestral Grouping Effects Derived from Principles of Auditory Perception'. *Music Theory Online* 28 (3). <https://mtosmt.org/issues/mto.22.28.3/mto.22.28.3.mcadams.html>.

Media Attributions

C3 Chord Spacing Types

Footnotes

SUBTLE COLOR CHANGES

Mark Gotham

KEY TAKEAWAYS

The previous chapter dealt with some important but relatively unsubtle color changes. Here, we hone in on some of the finer methods for making detailed changes of this kind, organizing the chapter around the apparent motivations for these changes, seeking to create:

- a timbral cadence
- a smooth structural boundary;
- an “attack-sustain” (“resonance”) effect
- a seamless orchestral crescendo
- a timbrally nuanced melody

For a timbral cadence

Apart from changing the timbral distribution between sections (after a cadence), some composers make changes for the cadence itself, emphasizing the cadential moment. This is related to the more formal considerations of holding back a timbre discussed [in the previous chapter](#).

Classical-era orchestral composers sometimes used wind parts in this way. Here’s an example from the opening of Mozart’s Piano Concerto K453, movement 3. The strings begin, and the timbral cadences are marked by the addition of winds (highlighted in the example).

Mozart K453

Shostakovich provides some extraordinary 20th-century examples of this device. Consider the end of Shostakovich 11/iii. The outer sections of this movement are effectively one long viola solo, and the timbral addition of unison violins at the end is integral to formalizing the end of the theme. The melodic contour and discontinuation of the countersubject are also contributing, but the harmony is deeply ambiguous. In the following recording, the theme plays from 0'50" and the timbral cadences fall at the ends of the sections (4'50" and 12'40").



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=2257#oembed-1>

This device is not unique to orchestral music. For instance, Blink 182 uses the same effect to close verses in the song “I Miss You”: here the timbral cadence is achieved by the addition of the other vocalist (e.g., at 0'55”).

To finesse a structural boundary

Timbral additions can also be used in the opposite sense: to finesse a structural boundary and actively connect the two sections. This is a favored device of Brahms. Brahms 2/iii opens with a gracious oboe theme, and it is the return of the oboe (in tandem with motivic handling and other matters) that finessees the return to the A section at m. 101/107.

Brahms 2 iii

It is the oboe again that Brahms adds to round out the first cadence of Brahms 4/i. (Note also the cello-violola dovetailing here.)

Brahms 4 i

For the “attack-sustain” (“resonance”) effect

One technique beloved of 20th-century composers is the “attack-sustain” or “resonance” effect. Acoustics teaches us that the very start of a note has a very different profile from the rest, and composers seem to be

striving for something similar in orchestral writing that casts some instruments in an “attacking” role (shorter notes at the start) and others as “sustain” (longer notes starting together on the same pitches).

Examples abound and are not limited to the 20th century. For instance:

- Mozart: Magic Flute overture. When the brass parts enter, the horns are long, while the trumpets and trombones are short.
- Mozart: Dies Irae (from the Requiem): again, trumpets and drums are short; others long.
- Beethoven: [The opening of Symphony 1/i](#) is an iconic example, and not only for the extraordinary harmonies. The winds’ *fp* chords achieve the attack-sustain pair on their own, and are enhanced by string pizzicato (attack only).

In the 20th century, Schoenberg’s groundbreaking “Farben” (no. 3 from *Five Orchestral Pieces*) includes this effect (e.g., see the harp at reh. 2), and Britten uses it to magnificent effect in movement iii of the *Four Sea Interludes*. Play the following example from c. 0’45”.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=2257#oembed-2>

Britten uses penetrating instruments for the attacks (including the harp again) and sets the resonance on sustained flute lines, as shown in this small excerpt:

“Attack-sustain”
detail from
Britten’s *Four Sea Interludes*

(Note the octave transposition of the harp harmonics.) Later in the movement (around reh. 3), the same device appears with xylophone and piccolo on attack, and trumpet sustaining.

This practice is related to the wider device of employing different articulations on doublings of the same melodic line. Clear examples include:

- Debussy: *La Mer* / iii (fig. 55). The oboe has repeated notes; the flute does not.
- Sibelius: *En Saga*: m. 189, (viola pizz. + arco); m. 290 (trumpet staccato with oboe legato), then oboe with viola.

This, in turn, is related to the practice of having string parts play melodies tremolo for loud sections as seen in the Grieg example [from the previous chapter](#).

For a seamless orchestral crescendo

That Grieg example displayed the kind of step-by-step orchestral crescendo that some composers turned into an extremely subtle process. Consider the following example of two extracts from Wagner's *Parsifal*. The melody is in unison, and in both cases, a timbre is added at the top of the crescendo. In both cases, a higher, brighter version of an instrument already in the mix is added. In the second case, this is partly for registral reasons (the oboe replaces the bassoon in a high register); in both cases it transforms the sound, very subtly adding a timbral dimension to mark the moment in question.

[Wagner – Parsifal extracts](#)

Once again, it falls to the 20th century to furnish us with the truly iconic example of this process. Listen to this short crescendo from niente from Berg's *Wozzeck* (preferably on good speakers, and having warned the neighbors!). Dramatically, this is the murder scene; musically, it is one huge orchestral crescendo on the pitch B₃. See if you can pick out some of the successively entering instruments, and then scroll down for the answer.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=2257#oembed-3>

This reduction sets out the process:

Extract from *Wozzeck*, Murder Scene

All parts sustain B3 until the chord at the end of the passage.
Order of instruments' entry as given.

fff Chord:
Full register;
addition of
4 picc,
C Bsn,
B.D. solo

*Summary of the
instrument
entrances in the
B3 unison of
Berg's Wozzeck*

In a landmark book about sound spectra, Robert Cogan described the beginning of this passage as “almost entirely fundamental”: that is, almost a pure sine wave, with strictly minimized upper partials. We begin *pppp* with the muted French horn: an entirely appropriate choice in that it has the least spectrally active sound available in the standard symphony orchestra and, partly by definition, also the most distant one. Not only do the players sit near the back, but their instrument projects the sound backwards, further increasing the distance and ensuring that the majority of the audience hears primarily wall-reflected sound. Between this and the use of a mute, a great deal of high-register spectral content is removed, leaving that nearly pure fundamental. The mute on the solo violin, which is next to enter, has a similar spectral-auditory effect. When the bass clarinet joins the sound, some higher spectra are introduced, though few, as the instrument is high in its range and produces only odd-numbered partials. What follows continues this crescendo not only of sound, but of instrument types and spectral content. Naturally, the heavy brass are last to enter, burnishing the end to this spectral progression with brilliance.

For timbrally nuanced melodies

Finally, many composers since around 1900 have used timbral variation to create a kind of “kaleidoscope” melody. This is most commonly known as *Klangfarbenmelodie* (“sound-color melody”). The term *Klangfarbenmelodie* was coined by Schoenberg in his *Harmonielehre* (1911) and employed most notably in his “Farben” (no. 3 from *Five Orchestral Pieces*). It is also related to musical pointillism, in which one melody passes among many instruments to color a single line. Examples include Webern’s iconic *Konzert*, Op. 24, in which timbre helps to articulate the structural divisions of the row (about this, see [this chapter](#)), but also in a great deal of Mahler. See, for instance, [this example](#) from the beginning of Mahler 7/iii, in which a pointillist start begins to coalesce.

We’ll end this chapter with an extraordinary example: Webern’s orchestration of Bach’s *Ricercata* from

the Musical Offering. The work is at once a faithful, note-for-note transcription of the original and an analysis-by-orchestration of its motives and melodic contour. It is more of a compositional orchestration than an arrangement or transcription per se. The image below provides a reduction of the exposition. There is a staff for each presentation of the theme (corresponding to the six entrances of the fugal voices).

A Musical Offering

Webern's instrumental distribution of the fugal subject theme follows a palindromic, possibly even double palindromic design. Dotted lines beneath each staff demonstrate the first, primary, clear and consistent palindrome; those over the top set out the second, which is not so consistently used, and which may be less effective in accounting for the last two instrumental choices than the square brackets that illuminate how these two instruments often repeat an earlier pairing. The asterisks above the staff indicate notes doubled by the harp, the first of which serves to articulate the first timbral recurrence (initiating the palindrome), while the latter two identify the end of the theme. The diagonal arrows further speculate on the possible relation between the successive instrumental timbres of the first answer and those that begin the next two subject-answer statements.

Finally, the last two systems show how Sofia Gubaidulina's violin concerto *Offertorium* takes up this double palindromic instrumentation of Bach's theme. That timbral design is not consistent throughout (hence only presenting the first two instances of the theme), but instead relates to an overall formal process that truncates one note from the beginning and end of the theme at each successive presentation. This continues up to a central point, after which the process is symmetrically reversed.



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Clearly these are highly specific modernist examples in which symmetry is paramount, but again, we can see pre-echoes of this kind of idea in pre-20th-century music. For instance, there are symmetrical timbral schemes in:

- Schubert 8/ii: the melody moves from the clarinet (in minor) to oboe (major) in the exposition; the process is reversed in the recapitulation (oboe-clarinet).
- Brahms 3/iii: the theme and accompaniment move from strings to winds in the first section and from winds to strings in the reprise.

Both cases reflect their larger forms just as Webern and Gubaidulina do.

Assignments

1. Coming soon!

Media Attributions

Ciii Britten

Diii Berg Wozzeck

TRANSCRIPTION FROM PIANO

Mark Gotham

KEY TAKEAWAYS

When orchestrating piano music, it's often best to think of this task in terms of *translation* rather than *transcription*, focusing on the core musical idea “behind” any (piano or orchestral) version, and asking:

- What is the piano effect trying to create? How might this (or something similar) be best achieved by the orchestra?
- What extra rhythms—and perhaps parts—could be extracted from the harmony, register, accents.

The several examples focus primarily on works that are well known in both the piano and orchestral repertoires, then end with my own orchestration of a piano piece by Bartók.

Some orchestral composers write for piano first, others write directly for orchestra,¹ while others still (perhaps most) sketch scores in a short-score format to begin with that is neither one nor the other. While composers use a variety of approaches, it will be most useful for us to focus on the first task: orchestrating from piano music. Among the reasons for this:

- There exists so much wonderful music in both piano and orchestral forms.
- It makes you consider closely the similarities and differences between two contexts.

It's best to think of this task in terms of going back to the core (“pre-pianistic”) idea and rewriting, re-realizing that idea for orchestra. You might like to think of this as analogous to translation, rather than mere transcription.

1. For instance, see Rimsky-Korsakov's Preface to his iconic *Principles of Orchestration*, 1891.

This chapter will begin with some basic principles, then move on to some magnificent examples of piano-orchestral pairs in the repertoire. I'll finish by putting my own neck on the block, going through an orchestration of my own after a piano piece by Bartók.

Basic Principles

Firstly, start by reading the original closely—*really* closely. Ask yourself:

- What is the piano effect trying to create? How might this (or something similar) be best achieved by the orchestra?
- What extra rhythms—and perhaps parts—could be extracted from the harmony, register, accents.

Examples for extracting “additional” material from piano music include:

- Extending notes: If the piano's sustain pedal is down, you may wish to add parts sustaining each of the notes beyond their notated length (to the notated length of the pedal changes).
- Extracting accents: Accents of all kinds can be separated off into separate parts in the manner of the “attack-sustain” effect discussed in the [previous chapter](#), in which some parts play the music “as written,” while others provide the attack only.

Examples that require reworking include:

- Oscillating figures such as broken octaves. This is a pianistic solution that usually needs reworking for other instrumental forces. Many other instruments can repeat notes more readily than the piano. (Don't forget to consider the register and rhythmic levels; as a rule of thumb, maintain at least those of the original.)
- Arpeggiation. Large florid arpeggiations, by contrast, are better suited to the piano than most other instruments. You will likely want to break them up into multiple parts, dovetailed together to give the continuous impression of the original.

Brief examples

Let's see this in practice with two examples from the piano repertoire. Consider how you would orchestrate them, then compare your result with the possible solutions below (but remember that there are always many different viable ways to do this—the solutions here are examples). Plan on realizing the Chopin example for string quartet and the Beethoven for classical orchestra.

Chopin: Prelude Op. 28, no. 13Beethoven Op. 13

In the Chopin prelude, the left-hand distribution invites reworking for orchestral instruments. [Here is a solution](#) that re-distributes the material over two parts (viola and cello). Even if you decide to do some kind of redistribution in principle, there are a lot of different ways to realize it. I like this particular solution because it separates “main” chord notes (cello) from a broken thirds figure (viola), and in so doing, it brings out the very slight metrical dissonance hinted at in the original (here: $\frac{12}{8}$ in the cello vs. $\frac{6}{4}$ in all other parts).

You may have noticed an elephant in the room here—I’ve changed the key. Whether and when it is appropriate to do this depends on context. For an orchestration of all 24 preludes, it would be best to leave the keys as they are; in doing just one or two, we’re freer to make changes like this move from F# to F in order to “fit” better on the string instruments, including hitting more open strings in the cello (which helps make some of the more unwieldy lines later on more practical).

Incidentally, earlier music is more likely to impel you to change keys between keyboard and orchestral versions. At least Baroque and Classical composers generally used a narrower set of keys for their orchestral works than they did in keyboard music.

Turning to the Beethoven, we have broken octaves in the left hand, a variable number of chord notes in the right, a crescendo, a growing tessitura, and some *sfz* chords. [Here](#) is a solution with viola, cello, bass, and timpani sharing that C pedal across three octaves and three different pulse values. Note also:

- Where parts are added: first on the *sfz*, then twice in the next measure on the basis of motivic parallels and accelerating the rate of change.
- The use of horns in E $\flat$ and trumpets in C—a common device for composers of the time working with “natural” brass instruments (see the Fifth Symphony, for instance).

Transcription Case Studies

Now let’s turn to some longer-range examples, including some of the most celebrated repertoire examples, and some specific questions:

1. Mahler 4/iv (piano and orchestral versions both by Mahler)
2. Bach: Partita BWV1006 (for violin) orchestrated by Bach as Cantata 29, mvt. 1
3. Mussorgsky: “Gnomus” from *Pictures at an Exhibition* (orch. Ravel and Stokowski)

4. Stravinsky: “Danse Sacrale” from *The Rite of Spring* (piano and orchestral versions both by Stravinsky)
5. Bartók: VIII from *Eight Improvisations on Hungarian Peasant Songs* (orch. Gotham)

Mahler 4/iv (piano and orchestral versions both by Mahler)

Question: How variously might you orchestrate “the same” material?

[Here](#) are some extracts from Mahler 4/iv with red boxes highlighting orchestrations of the arpeggiated accompaniment pattern. The extracts show Mahler creating a set of timbral variations on a single, simple idea. (Note that the pages are each separate extracts from the movement; they don’t run continuously together.)

As so often in Mahler, this music began life as a song forming part of a song cycle for voice and piano and was only later integrated into this symphony. The harp features in each of these extracts and is almost identical to the equivalent part of the original piano accompaniment, so we have that point of reference on the score and can see what else Mahler does with it.

- At the start (first page, m. 1,) we have a rather lovely distribution that’s a long way from the simplest, easiest option: the violas take the D₃ alone, while the cellos take the short, fast B₄-G₂ leap across a long glissando. Note further differences from the harp such as:
 - all the dynamic and articulation markings added in those string parts
 - the cohesive elements: overlapping the viola and cello parts, and the horn pedal on D₄ (sounding pitch)
- In measure 4 (still on the first page), we start with clarinet 2 doubling the harp exactly, before moving to ...
- Rehearsal mark 1, with a distribution of the harp part on to the bass clarinet and clarinet 2. This distribution resembles the opening in use of similarly paired parts (viola and cello; bass clarinet and clarinet 2), and in the separation of the rhythm. The pitch distribution has changed (now ordered G₂-D₃-B₃), and the expressive glissando is gone. Cellos “double” the G and D, but on the beats, thus slightly “missing” the original D and creating a slightly heterophonic effect.
- Later in the movement (on the next page, marked p. 341 in this score and at 3’28” in the recording below), we see the cellos double the harp part directly. This G₂-D₃-B₃ version allows cellos to use two open strings, which makes for a gentle, easy spread that befits the mood. The Cor anglais now picks up the D₄ pedal.
- From rehearsal mark 12 (5’19”), the harp moves to a lower tessitura as part of the “winding down” at the end of this symphony. Accordingly, we move from cellos down to double basses, who double the

downbeats much as the cellos did at figure 1, and again with an open string available (just one this time), but rhythmically simpler in this case, without the heterophonic effect.

- On the next and final page, you can see that this harp-bass doubling and the same low E₁ pitch (double bass open string) mark the final sonority of the symphony.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=2268#oembed-1>

Bach: Partita BWV1006 (for violin) orchestrated as Cantata 29, mvt 1 (orch. Bach)

[This page](#) provides scores for the violin part. Consider the following questions:

Question: How much can you get out of one single line? What is appropriate to draw out of the original, or simply to add?

Turn now to the opening of [the orchestral score](#) and note the following:

- m. 1: Addition of a new quarter-note part which is distributed over the trumpets on the one hand and the rest of the orchestra on the other, thus giving rhythmic life to a “mere” succession of chords on the beats. (See the Crucifixus from the B minor Mass for another example of Bach using this device.)
- m. 2: Orchestral parts join in the solo parts’ repeat of the opening rhythm. Note that they start on the second eighth note of the measure, reflecting the original rhythm and jumping on the moving train of sixteenth notes in that solo part.
- m. 4: A similar strategy, doubling the repeat of the solo line’s melodic idea, this time on the second descent from D, and again from the exact position (second sixteenth note of the beat this time).
- mm. 9–12 following: Bringing out the melodic eighth-note motion with parallel thirds above and below, alternating by the measure (mm. 9 and 11 above, mm. 10 and 12 below). Note how mm. 10 and 12 also resemble the opening rhythm, if not its contour.
- mm. 14–16: A similar process, all below, but alternating thirds and sixths (effectively “swapping” F# and D between solo and orchestra).
- m. (13,)16: The pedal D in the solo line (m. 13) moves into a separate bass pedal (m. 16).
- m. 20: Orchestral chords verticalize the cycle of fifth harmonies and reduce the orchestra’s metrical

levels to measure-only.

Overall, note:

- How Bach has not only picked out implied lines, but been relatively free in the addition of germane material to thicken out the orchestral version. This does not imply any deficiency in the original; it's Bach's way of realizing the same material for different media.
- The key change from E for the violin to D for the orchestra (in connection with our discussion of the Chopin example above).
- How consistent this piece is with Lester's (1986, 138) observation that Bach will often project multiple metrical levels simultaneously and explicitly: here we have very explicit pulses at sixteenth, eighth, and quarter-note levels for most of the time.

Mussorgsky: "Gnomus" from *Pictures at an Exhibition* (orch. Ravel and Stokowski)

Pictures at an Exhibition is one of those works that orchestrators can't seem to resist, so it seems fitting to use that as the case study to ask:

Question: How have composers handled the same material differently?

Let's look at the "Gnomus" movement as an example. The picture in this case depicts a sketch for a toy nutcracker shaped as a deformed gnome; the music is accordingly fragmentary and ghoulish. Again, start with [the piano original](#) and come up with your own ideas for how to orchestrate it; we'll then go through each successive piece of material in the movement as realized by Mussorgsky (M), Ravel (R), and Stokowski (S). Mussorgsky and Ravel are on IMSLP; regrettably, the Stokowski is not.

m. 1: We start with a dramatic run of eighth notes across two registers.

- M slurs by the bar and changes the dynamics on repeat (*ff/p*).
- R follows the same slurs as M and uses the same low strings and wind timbre for both *ff* and *p* versions.
- S opts for multiple articulations of bar 1 (note the wind slurs by register and the strings' accents). Unlike R, S changes the orchestration for the m. 3 *p*.
- Note how neither R nor M separates the part out into separate registers. The difficulty of the disjunct line works well for this pictorial effect.

mm. 2, 5: Pause note

- M: Note the notated *sfz* and remember the natural diminuendo of a piano chord's decay.
- R: The existing parts provide the attack; two horns provide the sustain with explicitly notated diminuendo. Note that the horns are muted the second time for the quieter version, and for timbral variety.
- S: Tutti on pause notes; no diminuendo.

mm. 8–9: Hemiola

- M: Indicated by *sfzs*.
- R and S: Also use accents and some secondary (incomplete) parts.

m. 10: Treble flourish

- M: Dispenses even with accents in this case.
- R and S: Add percussion to the downbeat. (Note: S does not include the second phrase but proceeds straight to m. 17.)

m. 19: At the double bar

- M: High treble with accents on both beats.
- R (reh. 8): High winds with pizzicato for attacks (on the first beat, not the second). Tuba theme, with a little from the trumpet on the last note, likely for both practical reasons (allowing the tuba to breathe!) and perhaps for a timbral sleight of hand not unlike the horns at the beginning. The second time (reh. 9) sees the ethereal addition of harp and celesta on the main, accented material and of a string glissando that did not (almost could not) exist in the piano version.
- S (reh. 1): String pizzicato on beat 1 versus trumpets and accents on the second beat, which add an antiphonal effect to the passage.

mm. 36–37: Before the meno mosso

- R: Subito *p*.
- S: Crescendo (sic, not diminuendo as in M) and the addition of timpani to the GP bar (then diminuendo).

m. 38: Meno mosso

- M: Slow parallel writing with the low E $\flat$ as a kind of pedal inviting separation.
- R and S: Indeed allocate some part to the E $\flat$ pedal only.

- S (fig. 2): Adds hairpins peaking at the half-bar.

m. 60:

- M: Loud, sequential descending passage.
- R (fig. 14): Full winds plus trumpets 2 and 3; string glissandos on the lower part (which is now becoming a characteristic gesture of this orchestration).
- S (fig. 5): Flute, piccolo, horn, trumpet; strings tremolo but not glissando. The allocation of instrumental sections changes at fig. 6.

m. 72

- M: Low murmuring; treble upper part version of earlier material.
- R (fig. 15): Alternating bass clarinet and bassoon. Double basses and cellos share the note and glissando respectively. In the treble, we have flute, violin, and harp, a choice which could be seen as a combination of earlier versions.
- S (fig. 7): Full, low winds and bass drum, all playing throughout. Treble parts as previously (with the same swap).

m. 94: Big flourishing finish

- M: A spare treatment, with just two voices until the final chord.
- R (fig. 18): Addition of voices (note how those voices relate to the original pitches and which metrical positions they start on).
- S: Adds in a longer version of the C^b , perhaps mindful of the other moments in which this movement has focused on the single, sustained pitch. All part additions begin on downbeats, with the primary additions on the penultimate measure.

In general, Stokowski adopts an approach that:

- closely resembles Ravel's more distinctive additions (including even, e.g., the glissando additions)
- more freely changes the material (in cutting all repeats, for instance)
- tends to join up successive sections somewhat (sustaining through rests, for instance), perhaps seeking to avoid this short work becoming too fragmentary

Stravinsky: “Danse Sacrale” from *The Rite of Spring* (bass part) (orch. Stravinsky)

On now to another iconic piece of music that has a rich concert life in both piano and orchestral forms. We also return to:

- bass line considerations (and to a bass line that consists of few pitches)
- the orchestral crescendo, which has featured through this chapter and section

Here the material consists of strictly separate elements that are rhythmically reworked in a dizzying range of ways. Fundamentally, however, we have a simple alternation between a bass part on the beats and a treble response off-beat. The treble part takes a few different forms, mostly centered on short, sharp, accented chords, but also intermittently including the classic Stravinsky crescendo: a short, rapid crescendo from a metrically weak position to a strong one. This is not indicated in the piano version (it's not possible there for sustained chords) but is a highly distinctive feature of Stravinsky's orchestral writing, here with horns and trombones for the crescendo and more brass added to mark the downbeat.

Here we're going to focus on the longer-range orchestral crescendo in the bass and ask:

Question: How would you score the bass in the main, “A” sections (of this “rondo”) as part of a gradual orchestral crescendo?

Like many, I first encountered this music aurally (and was blown away by it, of course!). Later, when I came to check out the score, the first thing that struck me was the bass line. I remembered the colossal forces involved, and the alternation between bass and treble, and I suppose I just assumed that the orchestration involved some kind of parity between the forces allocated to bass and treble. Instead, I found the bass very lightly scored (at least initially) and gradually changing throughout, creating timbral variety and a gradual crescendo both within sections (especially in the passage from reh. 186) and between them. Here's a brief summary of the process first entrances:

- Rehearsal mark 142 ff. (start): Double basses and timpani, initially alternating (i.e., only one at a time!), then briefly together on the first octave downbeat at reh. 144. The tuba is then added, for a new double bass and timpani alternation, the tuba siding with the basses (and the lower octave) until reh. 146, where the double basses and timpani are reunited (no tuba) for the more melodic D–F alternation.
- Rehearsal mark 167 ff. (c. 2'00” in the recording below) sees bassoon and contrabassoon initially take the place of the tuba, and then alternate with it in the same pattern as before. Double basses and timpani remain.

- Rehearsal mark 180ff. (c. 3'00"): A brief snatch of the A section here sees no bassoons, but tuba, double basses, timpani and the introduction of the bass drum before the final section.
- Rehearsal mark 186ff. (c. 3'40"): This final section initially starts with all the action concentrated in the bass register (i.e., both “bass” and “treble” from before). Bassoons and tubas split, covering both the “treble” and “bass” between their members, so we’re now more in the territory of self-contained subsections (rule of thumb from [the first chapter](#) than the more pointillistic approaches ([see this chapter](#)) we’ve seen so far. The double basses and bass drum are in, but the timpani is removed for the first time, returning only when the true treble range recommences at reh. 189.
- Rehearsal mark 190 sees the introduction of the bass clarinet, then two very low horns (VI and VIII) at reh. 192.
- Rehearsal mark 195 finally sees the true tutti with the bass clarinet, third bassoon and contrabassoons, horns VI and VIII, timpani, bass drum, and double basses, but not tubas—reallocated to the heavy brass for the “treble” off-beats.
- At the end of all of this variety, the single, unequivocal *sfff* bass cluster chord seems an especially fitting end, suitably prepared with equally garish flourishes in a genuinely treble register. Even here, the final downbeat does not feature all the bass instruments, but adds cellos for the first time and omits those of the wind section.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=2268#oembed-2>

Bartók: *Eight Improvisations on Hungarian Peasant Songs* (orch. Gotham)

I’ll round out the chapter and section by putting my head on the block with a full orchestration of my own. If nothing else, this should help to avoid leaving the impression that only the likes of Bach, Ravel, and Gubaidulina can do this kind of thing (brilliant though they doubtless are).

[Here are scores for this work on IMSLP:](#)

- The original Bartók piano piece is on the main landing page.
- Click on the Arrangements and Transcriptions tab for my orchestration.

I began this process with extreme attention to Bartók's fascinating articulations and found more about what he means by them through engaging with his other scores, and by chancing upon his own glossary of articulations as used in his 1916 edition of J.S. Bach's *Anna Magdalena Notebook* (see the title pages). In orchestrating this work, apart from realizing the implications of the score (highly inviting to orchestrators!), I also sought to realize something of Bartók's own style.

Here are more specific comments for the successive decisions.

- m. 1: Increase the sound and density of the opening flourish by the addition of octaves, by introducing several simultaneous rhythmic modifications of the triplet, and by inviting the double basses to play a snap (a.k.a. "Bartók") pizz on their lowest string, preferably on the "correct" pitch C₀ (for basses with extensions), but if not, then still preferring the open string to shifting the pitch up the octave.
- m. 2: For the repeated chords (with the piano's pedal down), alter the octave to make use of the four horns in a favorable range and to outline the outer voices of that chord with a battery of open strings.
- m. 5: Where the piano part sees doubled octaves, the orchestral version attracts concomitantly more.
- m. 6: Suddenly, the piano pedal comes off, so that's a cue to thin the texture (removing the added bass, for instance). The trumpets serve to mark that moment and contribute to the gradual move from repeated off-beat chords to the more active figure and emerging secondary line.
- m. 9: "Con grazia" in this range and in this slightly rustic context calls for the oboe.
- m. 11: Suddenly the dynamics, texture, and tessitura change again. The glissando is another Bartók hallmark and, in combination with the high E harmonic, adds a bravura flourish.
- m. 13: The alternation of two pitches in the bass register a fourth or fifth apart is very suggestive of the timpani.
- m. 19–20: Here's a chance to flex out dovetailing muscles as part of covering a large range with crescendo.
- m. 21: Reserve something (percussion) for the final *sff* chord. The timpani flourish is a creative addition which brings that soloistic part to a climactic close along with the wider section.
- m. 22: "Leggiero" is the main cue here. Use like timbres for the clusters. Oboes fit the leggiero bill here, and flutes round the sound out a little.
- m. 23: The accent invites a little creative change: I opt for a solitary string pizz and sending flute up one octave for this note only.
- m. 24: Cor anglais and solo cello duet sonority begins before the "true" duet from m. 28. (VC (moving from oboe to VC-Cor 28 duet). Solo/altri exchange.
- m. 26: The equivalent accent to m. 23 is similar, but less directly implied by the piano part (deduced from the solo line).
- m. 28: The articulation in the cello melody here is a little fussy, but should help to bring out the section's "capriciousness."

- m. 29: Yet another reworking of the accompaniment accent, here as a slightly different violin figure (similar to both mm. 23 and 26 and the snare drum in m. 13).
- m. 35: The texture and register develop here, notably expanding the use of the woodwinds.
- m. 43: Bassoon and contrabassoon share the octave leaps of the original; double basses connect the two somewhat with a semitone version.
- m. 46: The higher octave here allows us to return to a timbre and gesture from earlier on: the “throwaway” high E harmonic on the violins.
- m. 48: Once again, the bass “line” is separated between the F pedal and the moving part.
- m. 51: A variety of solutions to the clear “attack-sustain” gesture here. The solo timbres are as before, lending some continuity to avoid too excessively fragmentary a feel.
- m. 53: This two-voice invention with occasionally double octaves is an orchestrator’s dream. Trombones take center stage, horns pick out the quarter-note exchange as a kind of “bell peal” which is joined on every other measure by tubular bell (suitably enough!).
- m. 63: Changes to the horn parts bring out the rhythmic acceleration.
- m. 65: *Ruomoso*? *Al talone*? All down? The *Rite of Spring* looms large.
- m. 67: Subito *mf* reduced the strings to pizz, but introduces winds in preparation for the crescendo.
- m. 69: The big tune returns! Having flirted with a *Rite of Spring*–esque all down passage before, it seems fitting to try the legato version here. Sound covered by brass and off-beats.
- m. 77: Note the move into a higher octave here (in both versions).
- m. 81: The sextuplet requires some reworking for orchestra: here some parts play all six notes, but in close position and octave doublings; other parts (generally the lower ones) pick out a triplet version. The snare drum continues this sextuplet through the downbeat (an addition to the original) up to the final chord.

Assignments

1. Coming soon!

Footnotes

ANTHOLOGY

ANTHOLOGY CHAPTERS

- Harmony
- Twelve-Tone Rows

This final section provides an anthology to complement parts of the textbook with a large number of examples.

Prerequisites

While there are no prerequisites as such, these anthology chapters clearly relate to specific textbook chapters. The most relevant textbook chapters are always identified here

so you can easily move back and forth between textbook and anthology.

Organization

The chapters focus on:

1. Tonal (primarily chromatic) harmony. Sub-sections of the chapter provide examples of specific chords like the augmented and Neapolitan sixths and links to scores online that can be played, downloaded etc..
2. Twelve-tone rows in the repertoire

Other info

As the chapters note, these anthologies draw together examples identified by human analysts. You should expect to agree with some and disagree with others.

HARMONY ANTHOLOGY

Mark Gotham

KEY TAKEAWAYS

- This is an anthology of a different kind and at a larger scale than the usual provision. Instead of showcasing a few, select examples (as the textbook chapters proper do), the goal here is to provide long lists of cases that at least one analyst sees in terms of the chord under discussion.
- Harmonic analysis is a reductive and subjective task and you should fully expect to disagree with some of the entries included here.
- The idea is to provide minimal curation, allowing you to roam freely among *potentially* relevant cases from across a broad repertoire, making up your own mind about what counts as an ‘real’ example.

Throughout this textbook, we have provided short examples of the musical subjects under discussion such as a specific chord or progression. These examples have included both simple, ‘prototypical’ versions to clarify how the idea works in principle, and also moments from real pieces in the repertoire.

Inevitably, these chapters only have space for a few such examples, so this final, ‘anthology’ section seeks to provide many more instances, enabling users to see a wider range of cases and with full context. No textbook or anthology can hope to capture the full range of ways in which these chords are used. Indeed, it’s not always clear whether a moment constitutes a ‘real’ example of the chord at hand. Hopefully, this at least provides space to roam and explore those ‘edge cases’.

This first instalment of that vision focuses primarily on harmonic matters and on a corpus of nineteenth century songs encoded as part of the [OpenScore Lieder Corpus](#) which releases its transcriptions under the

CC0 licence meaning that they can be used for any purpose whatsoever without restriction.¹ The tables below list moments identified as relevant by human analysts. So while much of the grunt work of collating lists and retrieving examples etc. has been automated, the analysis itself has not.²

Each of the tables below gives the:

- song's metadata: composer, collection title, song name,
- measure number and Roman numeral (figure and key) for the moment in question.
- URL link through to check out (play, download, etc) the score online.

This page currently includes lists for:

- Augmented Sixth chords
- Augmented Triads
- Common Tone Diminished Sevenths
- Modal Mixture
- Neapolitan Sixth Chords

Please get in touch if you would like to see other chords or progressions represented here. For those interested in the computational side, [all source material \(scores, analyses, code, etc.\) is available here.](#)

Augmented Sixth chords

[Click here for this textbook's chapter on this topic.](#)

1. Here are links to the [public-facing "version of record"](#), the [Github mirror \(download all at once\)](#), the [first report \(2018\)](#), and the [updated report \(2021\)](#).

2. For a longer discussion of (methods for) creating a digital age anthologies, you might like to check of a paper I published with DLfM in 2019, called '[Moments Musicaux](#)'.

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOA
Bonis, Mel		Allons prier!	42	Ger65	A minor	6635424	.mscz .mxl
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	18	Fr43	B minor	5004701	.mscz .mxl
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	20	Fr43	B minor	5004701	.mscz .mxl
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	28	Fr43	Bb major	5004701	.mscz .mxl
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	30	Ger65	Bb major	5004701	.mscz .mxl
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	31	Ger65	Bb major	5004701	.mscz .mxl
Burleigh, Harry Thacker	5 Songs of Laurence Hope	2 The Jungle Flower	28	Ger65	Ab major	6518134	.mscz .mxl
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	2	Fr43	D minor	6471199	.mscz .mxl
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	18	Ger65	D minor	6471199	.mscz .mxl
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	24	Fr43	C major	6471199	.mscz .mxl
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	41	V43[b5]/vi	G minor	6471199	.mscz .mxl
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	42	V43[b5]/V	G minor	6471199	.mscz .mxl
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	67	Ger65	D minor	6471199	.mscz .mxl
Chaminade, Cécile		Amoroso	7	Ger65	Bb minor	4999292	.mscz .mxl
Chaminade, Cécile		Amoroso	8	Ger65	Bb minor	4999292	.mscz .mxl
Chaminade, Cécile		Amoroso	23	Ger65	Bb minor	4999292	.mscz .mxl
Chaminade, Cécile		Amoroso	24	Ger65	Bb minor	4999292	.mscz .mxl
Chaminade, Cécile		Amoroso	39	Ger65	Bb minor	4999292	.mscz .mxl
Chaminade, Cécile		Amoroso	40	Ger65	Bb minor	4999292	.mscz .mxl

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOA
Chaminade, Cécile		Berceuse	26	It6/iv	G minor	6264559	.mscz .mxl
Chaminade, Cécile		Berceuse	27	It6/iv	G minor	6264559	.mscz .mxl
Chaminade, Cécile		Berceuse	28	It6/iv	G minor	6264559	.mscz .mxl
Chaminade, Cécile		Berceuse	51	It6/iv	G major	6264559	.mscz .mxl
Chaminade, Cécile		Berceuse	52	It6/iv	G major	6264559	.mscz .mxl
Chaminade, Cécile		Berceuse	53	It6/iv	G major	6264559	.mscz .mxl
Chaminade, Cécile		Sur la plage	24	It6	D minor	5000363	.mscz .mxl
Chaminade, Cécile		Sur la plage	25	It6	D minor	5000363	.mscz .mxl
Chausson, Ernest	7 Mélodies, Op.2	7 Le Colibri	7	Fr43	Bb minor	5077780	.mscz .mxl
Chausson, Ernest	7 Mélodies, Op.2	7 Le Colibri	35	Fr43	Bb minor	5077780	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	1 Oh what comes over the Sea	22	Ger65	D major	6189652	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	1 Oh what comes over the Sea	24	Fr43/iv	E minor	6189652	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	29	Ger65	G major	6189644	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	59	Ger65	G major	6189644	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	4 She sat and sang alway	59	Ger65	A major	6189628	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	7	Ger65	F# minor	6189622	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	23	Ger65	F# minor	6189622	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	11	Ger65	D minor	6189616	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	20	Ger65	G minor	6189616	.mscz .mxl

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOA
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	23	Ger65	G minor	6189616	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	24	Ger65	G minor	6189616	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	35	Ger65	D minor	6189616	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	44	Ger65	G minor	6189616	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	47	Ger65	G minor	6189616	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	48	Ger65	G minor	6189616	.mscz .mxl
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	75	Ger65	G minor	6189616	.mscz .mxl
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	1 Nach Süden	6	Fr43	E major	5000467	.mscz .mxl
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	1 Nach Süden	8	Fr43	E major	5000467	.mscz .mxl
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	1 Nach Süden	37	Fr43	E major	5000467	.mscz .mxl
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	1 Nach Süden	39	Fr43	E major	5000467	.mscz .mxl
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	2 Vorwurf	5	It6	C# minor	5000464	.mscz .mxl
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	2 Vorwurf	16	Ger65	C# minor	5000464	.mscz .mxl
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	2 Vorwurf	17	Ger65	C# minor	5000464	.mscz .mxl
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	2 Vorwurf	21	Ger65	C# minor	5000464	.mscz .mxl
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	2 Vorwurf	34	Ger65	G# minor	5000464	.mscz .mxl
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	2 Vorwurf	38	Ger65	G# minor	5000464	.mscz .mxl
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	4 Im Herbste	23	Ger65	G minor	5000459	.mscz .mxl
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	1 Schwanenlied	17	Ger65	G minor	5100543	.mscz .mxl

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOA
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	1 Schwanenlied	22	Ger65	G minor	5100543	.mscz .mxl
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	1 Schwanenlied	44	Ger65	G minor	5100543	.mscz .mxl
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	1 Schwanenlied	49	Ger65	G minor	5100543	.mscz .mxl
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	4 Mayenlied	7	Ger65/I	B major	5101299	.mscz .mxl
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	4 Mayenlied	26	Ger65/I	B major	5101299	.mscz .mxl
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.9	2 Ferne	15	Ger65	G minor	5103883	.mscz .mxl
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.9	6 Die Mainacht	8	It6	C minor	4986030	.mscz .mxl
Holmès, Augusta Mary Anne	Les Heures	4 L'Heure d'Azur	20	Ger65	B major	5001674	.mscz .mxl
Jaëll, Marie	4 Mélodies	2 Éternel amour	24	Ger65	B major	5837811	.mscz .mxl
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	44	Fr43	B major	6061301	.mscz .mxl
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	80	Fr43	B major	6061301	.mscz .mxl
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	6	Ger65	E major	4920211	.mscz .mxl
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	16	Ger65	E major	4920211	.mscz .mxl
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	28	Ger65	E major	4920211	.mscz .mxl
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	38	Ger65	E major	4920211	.mscz .mxl
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	50	Ger65	E major	4920211	.mscz .mxl
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	58	Ger65	E major	4920211	.mscz .mxl

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOA
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	7	Ger65	C minor	5051724	.mscz .mxl
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	19	Ger65/ii	C major	5051724	.mscz .mxl
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	28	It6	F major	5051724	.mscz .mxl
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	33	Ger65	C major	5051724	.mscz .mxl
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	37	Ger65/II	Eb major	5051724	.mscz .mxl
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	38	Ger65/II	Eb major	5051724	.mscz .mxl
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	65	Ger65	C major	5051724	.mscz .mxl
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	70	Ger65/IV	C major	5051724	.mscz .mxl
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	71	Ger65/IV	C major	5051724	.mscz .mxl
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	72	Ger65	C major	5051724	.mscz .mxl
Mayer, Emilie	3 Lieder, Op.7	2 O lass mich dein gedenken	12	It6	E major	5840434	.mscz .mxl
Mayer, Emilie	3 Lieder, Op.7	2 O lass mich dein gedenken	22	Ger65	A major	5840434	.mscz .mxl
Mayer, Emilie	3 Lieder, Op.7	3 Wenn der Abendstern die Rosen	19	Ger65	Ab major	5841419	.mscz .mxl
Mayer, Emilie	3 Lieder, Op.7	3 Wenn der Abendstern die Rosen	23	Ger65/vi	Ab major	5841419	.mscz .mxl
Reichardt, Louise	Sechs Lieder von Novalis, Op.4	5 Noch ein Bergmannslied	6	Ger65	Eb major	5092612	.mscz .mxl

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOA
Reichardt, Louise	Zwölf Deutsche und Italiänische Romantische Gesänge	10 Ida (aus Ariels Offenbarungen)	9	Ger65	Bb minor	5002108	.mscz .mxl
Reichardt, Louise	Zwölf Deutsche und Italiänische Romantische Gesänge	10 Ida (aus Ariels Offenbarungen)	35	Ger65	Eb minor	5002108	.mscz .mxl
Reichardt, Louise	Zwölf Deutsche und Italiänische Romantische Gesänge	10 Ida (aus Ariels Offenbarungen)	43	Ger65	Eb minor	5002108	.mscz .mxl
Reichardt, Louise	Zwölf Deutsche und Italiänische Romantische Gesänge	10 Ida (aus Ariels Offenbarungen)	51	Ger65	Eb minor	5002108	.mscz .mxl
Reichardt, Louise	Zwölf Gesänge	04 Vaters Klage	3	It6	G minor	5001870	.mscz .mxl
Schubert, Franz		Das Rosenband, D.280	11	It6/vi	Ab major	5946872	.mscz .mxl
Schubert, Franz		Das Rosenband, D.280	27	It6/vi	Ab major	5946872	.mscz .mxl
Schubert, Franz	Die schöne Müllerin, D.795	02 Wohin	38	It6	E minor	4982535	.mscz .mxl
Schubert, Franz	Die schöne Müllerin, D.795	02 Wohin	39	It6	E minor	4982535	.mscz .mxl
Schubert, Franz	Die schöne Müllerin, D.795	02 Wohin	40	It6	E minor	4982535	.mscz .mxl
Schubert, Franz	Die schöne Müllerin, D.795	12 Pause	39	It6	Bb minor	4985946	.mscz .mxl
Schubert, Franz	Die schöne Müllerin, D.795	12 Pause	40	Fr43	Bb minor	4985946	.mscz .mxl
Schubert, Franz	Die schöne Müllerin, D.795	12 Pause	66	Ger65	Bb major	4985946	.mscz .mxl
Schubert, Franz	Die schöne Müllerin, D.795	12 Pause	74	Ger65	Bb major	4985946	.mscz .mxl
Schubert, Franz	Die schöne Müllerin, D.795	18 Trockne Blumen	14	It6	E minor	4985949	.mscz .mxl
Schubert, Franz	Die schöne Müllerin, D.795	18 Trockne Blumen	15	It6	E minor	4985949	.mscz .mxl

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOA
Schubert, Franz	Die schöne Müllerin, D.795	18 Trockne Blumen	28	It6	E minor	4985949	.mscz .mxl
Schubert, Franz	Die schöne Müllerin, D.795	18 Trockne Blumen	29	It6	E minor	4985949	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	14	Ger65	C minor	4986000	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	24	It6	C minor	4986000	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	111	Ger65	C minor	4986000	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	03 Frühlingssehnsucht	65	Ger65	Bb minor	4985999	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	53	Ger65	G major	4985990	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	108	Ger65	E minor	4985990	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	13 Der Doppelgänger	32	V43[b5]	B minor	4985964	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	13 Der Doppelgänger	33	V43[b5]	B minor	4985964	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	13 Der Doppelgänger	41	V43[b5]	B minor	4985964	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	13 Der Doppelgänger	42	V43[b5]	B minor	4985964	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	13 Der Doppelgänger	42	V43[b5]	B minor	4985964	.mscz .mxl
Schubert, Franz	Schwanengesang, D.957	13 Der Doppelgänger	51	Ger65	B minor	4985964	.mscz .mxl
Schubert, Franz	Winterreise, D.911	02 Die Wetterfahne	8	It	A minor	5015435	.mscz .mxl
Schubert, Franz	Winterreise, D.911	02 Die Wetterfahne	27	It	A minor	5015435	.mscz .mxl
Schubert, Franz	Winterreise, D.911	02 Die Wetterfahne	31	Ger65	A major	5015435	.mscz .mxl
Schubert, Franz	Winterreise, D.911	02 Die Wetterfahne	37	It6	A minor	5015435	.mscz .mxl
Schubert, Franz	Winterreise, D.911	02 Die Wetterfahne	43	Ger6	A major	5015435	.mscz .mxl

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOA
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	22	It6	F minor	5015499	.mscz .mxl
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	26	It6	Ab minor	5015499	.mscz .mxl
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	37	Ger65	F minor	5015499	.mscz .mxl
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	47	Ger65	F minor	5015499	.mscz .mxl
Schubert, Franz	Winterreise, D.911	05 Der Lindenbaum	45	Ger65	E minor	5016466	.mscz .mxl
Schubert, Franz	Winterreise, D.911	05 Der Lindenbaum	47	Ger6	E minor	5016466	.mscz .mxl
Schubert, Franz	Winterreise, D.911	05 Der Lindenbaum	52	Ger6	E minor	5016466	.mscz .mxl
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	23	Ger65	C minor	5023517	.mscz .mxl
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	26	Ger65	C minor	5023517	.mscz .mxl
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	27	Ger65	C minor	5023517	.mscz .mxl
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	28	Ger65	C minor	5023517	.mscz .mxl
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	29	Ger65	C minor	5023517	.mscz .mxl
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	53	Ger65	C minor	5023517	.mscz .mxl
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	56	Ger65	C minor	5023517	.mscz .mxl
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	57	Ger65	C minor	5023517	.mscz .mxl
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	58	Ger65	C minor	5023517	.mscz .mxl
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	59	Ger65	C minor	5023517	.mscz .mxl
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	32	Ger65	B minor	5023662	.mscz .mxl

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOA
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	34	Ger65	B minor	5023662	.mscz .mxl
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	35	Ger65	B minor	5023662	.mscz .mxl
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	44	Ger65	B minor	5023662	.mscz .mxl
Schubert, Franz	Winterreise, D.911	13 Die Post	18	Ger65	Eb major	5007176	.mscz .mxl
Schubert, Franz	Winterreise, D.911	13 Die Post	31	Fr43	Gb major	5007176	.mscz .mxl
Schubert, Franz	Winterreise, D.911	13 Die Post	63	Ger65	Eb major	5007176	.mscz .mxl
Schubert, Franz	Winterreise, D.911	13 Die Post	76	Fr43	Gb major	5007176	.mscz .mxl
Schubert, Franz	Winterreise, D.911	14 Der greise Kopf	21	It6	Ab major	5007178	.mscz .mxl
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	22	It6	G major	5007179	.mscz .mxl
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	21	Fr6	Eb minor	5007180	.mscz .mxl
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	22	Fr43	Eb minor	5007180	.mscz .mxl
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	22	Fr43	Eb minor	5007180	.mscz .mxl
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	22	Fr43	Eb minor	5007180	.mscz .mxl
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	23	Fr43	Eb minor	5007180	.mscz .mxl
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	23	Fr43	Eb minor	5007180	.mscz .mxl
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	23	Fr43	Eb minor	5007180	.mscz .mxl
Schubert, Franz	Winterreise, D.911	17 Im Dorfe	42	It6	D major	5007181	.mscz .mxl
Schubert, Franz	Winterreise, D.911	20 Der Wegweiser	38	Ger65	G minor	5009900	.mscz .mxl

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOA
Schubert, Franz	Winterreise, D.911	20 Der Wegweiser	78	Ger65	G minor	5009900	.mscz .mxl
Schumann, Robert	5 Lieder und Gesänge, Op.127	2 Dein Angesicht	12	Ger65	Ab minor	x_url_missing	x_missing
Schumann, Robert	Dichterliebe, Op.48	06 Im Rhein, im heiligen Strome	41	Fr43	E minor	4978379	.mscz .mxl
Schumann, Robert	Dichterliebe, Op.48	10 Hör' ich das Liedchen klingen	25	It6	G minor	5003150	.mscz .mxl
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	1	Ger65	Bb major	4978395	.mscz .mxl
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	6	Ger65	Bb major	4978395	.mscz .mxl
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	11	Ger65	Bb major	4978395	.mscz .mxl
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	19	Ger65	Bb major	4978395	.mscz .mxl
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	24	Ger65	Bb major	4978395	.mscz .mxl
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	26	Ger65	Bb major	4978395	.mscz .mxl
Schumann, Robert	Dichterliebe, Op.48	16 Die alten, bösen Lieder	54	Ger65	Db major	4978400	.mscz .mxl
Schumann, Robert	Dichterliebe, Op.48	16 Die alten, bösen Lieder	56	Ger65	Db major	4978400	.mscz .mxl
Schumann, Robert	Frauenliebe und Leben, Op.42	3 Ich kann's nicht fassen	18	Fr43	Eb major	4978485	.mscz .mxl
Schumann, Robert	Frauenliebe und Leben, Op.42	3 Ich kann's nicht fassen	26	Fr43	G minor	4978485	.mscz .mxl
Schumann, Robert	Frauenliebe und Leben, Op.42	3 Ich kann's nicht fassen	50	Ger65	C minor	4978485	.mscz .mxl
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	7	Fr43	G minor	5052714	.mscz .mxl

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOA
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	24	Ger65	Eb major	5052714	.mscz .mxl
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	27	It6	G minor	5052714	.mscz .mxl
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	32	Fr	G major	5077482	.mscz .mxl
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	45	Ger65	E major	5077482	.mscz .mxl
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	118	Ger65	G major	5077482	.mscz .mxl
Zumsteeg, Emilie	6 Lieder, Op.4	1 Die Kapelle	4	It6	F minor	6159729	.mscz .mxl
Zumsteeg, Emilie	6 Lieder, Op.4	1 Die Kapelle	16	Fr43	Ab minor	6159729	.mscz .mxl
Zumsteeg, Emilie	6 Lieder, Op.4	1 Die Kapelle	17	Fr43	Ab minor	6159729	.mscz .mxl

Augmented Triads

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COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EX
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	5	III+6	C# minor	4946239	.mscz .mxl	49
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	15	III+6	C# minor	4946239	.mscz .mxl	49
Brahms, Johannes	Marienlieder, Op.22	3 Marias Wallfahrt	0	III+6	C minor	8708688	.mscz .mxl	87
Brahms, Johannes	Marienlieder, Op.22	3 Marias Wallfahrt	8	III+6	C minor	8708688	.mscz .mxl	87
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	48	V+2	C major	6471199	.mscz .mxl	64
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	55	III+63	D minor	6471199	.mscz .mxl	64
Chaminade, Cécile		Amoroso	5	V+7	Bb minor	4999292	.mscz .mxl	49
Chaminade, Cécile		Amoroso	13	V+7	Eb major	4999292	.mscz .mxl	49
Chaminade, Cécile		Amoroso	14	I+64	Eb major	4999292	.mscz .mxl	49
Chaminade, Cécile		Amoroso	21	V+7	Bb minor	4999292	.mscz .mxl	49
Chaminade, Cécile		Amoroso	29	V+7	Eb major	4999292	.mscz .mxl	49
Chaminade, Cécile		Amoroso	30	I+64	Eb major	4999292	.mscz .mxl	49
Chaminade, Cécile		Amoroso	37	V+7	Bb minor	4999292	.mscz .mxl	49
Chaminade, Cécile		Amoroso	45	V+7	Eb major	4999292	.mscz .mxl	49
Chaminade, Cécile		Amoroso	46	I+64	Eb major	4999292	.mscz .mxl	49
Coleridge-Taylor, Samuel		Oh, the Summer	26	III+6	F minor	6232117	.mscz .mxl	62
Coleridge-Taylor, Samuel		Oh, the Summer	42	V+7	Ab major	6232117	.mscz .mxl	62
Coleridge-Taylor, Samuel		Oh, the Summer	66	III+6	F minor	6232117	.mscz .mxl	62
Coleridge-Taylor, Samuel		Oh, the Summer	82	V+7	Ab major	6232117	.mscz .mxl	62

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EX
Coleridge-Taylor, Samuel		Oh, the Summer	106	III+6	F minor	6232117	.mscz .mxl	62
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	1 Oh what comes over the Sea	4	III+6	E minor	6189652	.mscz .mxl	61
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	1 Oh what comes over the Sea	10	III+6	E minor	6189652	.mscz .mxl	61
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	1 Oh what comes over the Sea	13	bVI+64	G major	6189652	.mscz .mxl	61
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	4 She sat and sang alway	61	V+	A major	6189628	.mscz .mxl	61
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	68	V+6	G minor	6189616	.mscz .mxl	61
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	70	V+	G minor	6189616	.mscz .mxl	61
Franz, Robert	6 Gesänge, Op.14	5 Liebesfrühling	18	III+6	B minor	4976682	.mscz .mxl	49
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	1 Nach Süden	10	V+	A major	5000467	.mscz .mxl	50
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	1 Nach Süden	12	V+6	A major	5000467	.mscz .mxl	50
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	1 Nach Süden	26	I+64	E major	5000467	.mscz .mxl	50
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	1 Nach Süden	41	V+	A major	5000467	.mscz .mxl	50
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	1 Nach Süden	43	V+6	A major	5000467	.mscz .mxl	50
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	2 Vorwurf	44	III+	G# minor	5000464	.mscz .mxl	50
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	2 Vorwurf	45	III+	G# minor	5000464	.mscz .mxl	50
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	5 Bergeslust	30	III+6	A minor	5000446	.mscz .mxl	50
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	5 Bergeslust	35	V+6/vi	C major	5000446	.mscz .mxl	50
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	5 Bergeslust	37	V+6/vi	C major	5000446	.mscz .mxl	50
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	6 Gondellied	7	III+	B minor	5101361	.mscz .mxl	51

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EX
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	6 Gondellied	19	V+	A major	5101361	.mscz .mxl	51
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	6 Gondellied	24	III+	B minor	5101361	.mscz .mxl	51
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.9	6 Die Mainacht	10	III+	C minor	4986030	.mscz .mxl	49
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.9	6 Die Mainacht	12	V+6	Db major	4986030	.mscz .mxl	49
Holmès, Augusta Mary Anne	Les Heures	4 L'Heure d'Azur	45	bVI+	B major	5001674	.mscz .mxl	50
Holmès, Augusta Mary Anne	Les Heures	4 L'Heure d'Azur	47	bVI+	G major	5001674	.mscz .mxl	50
Jaëll, Marie	4 Mélodies	2 Éternel amour	3	I+64	B major	5837811	.mscz .mxl	58
Jaëll, Marie	4 Mélodies	2 Éternel amour	28	I+64	B major	5837811	.mscz .mxl	58
Kralik, Mathilde	Blumenlieder	1 Maiglöckchen	19	V+7	Db major	6165152	.mscz .mxl	61
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	14	bII+	C major	5051724	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	18	III+/ii	C major	5051724	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	20	VI+	C minor	5051724	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	21	VI+	C minor	5051724	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	24	V+	Db major	5051724	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	30	V+	F major	5051724	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	50	III+65	G minor	5051724	.mscz .mxl	50

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EX
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	52	III+/ii	Bb major	5051724	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	54	V+6	Gb major	5051724	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	56	V+	Cb major	5051724	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	62	V+/IV	C major	5051724	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	22	III+7/iii	Eb major	5062118	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	28	III+	Eb minor	5062118	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	43	V+7	Eb major	5062118	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	43	V+	Eb major	5062118	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	67	V+	Eb major	5062118	.mscz .mxl	50
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	67	I+7	Eb major	5062118	.mscz .mxl	50
Reichardt, Louise	Sechs Lieder von Novalis, Op.4	1 Sehnsucht nach dem Vaterlande	13	V+6/IV	Eb major	5002041	.mscz .mxl	50
Schubert, Franz		Das Rosenband, D.280	4	VI+	Bb minor	5946872	.mscz .mxl	59
Schubert, Franz		Das Rosenband, D.280	5	V+6	Ab major	5946872	.mscz .mxl	59
Schubert, Franz		Das Rosenband, D.280	9	I+6	Ab major	5946872	.mscz .mxl	59
Schubert, Franz		Das Rosenband, D.280	20	VI+	Bb minor	5946872	.mscz .mxl	59
Schubert, Franz		Das Rosenband, D.280	21	V+6	Ab major	5946872	.mscz .mxl	59

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EX
Schubert, Franz		Das Rosenband, D.280	25	I+6	Ab major	5946872	.mscz .mxl	59
Schubert, Franz	Op.52	6 Ellens Gesang III, D.839 (Ave Maria)	5	III+	G minor	6389103	.mscz .mxl	63
Schubert, Franz	Schwanengesang, D.957	01 Liebesbotschaft	44	V+65	E minor	5077744	.mscz .mxl	50
Schubert, Franz	Schwanengesang, D.957	01 Liebesbotschaft	45	V+65	E minor	5077744	.mscz .mxl	50
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	7	III+6	C minor	4986000	.mscz .mxl	49
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	49	VI+6	A minor	4986000	.mscz .mxl	49
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	74	V+6	F major	4986000	.mscz .mxl	49
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	101	V+6	F major	4986000	.mscz .mxl	49
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	119	III+6	C minor	4986000	.mscz .mxl	49
Schubert, Franz	Schwanengesang, D.957	03 Frühlingssehnsucht	76	III+64	Bb minor	4985999	.mscz .mxl	49
Schubert, Franz	Schwanengesang, D.957	08 Der Atlas	2	III+64	G minor	4985985	.mscz .mxl	49
Schubert, Franz	Schwanengesang, D.957	08 Der Atlas	3	III+64	G minor	4985985	.mscz .mxl	49
Schubert, Franz	Schwanengesang, D.957	08 Der Atlas	15	III+64	G minor	4985985	.mscz .mxl	49
Schubert, Franz	Schwanengesang, D.957	08 Der Atlas	53	III+64	G minor	4985985	.mscz .mxl	49
Schubert, Franz	Schwanengesang, D.957	08 Der Atlas	54	III+64	G minor	4985985	.mscz .mxl	49
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	30	V+6	Ab major	5015499	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	32	V+6	Ab major	5015499	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	40	V+6	Ab major	5015499	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	42	V+6	Ab major	5015499	.mscz .mxl	50

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EX
Schubert, Franz	Winterreise, D.911	04 Erstarrung	1	III+64	C minor	5015573	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	04 Erstarrung	103	III+64	C minor	5015573	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	09 Irrlicht	9	III+6	B minor	5023438	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	09 Irrlicht	21	III+6	B minor	5023438	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	14 Der greise Kopf	20	V+6	Ab major	5007178	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	14 Der greise Kopf	36	I+6	C major	5007178	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	15	V+6	Eb major	5007179	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	16	V+6	Eb major	5007179	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	16	V+6	Eb major	5007179	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	17	V+6	Eb major	5007179	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	17	V+6	Eb major	5007179	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	19	V+6	F major	5007179	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	20	V+6	F major	5007179	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	20	V+6	F major	5007179	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	21	V+6	F major	5007179	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	21	V+6	F major	5007179	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	19 Täuschung	30	V+	A major	5009833	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	21 Das Wirthshaus	20	V+	Bb minor	5013945	.mscz .mxl	50
Schubert, Franz	Winterreise, D.911	21 Das Wirthshaus	24	V+	Ab major	5013945	.mscz .mxl	50

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EX
Schumann, Clara		Die gute Nacht	26	III+43	D minor	5000388	.mscz .mxl	50
Schumann, Clara	6 Lieder, Op.13	1 Ich stand in dunklen Träumen	4	V+43	Eb major	5133602	.mscz .mxl	51
Schumann, Clara	6 Lieder, Op.13	1 Ich stand in dunklen Träumen	34	V+43	Eb major	5133602	.mscz .mxl	51
Schumann, Robert	Dichterliebe, Op.48	05 Ich will meine Seele tauchen	19	III+6	B minor	4978373	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	07 Ich grolle nicht	4	III+2/vi	C major	4978382	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	07 Ich grolle nicht	22	III+2/vi	C major	4978382	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	07 Ich grolle nicht	28	III+6/ii	C major	4978382	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	09 Das ist ein Flöten und Geigen	13	III+	G minor	4978390	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	09 Das ist ein Flöten und Geigen	47	III+	G minor	4978390	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	16	I+2[b7]	Bb major	4978395	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	21	V+	Bb major	4978395	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	13 Ich hab' im Traum geweinet	8	III+/vi	Cb major	4978396	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	13 Ich hab' im Traum geweinet	9	III+/vi	Cb major	4978396	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	13 Ich hab' im Traum geweinet	19	III+/vi	Cb major	4978396	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	13 Ich hab' im Traum geweinet	20	III+/vi	Cb major	4978396	.mscz .mxl	49
Schumann, Robert	Dichterliebe, Op.48	13 Ich hab' im Traum geweinet	30	V+64/IV	Db major	4978396	.mscz .mxl	49
Schumann, Robert	Frauenliebe und Leben, Op.42	1 Seit ich ihn gesehen	15	III+64/vi	Bb major	4978468	.mscz .mxl	49
Schumann, Robert	Frauenliebe und Leben, Op.42	1 Seit ich ihn gesehen	31	III+64/vi	Bb major	4978468	.mscz .mxl	49

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EX
Schumann, Robert	Frauenliebe und Leben, Op.42	3 Ich kann's nicht fassen	20	V+7	Eb major	4978485	.mscz .mxl	49
Schumann, Robert	Frauenliebe und Leben, Op.42	3 Ich kann's nicht fassen	24	V+7	Eb major	4978485	.mscz .mxl	49
Schumann, Robert	Frauenliebe und Leben, Op.42	3 Ich kann's nicht fassen	83	VI+	C minor	4978485	.mscz .mxl	49
Viardot, Pauline	6 Mélodies, VWV 1133-11371176	4 Sérénade à Rosine, VWV 1137	27	V+7	F major	5989772	.mscz .mxl	59
Viardot, Pauline	6 Mélodies, VWV 1133-11371176	4 Sérénade à Rosine, VWV 1137	71	V+7	F major	5989772	.mscz .mxl	59
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	22	I+	F# major	5024834	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	28	I+	F# major	5024834	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	34	I+	Bb major	5024834	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	40	I+	Bb major	5024834	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	13 Der Scholar	19	V+	C major	5052792	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	13 Der Scholar	19	III+7	F minor	5052792	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	13 Der Scholar	20	III+7	G minor	5052792	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	2	III+7	G minor	5052714	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	9	III+7	G minor	5052714	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	32	I+6	G major	5052714	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	23	III+2	G minor	5057804	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	24	III+43	G minor	5057804	.mscz .mxl	50

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EX
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	48	VI+64	B minor	5077482	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	106	V+64	G major	5077482	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	110	V+64	C major	5077482	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	111	I+6	C major	5077482	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	112	IV+	C major	5077482	.mscz .mxl	50
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	114	IV+	C major	5077482	.mscz .mxl	50

Common Tone Diminished Sevenths

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COMPOSER	COLLECTION	MOVEMENT	MEASURE	SCORE	DOWNLOAD	EXAMPLE
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	31	5004701	.mscz .mxl	5004701_31
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	41	5004701	.mscz .mxl	5004701_41
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	42	5004701	.mscz .mxl	5004701_42
Chaminade, Cécile		Sur la plage	5	5000363	.mscz .mxl	5000363_5
Chaminade, Cécile		Sur la plage	37	5000363	.mscz .mxl	5000363_37
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	27	6189616	.mscz .mxl	6189616_27
Hensel, Fanny (Mendelssohn)	3 Lieder	1 Sehnsucht	14	6012947	.mscz .mxl	6012947_14
Hensel, Fanny (Mendelssohn)	3 Lieder	2 Verlust	14	6013106	.mscz .mxl	6013106_14
Hensel, Fanny (Mendelssohn)	3 Lieder	2 Verlust	34	6013106	.mscz .mxl	6013106_34
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	3 Abendbild	42	4919798	.mscz .mxl	4919798_42
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	5 Bergeslust	15	5000446	.mscz .mxl	5000446_15
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	5 Bergeslust	56	5000446	.mscz .mxl	5000446_56
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	2 Wanderlied	17	5004632	.mscz .mxl	5004632_17
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	2 Wanderlied	27	5004632	.mscz .mxl	5004632_27
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	5 Morgenständchen	10	5004650	.mscz .mxl	5004650_10
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	5 Morgenständchen	13	5004650	.mscz .mxl	5004650_13
Lang, Josephine	3 Lieder, Op.8	1 Schmetterling	29	6088572	.mscz .mxl	6088572_29
Lang, Josephine	3 Lieder, Op.8	1 Schmetterling	65	6088572	.mscz .mxl	6088572_65
Lang, Josephine	6 Lieder, Op.26	1 Wiegenlied	39	6117412	.mscz .mxl	6117412_39
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	1	5062118	.mscz .mxl	5062118_1

COMPOSER	COLLECTION	MOVEMENT	MEASURE	SCORE	DOWNLOAD	EXAMPLE
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	19	5062118	.mscz .mxl	5062118_19
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	68	5062118	.mscz .mxl	5062118_68
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	69	5062118	.mscz .mxl	5062118_69
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	70	5062118	.mscz .mxl	5062118_70
Mayer, Emilie	3 Lieder, Op.7	2 O lass mich dein gedenken	18	5840434	.mscz .mxl	5840434_18
Reichardt, Louise	Sechs Lieder von Novalis, Op.4	6 Er besucht den Klostergarten und den Kirchoff, über den letztern findet sich folgendes Gedicht	6	5002078	.mscz .mxl	5002078_6
Schubert, Franz	Die schöne Müllerin, D.795	18 Trockne Blumen	36	4985949	.mscz .mxl	4985949_36
Schubert, Franz	Die schöne Müllerin, D.795	18 Trockne Blumen	45	4985949	.mscz .mxl	4985949_45
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	61	4986000	.mscz .mxl	4986000_61
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	62	4986000	.mscz .mxl	4986000_62
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	63	4986000	.mscz .mxl	4986000_63
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	64	4986000	.mscz .mxl	4986000_64
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	65	4986000	.mscz .mxl	4986000_65
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	66	4986000	.mscz .mxl	4986000_66
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	89	4986000	.mscz .mxl	4986000_89
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	90	4986000	.mscz .mxl	4986000_90

COMPOSER	COLLECTION	MOVEMENT	MEASURE	SCORE	DOWNLOAD	EXAMPLE
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	92	4986000	.mscz .mxl	4986000_92
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	93	4986000	.mscz .mxl	4986000_93
Schubert, Franz	Winterreise, D.911	04 Erstarrung	3	5015573	.mscz .mxl	5015573_3
Schubert, Franz	Winterreise, D.911	04 Erstarrung	37	5015573	.mscz .mxl	5015573_37
Schubert, Franz	Winterreise, D.911	04 Erstarrung	94	5015573	.mscz .mxl	5015573_94
Schubert, Franz	Winterreise, D.911	04 Erstarrung	101	5015573	.mscz .mxl	5015573_101
Schubert, Franz	Winterreise, D.911	04 Erstarrung	105	5015573	.mscz .mxl	5015573_105
Schubert, Franz	Winterreise, D.911	05 Der Lindenbaum	49	5016466	.mscz .mxl	5016466_49
Schubert, Franz	Winterreise, D.911	05 Der Lindenbaum	49	5016466	.mscz .mxl	5016466_49
Schubert, Franz	Winterreise, D.911	05 Der Lindenbaum	49	5016466	.mscz .mxl	5016466_49
Schubert, Franz	Winterreise, D.911	08 Rückblick	41	5015521	.mscz .mxl	5015521_41
Schubert, Franz	Winterreise, D.911	08 Rückblick	45	5015521	.mscz .mxl	5015521_45
Schubert, Franz	Winterreise, D.911	08 Rückblick	57	5015521	.mscz .mxl	5015521_57
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	16	5023662	.mscz .mxl	5023662_16
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	20	5023662	.mscz .mxl	5023662_20
Schubert, Franz	Winterreise, D.911	13 Die Post	34	5007176	.mscz .mxl	5007176_34
Schubert, Franz	Winterreise, D.911	13 Die Post	36	5007176	.mscz .mxl	5007176_36
Schubert, Franz	Winterreise, D.911	13 Die Post	79	5007176	.mscz .mxl	5007176_79

COMPOSER	COLLECTION	MOVEMENT	MEASURE	SCORE	DOWNLOAD	EXAMPLE
Schubert, Franz	Winterreise, D.911	13 Die Post	81	5007176	.mscz .mxl	5007176_81
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	36	5007179	.mscz .mxl	5007179_36
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	19	5007180	.mscz .mxl	5007180_19
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	45	5007180	.mscz .mxl	5007180_45
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	45	5007180	.mscz .mxl	5007180_45
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	45	5007180	.mscz .mxl	5007180_45
Schubert, Franz	Winterreise, D.911	17 Im Dorfe	30	5007181	.mscz .mxl	5007181_30
Schubert, Franz	Winterreise, D.911	20 Der Wegweiser	57	5009900	.mscz .mxl	5009900_57
Schumann, Clara	6 Lieder, Op.13	1 Ich stand in dunklen Träumen	26	5133602	.mscz .mxl	5133602_26
Schumann, Clara	6 Lieder, Op.13	4 Der Mond kommt still gegangen	26	5126921	.mscz .mxl	5126921_26
Schumann, Robert	Dichterliebe, Op.48	15 Aus alten Märchen winkt es	101	4978398	.mscz .mxl	4978398_101
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	29	5057804	.mscz .mxl	5057804_29
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	5	5077482	.mscz .mxl	5077482_5
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	91	5077482	.mscz .mxl	5077482_91

Modal Mixture

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This table provides examples of modal mixture which is much more difficult to define robustly than is the case for the Neapolitan sixth chords, for example. The list here provides examples where:

- Clearly mixed tone counts towards mixture and clearly non-mixed tone counts against it.
 - E.g., F-Ab-C-E in C major has both a clearly mixed tone (Ab, the minor sixth) and a clearly

non-mixed tone (E, the major third).

- Clearly clearly non-mixed tones do not necessarily preclude mixture if there are also strongly mixed tones.
- Mixture does not necessarily need to work in relation to all forms of the minor mode.
- “Chromatic” notes (that are not diatonic to the primary mode, shared between major and minor, nor mixed) are neutral
- Enharmonic spelling of the chord matters (so Ab might indicate mixture from c minor into C major, but G# probably does not);
- Secondary Roman numerals
 - can indicate mixture (are not necessarily excluded);
 - are considered against the home (primary rather than secondary) key. E.g., viio/V is considered against the I, primary tonic rather the V secondary.

Complex eh?! I'll provide a clear explanation and demonstration of all these options somewhere accessible soon. For now, every entry on this this makes at least a reasonably strong case for mixture.

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Bonis, Mel		Allons prier!	27	bVI	B major	6635424	.mscz .midi
Bonis, Mel		Allons prier!	28	bVI	B major	6635424	.mscz .midi
Bonis, Mel		Allons prier!	33	iv64	C major	6635424	.mscz .midi
Bonis, Mel		Allons prier!	52	I	A minor	6635424	.mscz .midi
Bonis, Mel		Allons prier!	53	I	A minor	6635424	.mscz .midi
Bonis, Mel		Allons prier!	54	I	A minor	6635424	.mscz .midi
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	28	viø7	Bb major	5004701	.mscz .midi
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	30	viø7	Bb major	5004701	.mscz .midi
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	30	Ger65	Bb major	5004701	.mscz .midi
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	31	Ger65	Bb major	5004701	.mscz .midi
Brahms, Johannes	6 Songs, Op.3	3 Liebe und Frühling II	31	viio2	Bb major	5004701	.mscz .midi
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	1	viio2	B major	4946239	.mscz .midi
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	2	viio2	B major	4946239	.mscz .midi
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	3	viio2	B major	4946239	.mscz .midi
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	4	viio7	F# major	4946239	.mscz .midi
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	5	viio2	B major	4946239	.mscz .midi
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	7	i	F# major	4946239	.mscz .midi
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	7	i6	F# major	4946239	.mscz .midi
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	9	viio43	B major	4946239	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	10	viio65	F# major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	11	viio2	B major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	12	viio2	B major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	13	viio2	B major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	14	viio7	F# major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	15	viio2	B major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	17	i	F# major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	17	i6	F# major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	19	viio43	B major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	20	viio65	F# major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	21	viio2	B major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	22	iiø2	B major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	22	viio65[no5]	B major	4946239	.mscz .m
Brahms, Johannes	7 Lieder, Op.48	3 Liebesklage des Mädchens	22	viio7	B major	4946239	.mscz .m
Brahms, Johannes	Marienlieder, Op.22	3 Marias Wallfahrt	8	I	G minor	8708688	.mscz .m
Brahms, Johannes	Marienlieder, Op.22	3 Marias Wallfahrt	16	I	G minor	8708688	.mscz .m
Brahms, Johannes	Marienlieder, Op.22	3 Marias Wallfahrt	20	iv	C major	8708688	.mscz .m
Brahms, Johannes	Marienlieder, Op.22	3 Marias Wallfahrt	23	I	C minor	8708688	.mscz .m
Brahms, Johannes	Marienlieder, Op.22	3 Marias Wallfahrt	24	I	C minor	8708688	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Brahms, Johannes	Marienlieder, Op.22	5 Ruf zur Maria	20	iv	Bb major	8712648	.mscz .midi
Brahms, Johannes	Marienlieder, Op.22	5 Ruf zur Maria	20	iiø7	Bb major	8712648	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	2 The Jungle Flower	27	iv6	Ab major	6518134	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	2 The Jungle Flower	28	Ger65	Ab major	6518134	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	2 The Jungle Flower	34	iv6	Ab major	6518134	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	2 The Jungle Flower	37	I	F minor	6518134	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	2 The Jungle Flower	41	iiø7	Ab major	6518134	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	2 The Jungle Flower	63	I	F minor	6518134	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	3	I64	D minor	6471199	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	34	viiø65	F major	6471199	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	49	i6	C major	6471199	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	68	Ger7	F major	6471199	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	75	Vb9	F major	6471199	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	79	I	D minor	6471199	.mscz .midi
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	83	I	D minor	6471199	.mscz .midi
Chaminade, Cécile		Amoroso	10	I	Bb minor	4999292	.mscz .midi
Chaminade, Cécile		Amoroso	26	I	Bb minor	4999292	.mscz .midi
Chaminade, Cécile		Amoroso	42	I	Bb minor	4999292	.mscz .midi
Chaminade, Cécile		Berceuse	43	viiø7	G major	6264559	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Chaminade, Cécile		Berceuse	44	viio7	G major	6264559	.mscz .m
Chaminade, Cécile		Berceuse	45	viio7	G major	6264559	.mscz .m
Chaminade, Cécile		Berceuse	50	viio7	G major	6264559	.mscz .m
Chaminade, Cécile		Berceuse	51	i	G major	6264559	.mscz .m
Chaminade, Cécile		Berceuse	52	i	G major	6264559	.mscz .m
Chaminade, Cécile		Berceuse	53	i	G major	6264559	.mscz .m
Chaminade, Cécile		Sur la plage	32	I	D minor	5000363	.mscz .m
Chaminade, Cécile		Sur la plage	33	I	D minor	5000363	.mscz .m
Chausson, Ernest	7 Mélodies, Op.2	7 Le Colibri	14	i6	Db major	5077780	.mscz .m
Chausson, Ernest	7 Mélodies, Op.2	7 Le Colibri	14	i	Db major	5077780	.mscz .m
Chausson, Ernest	7 Mélodies, Op.2	7 Le Colibri	27	iv	Db major	5077780	.mscz .m
Coleridge-Taylor, Samuel		Oh, the Summer	35	bVI6	Ab major	6232117	.mscz .m
Coleridge-Taylor, Samuel		Oh, the Summer	36	bVI6	Ab major	6232117	.mscz .m
Coleridge-Taylor, Samuel		Oh, the Summer	75	bVI6	Ab major	6232117	.mscz .m
Coleridge-Taylor, Samuel		Oh, the Summer	76	bVI6	Ab major	6232117	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	1 Oh what comes over the Sea	15	iiø43	G major	6189652	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	1 Oh what comes over the Sea	17	IV4b3	C major	6189652	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	1 Oh what comes over the Sea	18	I6	E minor	6189652	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	1 Oh what comes over the Sea	22	Ger65	D major	6189652	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	2	iv6	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	4	iv	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	27	iiø65	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	28	iiø7	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	29	Ger65	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	32	iv6	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	34	iv	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	57	iiø65	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	58	iiø7	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	59	Ger65	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	62	iv6	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	2 When I am dead, my dearest	64	iv	G major	6189644	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	4 She sat and sang alway	52	iv6	F major	6189628	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	4 She sat and sang alway	59	Ger65	A major	6189628	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	5	iv	E major	6189622	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	5	viiø43	E major	6189622	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	10	viiø2	E major	6189622	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	11	iv	E major	6189622	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	13	iiø7	E major	6189622	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	21	iv	E major	6189622	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	21	viio43	E major	6189622	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	26	viio2	E major	6189622	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	27	iv	E major	6189622	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	5 Unmindful of the Roses	29	iiø7	E major	6189622	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	6	iv64	Bb major	6189616	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	14	I64	C minor	6189616	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	16	I	C minor	6189616	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	30	iv64	Bb major	6189616	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	38	I64	C minor	6189616	.mscz .m
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	6 Too late for love	40	I	C minor	6189616	.mscz .m
Hensel, Fanny (Mendelssohn)	3 Lieder	1 Sehnsucht	11	iiø2	D major	6012947	.mscz .m
Hensel, Fanny (Mendelssohn)	3 Lieder	1 Sehnsucht	12	iiø65	D major	6012947	.mscz .m
Hensel, Fanny (Mendelssohn)	3 Lieder	2 Verlust	5	I	D minor	6013106	.mscz .m
Hensel, Fanny (Mendelssohn)	3 Lieder	2 Verlust	13	viio7	Bb major	6013106	.mscz .m
Hensel, Fanny (Mendelssohn)	3 Lieder	2 Verlust	13	viio7	Bb major	6013106	.mscz .m
Hensel, Fanny (Mendelssohn)	3 Lieder	2 Verlust	14	viio7	Bb major	6013106	.mscz .m
Hensel, Fanny (Mendelssohn)	3 Lieder	2 Verlust	25	I	D minor	6013106	.mscz .m
Hensel, Fanny (Mendelssohn)	3 Lieder	2 Verlust	33	viio7	Bb major	6013106	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Hensel, Fanny (Mendelssohn)	3 Lieder	2 Verlust	33	viiø7	Bb major	6013106	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	1 Nach Süden	16	iiø43	E major	5000467	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	1 Nach Süden	47	iiø43	E major	5000467	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	2 Vorwurf	25	Ger43	C# major	5000464	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	2 Vorwurf	48	I	G# minor	5000464	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	2 Vorwurf	49	I	G# minor	5000464	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	3 Abendbild	23	iiø	Eb major	4919798	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	3 Abendbild	25	iiø65	Eb major	4919798	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	4 Im Herbste	10	iv64	Bb major	5000459	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	4 Im Herbste	11	iiø2	Bb major	5000459	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	4 Im Herbste	12	iiø2	Bb major	5000459	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	4 Im Herbste	37	I	G minor	5000459	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	4 Im Herbste	38	I	G minor	5000459	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	5 Bergeslust	14	iiø43	A major	5000446	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	5 Bergeslust	55	iiø43	A major	5000446	.mscz .midi
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	5 Bergeslust	66	iiø65	A major	5000446	.mscz .midi
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	1 Schwanenlied	24	I	G minor	5100543	.mscz .midi
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	1 Schwanenlied	25	I	G minor	5100543	.mscz .midi
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	1 Schwanenlied	26	I	G minor	5100543	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	1 Schwanenlied	27	I	G minor	5100543	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	1 Schwanenlied	51	I	G minor	5100543	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	1 Schwanenlied	52	I	G minor	5100543	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	1 Schwanenlied	53	I	G minor	5100543	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	2 Wanderlied	15	viio2	D major	5004632	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	2 Wanderlied	17	viio2	D major	5004632	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	5 Morgenständchen	7	viio65	B major	5004650	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	5 Morgenständchen	17	vi	E minor	5004650	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.1	5 Morgenständchen	33	viio7	E major	5004650	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.9	1 Die Ersehnte	3	viio7	Eb major	4986023	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.9	1 Die Ersehnte	6	iv	Eb major	4986023	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.9	1 Die Ersehnte	6	iio6	Eb major	4986023	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.9	1 Die Ersehnte	6	viio7	Eb major	4986023	.mscz .m
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.9	1 Die Ersehnte	8	i64	Eb major	4986023	.mscz .m
Holmès, Augusta Mary Anne	Contes divins	3 Le chemin du ciel	8	bIII	E major	5904897	.mscz .m
Holmès, Augusta Mary Anne	Contes divins	3 Le chemin du ciel	11	i	E major	5904897	.mscz .m
Holmès, Augusta Mary Anne	Contes divins	3 Le chemin du ciel	44	bIII	E major	5904897	.mscz .m
Holmès, Augusta Mary Anne	Contes divins	3 Le chemin du ciel	47	i	E major	5904897	.mscz .m
Holmès, Augusta Mary Anne	Les Heures	4 L'Heure d'Azur	19	viio65	G major	5001674	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Holmès, Augusta Mary Anne	Les Heures	4 L'Heure d'Azur	20	Ger65	B major	5001674	.mscz .midi
Holmès, Augusta Mary Anne	Les Heures	4 L'Heure d'Azur	26	i6	E major	5001674	.mscz .midi
Holmès, Augusta Mary Anne	Les Heures	4 L'Heure d'Azur	36	i6	E major	5001674	.mscz .midi
Holmès, Augusta Mary Anne	Les Heures	4 L'Heure d'Azur	55	i6	E major	5001674	.mscz .midi
Holmès, Augusta Mary Anne	Les Heures	4 L'Heure d'Azur	61	iv64	B major	5001674	.mscz .midi
Jaëll, Marie	4 Mélodies	2 Éternel amour	24	Ger65	B major	5837811	.mscz .midi
Kinkel, Johanna	6 Lieder, Op.10	1 Nachgefühl	3	iiø65	E major	6177220	.mscz .midi
Kinkel, Johanna	6 Lieder, Op.15	2 Du nah'st!	17	iv	G major	6247458	.mscz .midi
Kinkel, Johanna	6 Lieder, Op.15	2 Du nah'st!	17	viiø65	G major	6247458	.mscz .midi
Kinkel, Johanna	6 Lieder, Op.15	2 Du nah'st!	18	viiø7	G major	6247458	.mscz .midi
Kinkel, Johanna	6 Lieder, Op.15	2 Du nah'st!	18	i	G major	6247458	.mscz .midi
Kinkel, Johanna	6 Lieder, Op.15	2 Du nah'st!	19	i	G major	6247458	.mscz .midi
Kinkel, Johanna	6 Lieder, Op.15	2 Du nah'st!	21	i	G major	6247458	.mscz .midi
Kinkel, Johanna	6 Lieder, Op.15	2 Du nah'st!	21	iiø6	G major	6247458	.mscz .midi
Kinkel, Johanna	6 Lieder, Op.15	2 Du nah'st!	23	i	G major	6247458	.mscz .midi
Lang, Josephine	6 Lieder, Op.10	6 Abschied	29	iiø2	Ab major	6073491	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	1	iv	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	2	iv	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	5	iv	B major	6061301	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	6	iv	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	19	iv64[no1]	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	20	iv64[no1]	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	21	iv64[no1]	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	22	iv64[no1]	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	60	iv	Eb major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	96	iv	Eb major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	105	iv	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	106	iv	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	128	iv	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	129	iv	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	132	iv	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	133	iv	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	146	iv64[no1]	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	147	iv64[no1]	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	148	iv64[no1]	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.12	3 Abermals am See	149	iv64[no1]	B major	6061301	.mscz .midi
Lang, Josephine	6 Lieder, Op.13	3 Aus der Ferne	27	I	E minor	6077132	.mscz .midi
Lang, Josephine	6 Lieder, Op.13	3 Aus der Ferne	28	I	E minor	6077132	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Lang, Josephine	6 Lieder, Op.13	3 Aus der Ferne	29	I	E minor	6077132	.mscz .midi
Lang, Josephine	6 Lieder, Op.13	3 Aus der Ferne	30	I	E minor	6077132	.mscz .midi
Lang, Josephine	6 Lieder, Op.13	3 Aus der Ferne	39	iiø65	D major	6077132	.mscz .midi
Lang, Josephine	6 Lieder, Op.13	3 Aus der Ferne	40	iiø65	D major	6077132	.mscz .midi
Lang, Josephine	6 Lieder, Op.13	3 Aus der Ferne	49	Vb9	D major	6077132	.mscz .midi
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	6	Ger65	E major	4920211	.mscz .midi
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	16	Ger65	E major	4920211	.mscz .midi
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	28	Ger65	E major	4920211	.mscz .midi
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	38	Ger65	E major	4920211	.mscz .midi
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	50	Ger65	E major	4920211	.mscz .midi
Lang, Josephine	6 Lieder, Op.25	4 Lied (Immer sich rein kindlich erfreu'n)	58	Ger65	E major	4920211	.mscz .midi
Lang, Josephine	6 Lieder, Op.26	1 Wiegenlied	46	i	Bb major	6117412	.mscz .midi
Lang, Josephine	6 Lieder, Op.26	1 Wiegenlied	47	i6	Bb major	6117412	.mscz .midi
Lang, Josephine	6 Lieder, Op.26	1 Wiegenlied	94	viio43	Bb major	6117412	.mscz .midi
Lang, Josephine	6 Lieder, Op.26	1 Wiegenlied	101	viø7	Eb major	6117412	.mscz .midi
Lang, Josephine	6 Lieder, Op.26	1 Wiegenlied	102	viø7	Eb major	6117412	.mscz .midi
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	26	vi64	A minor	5051724	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	33	Ger65	C major	5051724	.mscz .m
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	46	iv6	D major	5051724	.mscz .m
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	47	iv6	D major	5051724	.mscz .m
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	48	iv6	D major	5051724	.mscz .m
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	60	iiø7	C major	5051724	.mscz .m
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	65	Ger65	C major	5051724	.mscz .m
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	72	Ger65	C major	5051724	.mscz .m
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	73	i	C major	5051724	.mscz .m
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	45	iv	Eb major	5062118	.mscz .m
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	48	I64	Eb minor	5062118	.mscz .m
Mahler, Gustav	Kindertotenlieder	4 Oft denk' ich, sie sind nur ausgegangen	49	I64	Eb minor	5062118	.mscz .m
Mayer, Emilie	3 Lieder, Op.7	1 Du bist wie eine Blume	10	i	F major	5840527	.mscz .m
Mayer, Emilie	3 Lieder, Op.7	1 Du bist wie eine Blume	11	iv	F major	5840527	.mscz .m
Mayer, Emilie	3 Lieder, Op.7	1 Du bist wie eine Blume	20	iv	Ab major	5840527	.mscz .m
Mayer, Emilie	3 Lieder, Op.7	2 O lass mich dein gedenken	22	bVI	A major	5840434	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Mayer, Emilie	3 Lieder, Op.7	2 O lass mich dein gedenken	22	Ger65	A major	5840434	.mscz .midi
Mayer, Emilie	3 Lieder, Op.7	3 Wenn der Abendstern die Rosen	2	iv7	Ab major	5841419	.mscz .midi
Mayer, Emilie	3 Lieder, Op.7	3 Wenn der Abendstern die Rosen	19	Ger65	Ab major	5841419	.mscz .midi
Reichardt, Louise	Sechs Lieder von Novalis, Op.4	1 Sehnsucht nach dem Vaterlande	11	i64	Eb major	5002041	.mscz .midi
Reichardt, Louise	Sechs Lieder von Novalis, Op.4	1 Sehnsucht nach dem Vaterlande	11	i64	Eb major	5002041	.mscz .midi
Reichardt, Louise	Sechs Lieder von Novalis, Op.4	1 Sehnsucht nach dem Vaterlande	12	i64	Eb major	5002041	.mscz .midi
Reichardt, Louise	Sechs Lieder von Novalis, Op.4	5 Noch ein Bergmannslied	6	Ger65	Eb major	5092612	.mscz .midi
Reichardt, Louise	Sechs Lieder von Novalis, Op.4	6 Er besucht den Klostergarten und den Kirchoff, über den letztern findet sich folgendes Gedicht	9	viio43[no3]	Bb major	5002078	.mscz .midi
Reichardt, Louise	Sechs Lieder von Novalis, Op.4	6 Er besucht den Klostergarten und den Kirchoff, über den letztern findet sich folgendes Gedicht	10	i	Bb major	5002078	.mscz .midi
Reichardt, Louise	Sechs Lieder von Novalis, Op.4	6 Er besucht den Klostergarten und den Kirchoff, über den letztern findet sich folgendes Gedicht	11	viio43[no3]	Bb major	5002078	.mscz .midi
Reichardt, Louise	Sechs Lieder von Novalis, Op.4	6 Er besucht den Klostergarten und den Kirchoff, über den letztern findet sich folgendes Gedicht	12	i	Bb major	5002078	.mscz .midi
Reichardt, Louise	Zwölf Deutsche und Italiänische Romantische Gesänge	02 Wenn ich ihn nur habe	6	viio43	Ab major	5100067	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Reichardt, Louise	Zwölf Deutsche und Italiänische Romantische Gesänge	10 Ida (aus Ariels Offenbarungen)	33	i	Ab major	5002108	.mscz .midi
Reichardt, Louise	Zwölf Deutsche und Italiänische Romantische Gesänge	10 Ida (aus Ariels Offenbarungen)	34	i	Ab major	5002108	.mscz .midi
Reichardt, Louise	Zwölf Deutsche und Italiänische Romantische Gesänge	10 Ida (aus Ariels Offenbarungen)	45	I	Eb minor	5002108	.mscz .midi
Reichardt, Louise	Zwölf Deutsche und Italiänische Romantische Gesänge	10 Ida (aus Ariels Offenbarungen)	46	I	Eb minor	5002108	.mscz .midi
Reichardt, Louise	Zwölf Gesänge	02 Der Sänger geht	12	i	E major	5002130-adjusted	.mscz .midi
Reichardt, Louise	Zwölf Gesänge, Op.3	10 Der Mond	18	i	E major	5061932	.mscz .midi
Reichardt, Louise	Zwölf Gesänge, Op.3	10 Der Mond	19	i	E major	5061932	.mscz .midi
Reichardt, Louise	Zwölf Gesänge, Op.3	10 Der Mond	22	i	E major	5061932	.mscz .midi
Reichardt, Louise	Zwölf Gesänge, Op.3	10 Der Mond	23	i	E major	5061932	.mscz .midi
Schubert, Franz	Die schöne Müllerin, D.795	12 Pause	3	viio7	Bb major	4985946	.mscz .midi
Schubert, Franz	Die schöne Müllerin, D.795	12 Pause	44	viio7	Bb major	4985946	.mscz .midi
Schubert, Franz	Die schöne Müllerin, D.795	12 Pause	66	Ger65	Bb major	4985946	.mscz .midi
Schubert, Franz	Die schöne Müllerin, D.795	12 Pause	74	Ger65	Bb major	4985946	.mscz .midi
Schubert, Franz	Die schöne Müllerin, D.795	12 Pause	79	i	Bb major	4985946	.mscz .midi
Schubert, Franz	Die schöne Müllerin, D.795	18 Trockne Blumen	5	i64	G major	4985949	.mscz .midi
Schubert, Franz	Die schöne Müllerin, D.795	18 Trockne Blumen	9	i64	G major	4985949	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Schubert, Franz	Die schöne Müllerin, D.795	18 Trockne Blumen	19	i64	G major	4985949	.mscz .m
Schubert, Franz	Die schöne Müllerin, D.795	18 Trockne Blumen	23	i64	G major	4985949	.mscz .m
Schubert, Franz	Op.52	6 Ellens Gesang III, D.839 (Ave Maria)	2	viio7	Bb major	6389103	.mscz .m
Schubert, Franz	Op.52	6 Ellens Gesang III, D.839 (Ave Maria)	15	viio7	Bb major	6389103	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	16	viio43	Bb major	4919879	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	18	viio65	Bb major	4919879	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	18	viio7	Bb major	4919879	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	20	viio43	Bb major	4919879	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	26	iiø	Eb major	4919879	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	28	iiø	Eb major	4919879	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	39	viio43	Bb major	4919879	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	41	viio65	Bb major	4919879	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	41	viio7	Bb major	4919879	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	43	viio43	Bb major	4919879	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	49	iiø	Eb major	4919879	.mscz .m
Schubert, Franz	Op.59	3 Du bist die Ruh	51	iiø	Eb major	4919879	.mscz .m
Schubert, Franz	Schwanengesang, D.957	01 Liebesbotschaft	41	vi	E minor	5077744	.mscz .m
Schubert, Franz	Schwanengesang, D.957	01 Liebesbotschaft	42	vi	E minor	5077744	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Schubert, Franz	Schwanengesang, D.957	01 Liebesbotschaft	42	vi	E minor	5077744	.mscz .m
Schubert, Franz	Schwanengesang, D.957	01 Liebesbotschaft	44	I	E minor	5077744	.mscz .m
Schubert, Franz	Schwanengesang, D.957	01 Liebesbotschaft	45	I	E minor	5077744	.mscz .m
Schubert, Franz	Schwanengesang, D.957	01 Liebesbotschaft	46	vi6	E minor	5077744	.mscz .m
Schubert, Franz	Schwanengesang, D.957	01 Liebesbotschaft	46	vi	E minor	5077744	.mscz .m
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	20	iv6	Eb major	4986000	.mscz .m
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	24	viio43	Eb major	4986000	.mscz .m
Schubert, Franz	Schwanengesang, D.957	02 Kriegers Ahnung	88	i	F major	4986000	.mscz .m
Schubert, Franz	Schwanengesang, D.957	03 Frühlingssehnsucht	49	I	D minor	4985999	.mscz .m
Schubert, Franz	Schwanengesang, D.957	03 Frühlingssehnsucht	51	i	Ab major	4985999	.mscz .m
Schubert, Franz	Schwanengesang, D.957	03 Frühlingssehnsucht	56	I64	Bb minor	4985999	.mscz .m
Schubert, Franz	Schwanengesang, D.957	03 Frühlingssehnsucht	83	iv	Eb major	4985999	.mscz .m
Schubert, Franz	Schwanengesang, D.957	03 Frühlingssehnsucht	96	iv	Bb major	4985999	.mscz .m
Schubert, Franz	Schwanengesang, D.957	03 Frühlingssehnsucht	102	iv64	Bb major	4985999	.mscz .m
Schubert, Franz	Schwanengesang, D.957	04 Ständchen	29	iv	D major	5004835	.mscz .m
Schubert, Franz	Schwanengesang, D.957	04 Ständchen	41	i	D major	5004835	.mscz .m
Schubert, Franz	Schwanengesang, D.957	04 Ständchen	42	iiio6	D major	5004835	.mscz .m
Schubert, Franz	Schwanengesang, D.957	04 Ständchen	45	iv	D major	5004835	.mscz .m
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	18	I	E minor	4985990	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	53	Ger65	G major	4985990	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	60	viio43	G major	4985990	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	68	viio43	G major	4985990	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	72	viio43	G major	4985990	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	73	viio43	G major	4985990	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	122	I	E minor	4985990	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	24	I6	D minor	4985987	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	53	I6	D minor	4985987	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	74	iiø2	B major	4985987	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	83	I6	D minor	4985987	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	90	viio2	B major	4985987	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	91	viio2	B major	4985987	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	93	viio2	B major	4985987	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	94	viio2	B major	4985987	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	111	i	B major	4985987	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	113	i64	B major	4985987	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	115	i	B major	4985987	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	07 Abschied	148	i	Eb major	4978506	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	08 Der Atlas	25	viio2	B major	4985985	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Schubert, Franz	Schwanengesang, D.957	08 Der Atlas	29	viiø2	B major	4985985	.mscz .m
Schubert, Franz	Schwanengesang, D.957	09 Ihr Bild	20	iv6	Gb major	4985984	.mscz .m
Schubert, Franz	Schwanengesang, D.957	09 Ihr Bild	35	iv6	Bb major	4985984	.mscz .m
Schubert, Franz	Schwanengesang, D.957	09 Ihr Bild	35	i64	Bb major	4985984	.mscz .m
Schubert, Franz	Schwanengesang, D.957	09 Ihr Bild	36	i	Bb major	4985984	.mscz .m
Schubert, Franz	Schwanengesang, D.957	10 Das Fischermädchen	19	viiø7	Ab major	5098612	.mscz .m
Schubert, Franz	Schwanengesang, D.957	10 Das Fischermädchen	27	viiø65	Cb major	5098612	.mscz .m
Schubert, Franz	Schwanengesang, D.957	10 Das Fischermädchen	40	viiø7	Cb major	5098612	.mscz .m
Schubert, Franz	Schwanengesang, D.957	10 Das Fischermädchen	61	viiø7	Ab major	5098612	.mscz .m
Schubert, Franz	Schwanengesang, D.957	12 Am Meer	1	Ger43	C major	4985965	.mscz .m
Schubert, Franz	Schwanengesang, D.957	12 Am Meer	2	Ger43	C major	4985965	.mscz .m
Schubert, Franz	Schwanengesang, D.957	12 Am Meer	12	i	C major	4985965	.mscz .m
Schubert, Franz	Schwanengesang, D.957	12 Am Meer	18	iiø2	C major	4985965	.mscz .m
Schubert, Franz	Schwanengesang, D.957	12 Am Meer	22	i64	C major	4985965	.mscz .m
Schubert, Franz	Schwanengesang, D.957	12 Am Meer	23	i64	C major	4985965	.mscz .m
Schubert, Franz	Schwanengesang, D.957	12 Am Meer	33	i	C major	4985965	.mscz .m
Schubert, Franz	Schwanengesang, D.957	12 Am Meer	39	iiø2	C major	4985965	.mscz .m
Schubert, Franz	Schwanengesang, D.957	12 Am Meer	44	Ger43	C major	4985965	.mscz .m
Schubert, Franz	Schwanengesang, D.957	12 Am Meer	45	Ger43	C major	4985965	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Schubert, Franz	Schwanengesang, D.957	13 Der Doppelgänger	62	I	B minor	4985964	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	14 Die Taubenpost	14	iv64	B major	4985962	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	14 Die Taubenpost	14	viiø2	B major	4985962	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	14 Die Taubenpost	31	i64	G major	4985962	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	14 Die Taubenpost	60	iv64	B major	4985962	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	14 Die Taubenpost	60	viiø2	B major	4985962	.mscz .midi
Schubert, Franz	Schwanengesang, D.957	14 Die Taubenpost	82	i6	A major	4985962	.mscz .midi
Schubert, Franz	Winterreise, D.911	02 Die Wetterfahne	11	viiø2	C major	5015435	.mscz .midi
Schubert, Franz	Winterreise, D.911	02 Die Wetterfahne	31	Ger65	A major	5015435	.mscz .midi
Schubert, Franz	Winterreise, D.911	02 Die Wetterfahne	43	Ger6	A major	5015435	.mscz .midi
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	4	iiø2	Ab major	5015499	.mscz .midi
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	5	i	Ab major	5015499	.mscz .midi
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	6	iiø6	Ab major	5015499	.mscz .midi
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	6	iiø	Ab major	5015499	.mscz .midi
Schubert, Franz	Winterreise, D.911	03 Gefror'ne Thränen	12	iiø2	Ab major	5015499	.mscz .midi
Schubert, Franz	Winterreise, D.911	04 Erstarrung	46	i64	Ab major	5015573	.mscz .midi
Schubert, Franz	Winterreise, D.911	04 Erstarrung	54	iiø6	Ab major	5015573	.mscz .midi
Schubert, Franz	Winterreise, D.911	04 Erstarrung	58	iiø6	Ab major	5015573	.mscz .midi
Schubert, Franz	Winterreise, D.911	05 Der Lindenbaum	54	iv6	E major	5016466	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Schubert, Franz	Winterreise, D.911	05 Der Lindenbaum	55	iv6	E major	5016466	.mscz .m
Schubert, Franz	Winterreise, D.911	05 Der Lindenbaum	56	iio64[no3]	E major	5016466	.mscz .m
Schubert, Franz	Winterreise, D.911	06 Wasserfluth	19	viio2	A major	5016512	.mscz .m
Schubert, Franz	Winterreise, D.911	06 Wasserfluth	23	viio2	A major	5016512	.mscz .m
Schubert, Franz	Winterreise, D.911	06 Wasserfluth	25	viio2	A major	5016512	.mscz .m
Schubert, Franz	Winterreise, D.911	07 Auf dem Flusse	25	viio7	E major	5015410	.mscz .m
Schubert, Franz	Winterreise, D.911	07 Auf dem Flusse	33	viio7	E major	5015410	.mscz .m
Schubert, Franz	Winterreise, D.911	07 Auf dem Flusse	39	i6	E major	5015410	.mscz .m
Schubert, Franz	Winterreise, D.911	08 Rückblick	27	I	G minor	5015521	.mscz .m
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	2	I	C minor	5023517	.mscz .m
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	5	I	C minor	5023517	.mscz .m
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	7	I	C minor	5023517	.mscz .m
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	32	I	C minor	5023517	.mscz .m
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	35	I	C minor	5023517	.mscz .m
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	37	I	C minor	5023517	.mscz .m
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	62	I	C minor	5023517	.mscz .m
Schubert, Franz	Winterreise, D.911	10 Rast (Spätere Fassung)	65	I	C minor	5023517	.mscz .m
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	25	I	A minor	5023662	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	27	I	A minor	5023662	.mscz .midi
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	28	I	A minor	5023662	.mscz .midi
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	37	I	G minor	5023662	.mscz .midi
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	39	I	A minor	5023662	.mscz .midi
Schubert, Franz	Winterreise, D.911	12 Einsamkeit (Urspruengliche Fassung)	40	I	A minor	5023662	.mscz .midi
Schubert, Franz	Winterreise, D.911	13 Die Post	18	Ger65	Eb major	5007176	.mscz .midi
Schubert, Franz	Winterreise, D.911	13 Die Post	27	i	Eb major	5007176	.mscz .midi
Schubert, Franz	Winterreise, D.911	13 Die Post	28	i	Eb major	5007176	.mscz .midi
Schubert, Franz	Winterreise, D.911	13 Die Post	29	i	Eb major	5007176	.mscz .midi
Schubert, Franz	Winterreise, D.911	13 Die Post	63	Ger65	Eb major	5007176	.mscz .midi
Schubert, Franz	Winterreise, D.911	13 Die Post	72	i	Eb major	5007176	.mscz .midi
Schubert, Franz	Winterreise, D.911	13 Die Post	73	i	Eb major	5007176	.mscz .midi
Schubert, Franz	Winterreise, D.911	13 Die Post	74	i	Eb major	5007176	.mscz .midi
Schubert, Franz	Winterreise, D.911	14 Der greise Kopf	22	i6	Ab major	5007178	.mscz .midi
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	1	I6	C minor	5007179	.mscz .midi
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	14	viio43	Eb major	5007179	.mscz .midi
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	14	iv	Eb major	5007179	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	18	I6	C minor	5007179	.mscz .m
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	19	I6	C minor	5007179	.mscz .m
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	38	I6	C minor	5007179	.mscz .m
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	7	I	Eb minor	5007180	.mscz .m
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	7	I64	Eb minor	5007180	.mscz .m
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	8	I	Eb minor	5007180	.mscz .m
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	11	I	Eb minor	5007180	.mscz .m
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	41	i64	Eb major	5007180	.mscz .m
Schubert, Franz	Winterreise, D.911	16 Letzte Hoffnung	46	iv	Eb major	5007180	.mscz .m
Schubert, Franz	Winterreise, D.911	17 Im Dorfe	9	iiø65	D major	5007181	.mscz .m
Schubert, Franz	Winterreise, D.911	17 Im Dorfe	10	iiø65	D major	5007181	.mscz .m
Schubert, Franz	Winterreise, D.911	17 Im Dorfe	13	Vb9	D major	5007181	.mscz .m
Schubert, Franz	Winterreise, D.911	17 Im Dorfe	16	i64	D major	5007181	.mscz .m
Schubert, Franz	Winterreise, D.911	17 Im Dorfe	29	viio2	D major	5007181	.mscz .m
Schubert, Franz	Winterreise, D.911	17 Im Dorfe	30	viio2	D major	5007181	.mscz .m
Schubert, Franz	Winterreise, D.911	17 Im Dorfe	33	iiø65	D major	5007181	.mscz .m
Schubert, Franz	Winterreise, D.911	17 Im Dorfe	34	iiø65	D major	5007181	.mscz .m
Schubert, Franz	Winterreise, D.911	17 Im Dorfe	44	i64	D major	5007181	.mscz .m
Schubert, Franz	Winterreise, D.911	18 Der sturmische Morgen	1	I6	D minor	5007182	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Schubert, Franz	Winterreise, D.911	18 Der stürmische Morgen	10	iiø2	Bb major	5007182	.mscz .midi
Schubert, Franz	Winterreise, D.911	18 Der stürmische Morgen	12	iiø2	Bb major	5007182	.mscz .midi
Schubert, Franz	Winterreise, D.911	18 Der stürmische Morgen	13	iiø43	Bb major	5007182	.mscz .midi
Schubert, Franz	Winterreise, D.911	19 Täuschung	22	i	A major	5009833	.mscz .midi
Schubert, Franz	Winterreise, D.911	19 Täuschung	23	i	A major	5009833	.mscz .midi
Schubert, Franz	Winterreise, D.911	21 Das Wirthshaus	8	iv	F major	5013945	.mscz .midi
Schubert, Franz	Winterreise, D.911	21 Das Wirthshaus	8	iiø6	F major	5013945	.mscz .midi
Schubert, Franz	Winterreise, D.911	21 Das Wirthshaus	14	iiø6	F major	5013945	.mscz .midi
Schubert, Franz	Winterreise, D.911	21 Das Wirthshaus	18	viiø65	F major	5013945	.mscz .midi
Schubert, Franz	Winterreise, D.911	21 Das Wirthshaus	20	I64	Bb minor	5013945	.mscz .midi
Schubert, Franz	Winterreise, D.911	21 Das Wirthshaus	20	I64	Bb minor	5013945	.mscz .midi
Schubert, Franz	Winterreise, D.911	21 Das Wirthshaus	26	i	F major	5013945	.mscz .midi
Schubert, Franz	Winterreise, D.911	22 Muth	32	I	A minor	5013969	.mscz .midi
Schumann, Clara		Die gute Nacht	14	viiø7	D major	5000388	.mscz .midi
Schumann, Clara		Die gute Nacht	33	viiø7	Bb major	5000388	.mscz .midi
Schumann, Clara		Die gute Nacht	38	iv6	D major	5000388	.mscz .midi
Schumann, Clara		Die gute Nacht	38	iiø43	D major	5000388	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	1 Ich stand in dunklen Träumen	1	iiø2	Eb major	5133602	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Schumann, Clara	6 Lieder, Op.13	1 Ich stand in dunklen Träumen	6	iiø2	Eb major	5133602	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	3 Liebeszauber	39	iv64	Eb major	5126774	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	3 Liebeszauber	40	iiø2	Eb major	5126774	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	3 Liebeszauber	41	iv64	Eb major	5126774	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	3 Liebeszauber	42	iiø2	Eb major	5126774	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	3 Liebeszauber	44	iiø2	Eb major	5126774	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	3 Liebeszauber	51	viio2	Eb major	5126774	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	4 Der Mond kommt still gegangen	28	iv6	Db major	5126921	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	4 Der Mond kommt still gegangen	29	iiø2	Db major	5126921	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	4 Der Mond kommt still gegangen	30	iv6	Db major	5126921	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	4 Der Mond kommt still gegangen	31	iv	Db major	5126921	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	4 Der Mond kommt still gegangen	31	viio7	Db major	5126921	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	6 Die stille Lotosblume	16	iv	Ab major	5130634	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	6 Die stille Lotosblume	34	i	Ab major	5130634	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	6 Die stille Lotosblume	39	iiø7	Db major	5130634	.mscz .midi
Schumann, Clara	6 Lieder, Op.13	6 Die stille Lotosblume	42	iiø7	Ab major	5130634	.mscz .midi
Schumann, Clara	Lieder, Op.12	04 Liebst du um Schönheit	5	i6	Db major	5000397	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Schumann, Clara	Lieder, Op.12	04 Liebst du um Schönheit	13	i6	Db major	5000397	.mscz .midi
Schumann, Clara	Lieder, Op.12	04 Liebst du um Schönheit	21	i6	Db major	5000397	.mscz .midi
Schumann, Clara	Lieder, Op.12	04 Liebst du um Schönheit	29	i6	Db major	5000397	.mscz .midi
Schumann, Clara	Lieder, Op.12	04 Liebst du um Schönheit	33	ii0	Db major	5000397	.mscz .midi
Schumann, Clara	Lieder, Op.12	04 Liebst du um Schönheit	33	iiø2	Db major	5000397	.mscz .midi
Schumann, Clara	Lieder, Op.12	04 Liebst du um Schönheit	35	iv	Db major	5000397	.mscz .midi
Schumann, Clara	Lieder, Op.12	04 Liebst du um Schönheit	37	iiø65	Db major	5000397	.mscz .midi
Schumann, Robert	5 Lieder und Gesänge, Op.127	2 Dein Angesicht	9	i64	G major	6834542	.mscz .midi
Schumann, Robert	5 Lieder und Gesänge, Op.127	2 Dein Angesicht	27	iiø43	Eb major	6834542	.mscz .midi
Schumann, Robert	Dichterliebe, Op.48	06 Im Rhein, im heiligen Strome	30	vi43	C minor	4978379	.mscz .midi
Schumann, Robert	Dichterliebe, Op.48	06 Im Rhein, im heiligen Strome	31	I6	C minor	4978379	.mscz .midi
Schumann, Robert	Dichterliebe, Op.48	07 Ich grolle nicht	3	iiø7	C major	4978382	.mscz .midi
Schumann, Robert	Dichterliebe, Op.48	07 Ich grolle nicht	8	vii07	C major	4978382	.mscz .midi
Schumann, Robert	Dichterliebe, Op.48	07 Ich grolle nicht	21	iiø7	C major	4978382	.mscz .midi
Schumann, Robert	Dichterliebe, Op.48	07 Ich grolle nicht	26	vii07	C major	4978382	.mscz .midi
Schumann, Robert	Dichterliebe, Op.48	07 Ich grolle nicht	27	vii043	C major	4978382	.mscz .midi
Schumann, Robert	Dichterliebe, Op.48	07 Ich grolle nicht	29	iiø7	C major	4978382	.mscz .midi
Schumann, Robert	Dichterliebe, Op.48	09 Das ist ein Flöten und Geigen	34	I	A minor	4978390	.mscz .midi
Schumann, Robert	Dichterliebe, Op.48	09 Das ist ein Flöten und Geigen	68	I	A minor	4978390	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Schumann, Robert	Dichterliebe, Op.48	10 Hör' ich das Liedchen klingen	12	iiø2	Bb major	5003150	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	1	Ger65	Bb major	4978395	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	6	Ger65	Bb major	4978395	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	11	Ger65	Bb major	4978395	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	19	i	G major	4978395	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	19	Ger65	Bb major	4978395	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	24	Ger65	Bb major	4978395	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	12 Am leuchtenden Sommermorgen	26	Ger65	Bb major	4978395	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	13 Ich hab' im Traum geweinet	30	i64	Db major	4978396	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	14 Allnächtlich im Traume	11	viiø7	B major	4978397	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	14 Allnächtlich im Traume	24	viiø7	B major	4978397	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	15 Aus alten Märchen winkt es	98	viiø7	E major	4978398	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	16 Die alten, bösen Lieder	54	Ger65	Db major	4978400	.mscz .m
Schumann, Robert	Dichterliebe, Op.48	16 Die alten, bösen Lieder	56	Ger65	Db major	4978400	.mscz .m
Schumann, Robert	Frauenliebe und Leben, Op.42	1 Seit ich ihn gesehen	6	iiø6	Bb major	4978468	.mscz .m
Schumann, Robert	Frauenliebe und Leben, Op.42	1 Seit ich ihn gesehen	22	iiø6	Bb major	4978468	.mscz .m
Schumann, Robert	Frauenliebe und Leben, Op.42	3 Ich kann's nicht fassen	34	iiø6	Eb major	4978485	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Schumann, Robert	Frauenliebe und Leben, Op.42	3 Ich kann's nicht fassen	85	I	C minor	4978485	.mscz .m
Viardot, Pauline	6 Mélodies, VWV 1133-11371176	4 Sérénade à Rosine, VWV 1137	24	Vb9	F major	5989772	.mscz .m
Viardot, Pauline	6 Mélodies, VWV 1133-11371176	4 Sérénade à Rosine, VWV 1137	25	bVI2	F major	5989772	.mscz .m
Viardot, Pauline	6 Mélodies, VWV 1133-11371176	4 Sérénade à Rosine, VWV 1137	26	bVI64	F major	5989772	.mscz .m
Viardot, Pauline	6 Mélodies, VWV 1133-11371176	4 Sérénade à Rosine, VWV 1137	37	Ger7	F major	5989772	.mscz .m
Viardot, Pauline	6 Mélodies, VWV 1133-11371176	4 Sérénade à Rosine, VWV 1137	68	Vb9	F major	5989772	.mscz .m
Viardot, Pauline	6 Mélodies, VWV 1133-11371176	4 Sérénade à Rosine, VWV 1137	69	bVI2	F major	5989772	.mscz .m
Viardot, Pauline	6 Mélodies, VWV 1133-11371176	4 Sérénade à Rosine, VWV 1137	70	bVI64	F major	5989772	.mscz .m
Viardot, Pauline	6 Mélodies, VWV 1133-11371176	4 Sérénade à Rosine, VWV 1137	81	Ger7	F major	5989772	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	1	i[add4]	D major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	2	i[add4]	D major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	12	iiø2	D major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	18	iiø2	D major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	23	iv	F# major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	26	iiø2	F# major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	29	iv	F# major	5024834	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	35	iv	Bb major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	41	iv	Bb major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	43	iv	Bb major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	44	V7b9	D major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	50	iiø2	D major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	04 Das Ständchen	56	iiø2	D major	5024834	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	1	iiø6	F# major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	2	iiø6	F# major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	3	iiø6	F# major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	7	i	F# major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	8	Ger43	F# major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	15	iv6	B major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	22	viiø2	B major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	23	viiø7	B major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	23	iv	B major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	24	iv	B major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	25	i64	B major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	28	i	Bb major	5039817	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	28	iv	F# major	5039817	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	29	iio	F# major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	31	iio64	F# major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	32	iio64	F# major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	33	iio64	F# major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	36	i	F# major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	37	Ger43	F# major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	44	iv6	B major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	51	viiio2	B major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	52	viiio7	B major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	52	iv	B major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	53	iv	B major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	54	i64	B major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	57	i	Bb major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	57	iv	F# major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	58	iio	F# major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	60	iio64	F# major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	08 Nachtzauber	62	iio64	F# major	5039817	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	13 Der Scholar	44	I	A minor	5052792	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	13 Der Scholar	45	I	A minor	5052792	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Wolf, Hugo	Eichendorff-Lieder	13 Der Scholar	46	I	A minor	5052792	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	13 Der Scholar	47	I	A minor	5052792	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	13 Der Scholar	48	I	A minor	5052792	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	23	IV6b5	Eb major	5052714	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	24	Ger65	Eb major	5052714	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	1	I64	D minor	5057804	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	4	I	E minor	5057804	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	4	I	E minor	5057804	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	5	I64	D minor	5057804	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	7	iv	F major	5057804	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	7	iv	F major	5057804	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	12	I	A minor	5057804	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	12	I	A minor	5057804	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	18	I	Bb minor	5057804	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	20	viiø43	Bb minor	5057804	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	15 Unfall	23	I	Bb minor	5057804	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	7	Ger43	G major	5077482	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	13	iiø6	B major	5077482	.mscz .m

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOADED
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	15	iio64	B major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	28	viio65	G major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	36	viio65	G major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	43	i	E major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	44	Ger43	E major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	45	Ger65	E major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	52	Ger43	E major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	53	bVI	E major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	70	i6	C# major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	76	viio65	B major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	84	viio65	B major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	93	Ger43	G major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	99	iio6	B major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	101	iio64	B major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	115	viio7	G major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	116	viio7	G major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	117	viio7	G major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	118	Ger65	G major	5077482	.mscz .midi
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	122	viio7	G major	5077482	.mscz .midi

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLO
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	123	viiø7	G major	5077482	.mscz .m
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	140	viiø7	G major	5077482	.mscz .m
Zumsteeg, Emilie	6 Lieder, Op.4	1 Die Kapelle	21	I	Ab minor	6159729	.mscz .m

Neapolitan Sixth Chords

This table includes root position (bII) in addition to first inversion (bII6) chords, as well as seventh chords based on both.

[Click here for this textbook's chapter on this topic.](#)

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EXAMPLE
Burleigh, Harry Thacker	5 Songs of Laurence Hope	5 Till I Wake	78	bII9	D minor	6471199	.mscz .mxl	6471199
Chaminade, Cécile		Berceuse	23	bII	G minor	6264559	.mscz .mxl	6264559
Chaminade, Cécile		Berceuse	24	bII	G minor	6264559	.mscz .mxl	6264559
Chaminade, Cécile		Berceuse	25	bII	G minor	6264559	.mscz .mxl	6264559
Chaminade, Cécile		Berceuse	48	bII	G major	6264559	.mscz .mxl	6264559
Chaminade, Cécile		Berceuse	49	bII	G major	6264559	.mscz .mxl	6264559
Chaminade, Cécile		Berceuse	50	bII	G major	6264559	.mscz .mxl	6264559
Chaminade, Cécile		Sur la plage	22	bII#7	D minor	5000363	.mscz .mxl	5000363
Coleridge-Taylor, Samuel	6 Sorrow Songs, Op.57	1 Oh what comes over the Sea	19	bII6	E minor	6189652	.mscz .mxl	6189652
Hensel, Fanny (Mendelssohn)	5 Lieder, Op.10	4 Im Herbste	31	bII6	G minor	5000459	.mscz .mxl	5000459
Hensel, Fanny (Mendelssohn)	6 Lieder, Op.9	2 Ferne	20	bII65	G minor	5103883	.mscz .mxl	5103883
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	13	bII7	C major	5051724	.mscz .mxl	5051724
Mahler, Gustav	Kindertotenlieder	2 Nun seh' ich wohl, warum so dunkle Flammen	14	bII7	C major	5051724	.mscz .mxl	5051724
Reichardt, Louise	Zwölf Gesänge	04 Vaters Klage	7	bII6	G minor	5001870	.mscz .mxl	5001870
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	48	bII65	B minor	4985990	.mscz .mxl	4985990
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	52	bII65	B minor	4985990	.mscz .mxl	4985990
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	103	bII65	B minor	4985990	.mscz .mxl	4985990

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EXAMPLE
Schubert, Franz	Schwanengesang, D.957	05 Aufenthalt	107	bII65	B minor	4985990	.mscz .mxl	4985990
Schubert, Franz	Schwanengesang, D.957	06 In der Ferne	112	bII	B major	4985987	.mscz .mxl	4985987
Schubert, Franz	Schwanengesang, D.957	11 Die Stadt	32	bII6	C minor	4985973	.mscz .mxl	4985973
Schubert, Franz	Schwanengesang, D.957	13 Der Doppelgänger	59	bII	B minor	4985964	.mscz .mxl	4985964
Schubert, Franz	Winterreise, D.911	04 Erstarrung	6	bII	C minor	5015573	.mscz .mxl	5015573
Schubert, Franz	Winterreise, D.911	11 Frühlingstraum	23	bII2[#7]	A minor	5023603	.mscz .mxl	5023603
Schubert, Franz	Winterreise, D.911	11 Frühlingstraum	67	bII2[#7]	A minor	5023603	.mscz .mxl	5023603
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	3	bII	C minor	5007179	.mscz .mxl	5007179
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	4	bII6	C minor	5007179	.mscz .mxl	5007179
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	40	bII	C minor	5007179	.mscz .mxl	5007179
Schubert, Franz	Winterreise, D.911	15 Die Kraehe	41	bII6	C minor	5007179	.mscz .mxl	5007179
Schubert, Franz	Winterreise, D.911	20 Der Wegweiser	11	bII64	G minor	5009900	.mscz .mxl	5009900
Schubert, Franz	Winterreise, D.911	20 Der Wegweiser	13	bII64	F minor	5009900	.mscz .mxl	5009900
Schubert, Franz	Winterreise, D.911	20 Der Wegweiser	46	bII64	G minor	5009900	.mscz .mxl	5009900
Schubert, Franz	Winterreise, D.911	20 Der Wegweiser	48	bII64	F minor	5009900	.mscz .mxl	5009900
Schubert, Franz	Winterreise, D.911	20 Der Wegweiser	66	bII6	G minor	5009900	.mscz .mxl	5009900
Schubert, Franz	Winterreise, D.911	20 Der Wegweiser	76	bII6	G minor	5009900	.mscz .mxl	5009900
Schumann, Clara	6 Lieder, Op.23	4 Auf einem grünen Hügel	28	bII6	A minor	5142672	.mscz .mxl	5142672
Schumann, Robert	Dichterliebe, Op.48	06 Im Rhein, im heiligen Strome	14	bII6	E minor	4978379	.mscz .mxl	4978379

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EXAMPLE
Schumann, Robert	Dichterliebe, Op.48	06 Im Rhein, im heiligen Strome	27	bII6	D minor	4978379	.mscz .mxl	4978379
Schumann, Robert	Dichterliebe, Op.48	06 Im Rhein, im heiligen Strome	29	bII6	C minor	4978379	.mscz .mxl	4978379
Schumann, Robert	Dichterliebe, Op.48	08 Und wüssten's die Blumen	3	bII	A minor	4978387	.mscz .mxl	4978387
Schumann, Robert	Dichterliebe, Op.48	08 Und wüssten's die Blumen	4	bII6	A minor	4978387	.mscz .mxl	4978387
Schumann, Robert	Dichterliebe, Op.48	08 Und wüssten's die Blumen	11	bII	A minor	4978387	.mscz .mxl	4978387
Schumann, Robert	Dichterliebe, Op.48	08 Und wüssten's die Blumen	12	bII6	A minor	4978387	.mscz .mxl	4978387
Schumann, Robert	Dichterliebe, Op.48	08 Und wüssten's die Blumen	19	bII	A minor	4978387	.mscz .mxl	4978387
Schumann, Robert	Dichterliebe, Op.48	08 Und wüssten's die Blumen	20	bII6	A minor	4978387	.mscz .mxl	4978387
Schumann, Robert	Dichterliebe, Op.48	10 Hör' ich das Liedchen klingen	10	bII6	C minor	5003150	.mscz .mxl	5003150
Schumann, Robert	Dichterliebe, Op.48	10 Hör' ich das Liedchen klingen	24	bII65	G minor	5003150	.mscz .mxl	5003150
Schumann, Robert	Dichterliebe, Op.48	13 Ich hab' im Traum geweinet	29	bII65	Db major	4978396	.mscz .mxl	4978396
Wolf, Hugo	Eichendorff-Lieder	13 Der Scholar	43	bII6	A minor	5052792	.mscz .mxl	5052792
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	4	bII#7	G minor	5052714	.mscz .mxl	5052714
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	9	bII#7	G minor	5052714	.mscz .mxl	5052714

COMPOSER	COLLECTION	MOVEMENT	MEASURE	FIGURE	KEY	SCORE	DOWNLOAD	EXAMPLE
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	19	bII	F major	5052714	.mscz .mxl	5052714
Wolf, Hugo	Eichendorff-Lieder	14 Der verzweifelte Liebhaber	21	bII	F major	5052714	.mscz .mxl	5052714
Wolf, Hugo	Eichendorff-Lieder	19 Die Nacht	4	bII	F# minor	5052801	.mscz .mxl	5052801
Wolf, Hugo	Eichendorff-Lieder	19 Die Nacht	8	bII	F# minor	5052801	.mscz .mxl	5052801
Wolf, Hugo	Eichendorff-Lieder	19 Die Nacht	19	bII	F# minor	5052801	.mscz .mxl	5052801
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	23	bII	G major	5077482	.mscz .mxl	5077482
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	27	bII	G major	5077482	.mscz .mxl	5077482
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	31	bII	G major	5077482	.mscz .mxl	5077482
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	35	bII	G major	5077482	.mscz .mxl	5077482
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	39	bII	G major	5077482	.mscz .mxl	5077482
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	75	bII	B major	5077482	.mscz .mxl	5077482
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	79	bII	B major	5077482	.mscz .mxl	5077482
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	83	bII	B major	5077482	.mscz .mxl	5077482
Wolf, Hugo	Eichendorff-Lieder	20 Waldmädchen	87	bII	B major	5077482	.mscz .mxl	5077482

... and many more

Here, finally, are external links to corresponding anthologies on the same topics for other repertoire collections. These don't get the same focus here as they are slightly more experimental and the all important links to scores online are not currently possible. All the same, "more is more" for this large, exploratory style of anthology.

Corpus ↓; collection →	Applied	Augmented	Aug. Sixths	CTo 7th
Early Choral	Early Choral Applied	Early Choral Augmented	Early Choral Aug 6	Early Choral Cto7
Keyboard Other	Keyboard Other Applied	Keyboard Other Augmented	Keyboard Other Aug 6	Keyboard Other Cto7
OpenScore-LiederCorpus	OpenScore-LiederCorpus Applied	OpenScore-LiederCorpus Augmented	OpenScore-LiederCorpus Aug 6	OpenScore-LiederCorpus Cto7
Piano_Sonatas	Piano Sonatas Applied	Piano Sonatas Augmented	Piano Sonatas Aug 6	Piano Sonatas Cto7
Quartets	Quartets Applied	Quartets Augmented	Quartets Aug 6	Quartets Cto7
Variations_and_Grounds	Variations and Grounds Applied	Variations and Grounds Augmented	Variations and Grounds Aug 6	Variations and Grounds Cto7

Footnotes

METER ANTHOLOGY

Mark Gotham

This is a placeholder chapter for forthcoming lists of moments that are notable for particular metrical techniques.

In the meantime, here is a list (from Gotham 2019) of passages in mixed meters (5s, 7s, ...). The list is organised chronologically by year of composition and limited to notated music and cases in which a single mixed metrical pattern is sustained for at least four iterations such that it might realistically be internalised by a listener as a meter.

These (imperfect) criteria are intended to define a meaningful boundary for the collection guided by what meter 'is'.

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
						Quotes as specified; otherwise as deduced	"?"
Escobar, Pedro de	Cancionero Musical de Palacio	1516-20	Barbieri No.48	Las mis penas, madre		Proportio quintupla [5/ 2]	3+
Encina, Juan del	Cancionero Musical de Palacio	1516-20	Barb. No. 79	Amor con fortuna		Proportio quintupla [5/ 2]	3+
Anon.	Cancionero Musical de Palacio	1516-20	Barb. No. 102	Pensad ora'n al		Proportio quintupla [5/ 2]	3+
Encina, Juan del	Cancionero Musical de Palacio	1516-20	Barb. No. 115	Dos ánades, madre		Proportio quintupla [5/ 2]	3+
Fernández, Diego	Cancionero Musical de Palacio	1516-20	Barb. No. 132	De ser mal casada		Proportio quintupla [5/ 2]	3+
Encina, Juan del	Cancionero Musical de Palacio	1516-20	Barb. No. 215	Con amores, mi madre		Proportio quintupla [5/ 2]	3+
Encina, Juan del	Cancionero Musical de Palacio	1516-20	Barb. No. 403	Tan buen ganadico		Proportio quintupla [5/ 2]	3+
Tye, Christopher	21 In Nomines	1525 approx.		Trust		[5/2]	?
Tye, Christopher	21 In Nomines	1525 approx.		Sit Fast		[5/2]	?
Strogers, Nicholas	In Nomine	1578 approx.				[5/2]	
Parsley, Osbert	Spes Nostra	1578 approx.				[5/2]	
Parsley, Osbert	In Nomine "upon 5 minims"	1578 approx.				[5/2]	
Bull, John	In Nomine	1610–25 approx.	K28		All but final section	"Alla breve" [Actually 11/4; 4+4+3/4]	2+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Le Jeune, Claude	Airs a III. IIII. V. et VI. parties (1ère livre)	1608		"Revecy venir du Printans"		"C" [Actually 12/4]	2+
Le Jeune, Claude	Airs a III. IIII. V. et VI. parties (1ère livre)	1608		"Cigne Je Suis"		"C" [Actually 12/4]	2+
Le Jeune, Claude	Airs a III. IIII. V. et VI. parties (1ère livre)	1608		"Perdre le Sens"	Chant	"C" [Actually 12/4]	2+
Le Jeune, Claude	Airs a III. IIII. V. et VI. parties (2ème livre)	1608		"Tel Qu'Aigle Suis		"C" [Actually 12/4]	2+
Le Jeune, Claude	Airs a III. IIII. V. et VI. parties (2ème livre)	1608		"Trinke, Trink, Trink"		"C" [Actually 12/4]	3+
Le Jeune, Claude	Airs a III. IIII. V. et VI. parties (2ème livre)	1608		"Sui ton Erre"	Chant	[12/4]	2+
Händel, Georg Friedrich	Orlando (opera)	1733	HWV 31	Act 2, Scene xi	‘Mad scene’	"5/8"	
Haydn (attrib.)	Piano Sonata No.12	1767?	Hob.XVI:12	Movt 3 (Finale)		"2/4" (7-time hypermetre)	
Reeve, William	The Gypsies (a Glee for 3 voices)	1796?		"Come, stain your cheeks with nut or berry"		"5/4"	

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Reicha, Antoine	Thirty-six Fugues	1803		No.20		"5/8"	3+
Reicha, Antoine	Thirty-six Fugues	1803		No.24		"[Cut common] et 3/4"	2+
Reicha, Antoine	Thirty-six Fugues	1803		No.28		"6/8 et 2/4"	3+
Shield, William	3 String Trios, No.1 in F major	1811		3: Scherzo		"5/4"	3+
Boieldieu, François-Adrien	"La dame blanche" (opera)	1825		Act 2, No.8, Cavatine "Viens, gentille dame"	Allegretto section	"5/4"	[3-
Chopin, Fryderyk	Piano sonata No.1	1828	op.4	3		"5/4"	?
Glinka, Mikhail	Life for the Tsar (opera)	1834–36		Act 3, No.15 "Nuptial chorus and scene"		"5/4"	[2-
Loewe, Carl	Prinz Eugen, der edle Ritter (Ballad for voice and piano)	1844	op.92			"5/4"	?
Alkan, Charles-Valentin	Deuxième recueil d'impromptus	1849	op.32, no.2	No.1, Air à cinq temps	Including trio	"5/4"	3+
Alkan, Charles-Valentin	Deuxième recueil d'impromptus	1849	op.32, no.2	No.2, Air à cinq temps		"5/8"	3+
Alkan, Charles-Valentin	Deuxième recueil d'impromptus	1849	op.32, no.2	No.3, Air à cinq temps		"5/16"	3+
Alkan, Charles-Valentin	Deuxième recueil d'impromptus	1849	op.32, no.2	No.4, Air à sept temps		"7/4"	2+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Div
Liszt, Franz	Harmonies poétiques et religieuses III	1849/53	S.173/4	4: Pensée des morts	b.1-19, 66-76	"5/4"	?
Hiller, Ferdinand	Rhythmische Studien for piano	1851	op.53	No.5		"5/4"	2+
Hiller, Ferdinand	Rhythmische Studien for piano	1851	op.53	No.7	b.43-106, 151-193	"6/8, 9/8"	2+
Saint-Saëns, Charles-Camille	Trois morceaux	1852	op.1	No.3, Prière		"11/4"	?
Bischoff, Kaspar Jacob	String Trio	1853?	op.5	Scherzo		"5/8"	3+ 2+
Iparraguirre, José María	Gernikako Arbola	1853				"5/8"	3+
Brahms, Johannes	Variations on a Hungarian Song	1853–56?	op.21, No.2	Theme, Variations 1-8	(<)	"3/4, C[4/ 4]" (=7/4)	3+
Berlioz, Hector	L'enfance du Christ	1854	op.25	Conjuration of soothsayers, Scene 4		"7/4 (3/4+4/ 4)"	3+
Hiller, Ferdinand	Serenade (Piano Trio No. 4)	1855?	op.64	N.5, Intermezzo	b.1-32 and elsewhere	"2/4, 3/ 4"=5/4	2+
Berlioz, Hector	Les Troyens (opera)	1856–58	H.133	Act 2, Scene 1, "Combat de ceste" (Pas de lutteurs)	b.17-29	"5/8"	3+ div
Alkan, Charles-Valentin	Petit Caprice, Réconciliation	1857	op.42	Central moderato section including trio		"5/4"	2+
Liszt, Franz	Dante Symphony	1857	S.109	Fig.R and S ff.		"5/4"	2+
Liszt, Franz	Dante Symphony	1857	S.109	Fig.V-X		"7/4"	3+ div

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Rubinstein, Anton	Der Thurm zu Babel (The Tower of Babel)	1868–69	op.80	"How fiercely ..." section	After Fig.E	"5/4"	?
Brahms, Johannes	Agnes (song)	1870–73	op.59/5			"3/4, 2/4" (=5)	3+
Prokunin, Vasily (ed. Tchaikovsky)	65 Russian Folk Songs for voice and piano	1872		No.54		"2/4" alt. "3/ 4"=5/4	2+
Tchaikovsky, Pyotr Il'yich	String quartet No.2 in F major	1874	op.22	2 (Scherzo)		"6/8[x2], 9/ 8"	2+
Mussorgsky, Modest	Pictures at an Exhibition	1874		Promenade	b.1-8	"5/4" alt. "6/ 4"=1 1/4	5+
Chausson, Ernest	7 Mélodies	1879-80	Op.2 no.7	7. Le Colibri		"5/4"	
Chabrier, Emmanuel	10 Pièces pittoresques	1881		No.2 Mélancolie	b.1-8, 15-18	"9/8" alt. "6/ 8"	3+
Brahms, Johannes	Das Mädchen (song)	1883–84	op.95/1			"3/4, C[4/ 4]" (=7/4)	3+
Brahms, Johannes	Piano Trio in C minor	1886	op.101	3		"3/4, 2/ 4[x2]" (=7/ 4); later "9/ 8+6/8" (=15/8).	3+
Borodin, Alexander	Symphony No.3	1886–7		Movt.2, Scherzo (not the trio)		"5/8"	[2+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Scriabin, Alexander	24 Preludes	1888-96	op.11 no.1	1		"2/2" (actually 10/ 8)	5+
Scriabin, Alexander	24 Preludes	1888-96	op.11 no.14	14		"15/8"	3+ 5/8
Scriabin, Alexander	24 Preludes	1888-96	op.11 no.16	16	>	"5/8, 4/8"	?
Scriabin, Alexander	24 Preludes	1888-96	op.11 no.24	24	>	"6/8, 5/8"	3+
Sibelius, Jean	Kullervo	1891–92		Movt 3	To Fig.L	"5/4"	[3-
Tchaikovsky, Pyotr Il'yich	Symphony No.6	1893	op.74	2		"5/4"	2+
Sibelius, Jean	Six Partsongs	1893-1914***	op.18	No.1, "Sortunut ääni"		"5/4"	?
Sibelius, Jean	Six Partsongs	1893-1914***	op.18	No.3, "Venematka"		"5/4"	3+
Sibelius, Jean (/ Vihtol)	Laulun mahti (arr. of ballad by J. Vihtol)	1895	JS 118		b.1-16	"3/4, 4/4"	3+
Sibelius, Jean	Nine Songs for Chorus	1897	op.23	No. 2: Tuuli tuudittele		"5/2"	3+
Coleridge-Taylor, Samuel	Fantasiestücke for string quartet	1895	op.5	Movt. 2, "Serenade"	Two outer sections.	"5/4"	?
Berg, Alban	Zwei Lieder	1900 version (not 1925)		Schließe mir die Augen beide	9 bars	"5/4"	3+
Scriabin, Alexander	4 Preludes	1903	op.33 no.4	4		"5/4"	?

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Ravel, Maurice	Miroirs	1904–05		Movt 5: “La vallée des cloches”	b.20-27	"5/4"	?
Pierné, Gabriel	Ramuntcho	1907		Act 1, No.7, 10		"5/8"	3+
Pierné, Gabriel	Ramuntcho	1907		Act 2, No.14 Fig. L-Q, No.15		"5/8"	3+
Pierné, Gabriel	Ramuntcho	1907		Act 3, No.18, 19		"5/8"	3+
Rachmaninoff, Sergey	The Isle of the Dead	1908	op.29	Outer sections: Start until Fig.13+4 (Tranquillo), and Fig.23-3 (Largo) to end.		"5/8"	2+ also
Stanchinsky, Alexei	Prelude in Lydian Mode	1908				"21/16"	7x
Holst, Gustav	Rig Veda Collection, Group 1	1908–10	op.26, H.97	Movt 1. Battle Hymn		"5/4"	3+
Holst, Gustav	Rig Veda Collection, Group 1	1908–10	op.26, H.97	Movt 3. Funeral Hymn		"7/4"	4+
Holst, Gustav	Rig Veda Collection, Group 2	1909	op.26, H.98	Movt 5. To Agni	b.1-18, 24ff.	"5/4" (10/4)	3+
Ravel, Maurice	Daphnis et Chloé	1909–12		Danse générale	Fig.194 (Animé) to 218	"5/4"	"3-
Holst, Gustav	Rig Veda Collection, Group 3	1910	op.26, H.99	Movt 8. Hymn to the Waters		"7/4" and "21/8" (triplets)	4+ [2-

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Holst, Gustav	Rig Veda Collection, Group 3	1910	op.26, H.99	Movt 10. Hymn to the Travellers		"5/4"	3+
Prokofiev, Sergey	Four Pieces for Piano	1911	op.3	No.4 "Prizrak" (Phantom)		"5/8"	2+
Medtner, Nikolai	Piano Sonata No.2 in E minor ("Night Wind")	1911	op.25 no.2		Allegro (m.38ff.)	"15/8"	?
Stanchinsky, Alexei	Sketch	1911–13	op.1	Movt 1		"5/4"	?
Stanchinsky, Alexei	Sketch	1911–13	op.1	Movt 5		"11/8"	
Stanchinsky, Alexei	Sketch	1911–13	op.1	Movt 6		"17/8 (4/ 8+4/8+5/ 8+4/8)"	
Stanchinsky, Alexei	Sketch	1911–13	op.1	Movt 7		"10/8"	Va
Stanchinsky, Alexei	Sketch	1911–13	op.1	Movt 11		"7/4"	Va
Stravinsky, Igor	Petrushka	1911, 1947		Tableau IV: The Shrovetide Fair	"The Mummers"	"5/8"	?2- cor
Stanchinsky, Alexei	Piano Sonata No.2	1912		Movt 2		"11/8"	2+ ini 3+
Scriabin, Alexander	2 Preludes	1913	op.67	1		"5/8"	3+
Roslavets, Nikolai	String quartet No.1	1913		Movt 1	b.58-70	"10/16"	5+
Sibelius, Jean	På berget	1914	op.84 no.2			"7/4 (3/4+4/ 4)"	3+
Ravel, Maurice	Piano Trio in A minor	1914	op.67	1		8/8	3+
Holst, Gustav	The Planets	1914	op.32	Mars		"5/4"	[3+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Holst, Gustav	The Planets	1914	op.32	Neptune		"5/4, 3 beats followed by 2"	3+
Bartók, Béla	15 Hungarian Peasant Songs and Dances	1914-18	Sz. 71, BB 79	No.4		"3/4[x2], 2/ 4[x2]" (=10/ 4)	3+
Bartók, Béla	15 Hungarian Peasant Songs and Dances	1914-18	Sz. 71, BB 79	No.6 (Ballade)	First and last sections	"7/8"	2+
Bartók, Béla	Romanian Christmas Carols	1915	Sz.57, BB.67	Series 1 no 3		"4/8+3/8"	
Bartók, Béla	Romanian Christmas Carols	1915	Sz.57, BB.67	Series 2 no 9		"4/8+3/8"	2+
Pierné, Gabriel	Piano Quintet	1917	op.41	Movt 2, "Sur un rythme de Zortzico"	Fig.26-42, 47-end	"5/8"	3+
Ravel, Maurice	Frontispiece for two pianos	1918				"5/4" and "15/8" (triplets)	?
Holst, Gustav	The Perfect Fool	1918–22	op.39	Dance of spirits of earth (two sections)		"7/8"	2+
Vladigerov, Pancho	Bulgarian Rhapsody, 'Vardar'	1922, 28	op.16		Start - Fig.3, Fig.22-26	"5/16"	2+
Stravinsky, Igor	Octet for winds	1923, 52		Movt. 2, Variation E (Fig. 51-6)		"5/8"	
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	20(67)		8/8	"3-
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	31(97)		"7/8" (actually 7/ 4)	2+
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	32(98)		"7/8"	2+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	33(113)		"7/8"	2+
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	48: In the Mixolydian Mode		"5/4"	Bo
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	113: Bulgarian Rhythm 1		"7/8"	2+
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	115: Bulgarian Rhythm 2		"5/8"	2+ pla
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	148: Six dances in Bulgarian Rhythm no. 1		9/8	"4- [2-
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	149: Six dances in Bulgarian rhythm no. 2		7/8	"2-
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	150: Six dances in Bulgarian rhythm no. 3		"5/8"	2+
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	151: Six dances in Bulgarian rhythm no. 4		8/8	"3-
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	152: Six dances in Bulgarian rhythm no. 5		9/8	"2-
Bartók, Béla	Mikrokosmos	1926-39	Sz.107, BB 105	153: Six dances in Bulgarian rhythm no. 6		8/8	"3-
Puccini, Giacomo	Turandot	1926		Act 1, Fig. 28, 32 (34). Ricordi VS pp. 62–63, 69-70, (72-73)		"2/4, 3/4" alternating	2+
Pierné, Gabriel	Fantaisie basque for violin and orchestra	1927	op.49	"Zortzico" section	Fig. 17-21	"5/8"	3+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Chávez, Carlos	Piano Sonata No.3	1928		Movt 4, "Claro y Conciso"	18 bars	One passage of $2\{1/2\}/8=5/16$.	2+
Holst, Gustav	Double Concerto for Two Violins and Orchestra	1929	op.49	Movt 2: "Lament"		"5/4"	?
Holst, Gustav	Double Concerto for Two Violins and Orchestra	1929	op.49	Movt 3: "Variations on a Ground"	11th and 18th variations	"5/4"	?
Holst, Gustav	Double Concerto for Two Violins and Orchestra	1929	op.49	Movt 3: "Variations on a Ground"	13th and 17th variations	"7/4"	[3+
Roslavets, Nikolai	Legend	1930		Middle section		"5/4"	2+
Holst, Gustav	A Choral Fantasia	1930	op.51, H.177		Three passages, b.70–98 (fig. IV ff.), 179–85, 201–209	"7/4"	?
Bartók, Béla	44 Duos for 2 Violins	1931	Sz.98	No. 19: A Fairly Tale	Outer sections	"3+3+2/8" [8/8]	"3+
Bartók, Béla	44 Duos for 2 Violins	1931	Sz.98	No. 31: New Year's Song No.4		"5/8" actually 5/8+5/8+5/8+3/8 [18/8]	2+
Ravel, Maurice	Don Quichotte a Dulcinée (song cycle)	1932–33		No.1, "Chanson Romanesque"		"6/8, 3/4"	[3+
Ravel, Maurice	Don Quichotte a Dulcinée (song cycle)	1932–33		No.2, "Chanson épique"		"5/4"	?
Chávez, Carlos	Sinfonía de Antígona (Symphony No.1)	1933		Various passages eg. Fig. 6-10		"5/8"	3+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Bartók, Béla	String Quartet no.5	1934	Sz.102, BB 110	Movt 3, Scherzo: alla bulgarese		"4+2+3" (9/ 8)	2+
Bartók, Béla	String Quartet no.5	1934	Sz.102, BB 110	Movt 3, Scherzo: alla bulgarese	Trio	"3+2+2+3" (10/8)	3+
Chávez, Carlos	Sinfonía india	1935–36		Various passages in the opening section and from 81ff.		"5/8"	3+
Chávez, Carlos	Sinfonía india	1935–36		Figs 14 and 64		"7/8"	3+
David Diamond	Sonata for violoncello and piano	1936-8		Movt 2, Lento Assai	b.1-143 (with exceptions)	"5/8"	3+
Copland, Aaron	Sextet	1937			b.74-81	"5/8"	Bo
Copland, Aaron	Sextet	1937			b.90(Fig.28)-100	"7/8"	2+ Cl.
Copland, Aaron	Sextet	1937			Fig.30-32(bb.116-131)	"7/8"	2+
Villa-Lobos, Heitor	Bachianas Brasileiras no. 3	1938		Movt 2	4 bars x 2: 3rd of Fig.5 and 13th of Fig.8	"5/4"	?
Villa-Lobos, Heitor	Bachianas Brasileiras no. 5	1938		Movt 1, "Aria (Cantilena)"	b.1-4, Fig.3ff. (18 bars), and elsewhere	"5/4"	?
Revueltas, Silvestre	Sensemaya	1938	R.48, 67		Fig.1-23, 35-42	"7/8 (2/4+3/ 8)"	2+
Revueltas, Silvestre	Sensemaya	1938	R.48, 67		Fig.23-25	"9/8 (3/4+3/ 8)"	2+
Revueltas, Silvestre	Sensemaya	1938	R.48, 67		Fig.29-33	[21/16]: 7/8 [as before] alt. 7/ 16(4+3)	4+
Bartók, Béla	Contrasts	1938	Sz.111, BB 116	3: Sebes	b.132-168	"8+5/8" (half-bar notated)	3+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Roslavets, Nikolai	24 Preludes for violin and piano	1941–42		Movt 4	Con moto sections	"5/4"	3+
Roslavets, Nikolai	24 Preludes for violin and piano	1941–42		Movt 8		"4/4+3/4"	2+
Roslavets, Nikolai	24 Preludes for violin and piano	1941–42		Movt 9		"5/8"	3+
Roslavets, Nikolai	24 Preludes for violin and piano	1941–42		Movt 19		"4/8+3/8"	2+
Schoeck, Othmar	Unter Sternen (Under the Stars)	1941-43	op.55	Trost der Kreatur (Heft 1)	b.2ff.	"3/4+2/4" [8/4]	3+
Prokofiev, Sergey	Piano Sonata No. 7	1942	op.83	Movt. 3 ("Precipitato")		"7/8"	2+
Hindemith, Paul	Ludus Tonalis	1942		Preludium last 8 measures [= Postludium first 4]		"15/8"	
Hindemith, Paul	Ludus Tonalis	1942		Movt 4: Fugue Secunda in G		"5/8"	Bo
Piston, Walter	Passacaglia for piano	1943				"5/8"	3+
Alberto Ginastera	12 American Preludes for piano	1944		No. 5: In the First Pentatonic Minor Mode		"7/8"	2+
Copland, Aaron	Appalachian Spring	1944			Reh. 31–32	"2/4, 5/8" alternating [9/8]	2+ line
Britten, Benjamin	Peter Grimes (opera)	1945	op.33	End of Act 1, "Old Joe Has Gone Fishing"	Fig.79-83	"7/4"	"2-
Villa-Lobos, Heitor	Bachianas Brasileiras No. 9	1945		Pt 2: Fugue		"11/8"	
Ginastera, Alberto	Suite de danzas Criollas	1946, 56		Movt 3		"11/8 (6/ 8+5/8)"	Bo 3+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Copland, Aaron	Clarinet Concerto	1948			379-391	"2/4, 3/4" alternating [5/4]	2+
Villa-Lobos, Heitor	Fantasia	1948		Movt 3, "Très Animé"	Fig.0-7, 10-12	"7/4 (3/4+4/ 4)"	3+
Bernstein, Leonard	Symphony No. 2: The Age of Anxiety	1949, 65		Part I. Variation IV: Più mosso		"5/8"	3+
Bernstein, Leonard	Symphony No. 2: The Age of Anxiety	1949, 65		Part I. Variation X: Più mosso		"[Cut common time], 3/4" (=7/4)	2+
Bernstein, Leonard	Symphony No. 2: The Age of Anxiety	1949, 65		Part IIb, Masque	Fig. 35	"2/4+3/8"	2+
Bernstein, Leonard	Symphony No. 2: The Age of Anxiety	1949, 65		Part IIc, Epilogue	Fig. J	7/4 (4+3)	2+
Britten, Benjamin	A Spring Symphony	1949	op.44	Movt 7: ‘Waters Above!’		"5/4"	?
Shostakovich, Dmitri	Twenty-Four Preludes and Fugues	1950–51	op.87	Fugue 12 in g# minor		"5/4"	Bo
Shostakovich, Dmitri	Twenty-Four Preludes and Fugues	1950–51	op.87	Prelude 14 in eb minor		"7/4"	?3- 2+
Shostakovich, Dmitri	Twenty-Four Preludes and Fugues	1950–51	op.87	Fugue 17 in Ab major		"5/4"	?
Shostakovich, Dmitri	Twenty-Four Preludes and Fugues	1950–51	op.87	Fugue 19 in Eb major		"5/4"	?2-
Ligeti, György	Musica Ricercata	1951–53		No. 8		"7/8" (x2=14/8)	2+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Britten, Benjamin	Gloriana (opera)	1952–3, 66	op.53	Act 1, Scene 1, No.2: The Tournament	Fig. M-end (16 bars)	"5/4"	2+
Britten, Benjamin	Gloriana (opera)	1952–3, 66	op.53	Act 1, Scene 1, No.8: Ensemble of Reconciliation	Fig. Aa-end (13 bars)	"5/4"	2+
Britten, Benjamin	Gloriana (opera)	1952–3, 66	op.53	Act 1, Scene 2, No.2: The Queen's Song	All (21 bars)	"5/4"	?
Britten, Benjamin	Gloriana (opera)	1952–3, 66	op.53	Act 3, Scene 1, No.4: The Dressing-Table Song	All	"5/4"	?
Britten, Benjamin	Gloriana (opera)	1952–3, 66	op.53	Act 3, Scene 3, No.7: Epilogue	Fig. Bb-end (13 bars)	"5/4"	2+
Ligeti, György	Six bagatelles for wind quintet	1953		IV		"7/8" (x2=14/8)	2+
Britten, Benjamin	Canticle III ("Still Falls the Rain")	1954	op.55	Theme and Variation IV		"5/4"	?
Bernstein, Leonard	Serenade	1954		Movt I, "Phaedrus: Pausanias"	2nd of Fig.M to N, Fig. U	"2/4+3/8"	2+
Bernstein, Leonard	Serenade	1954		Movt IV, "Agathon"	b.5ff	"5/16" (with dotted line divisions)	Bo
Bernstein, Leonard	Serenade	1954		Movt V, "V. Socrates: Alcibiades"	Fig.2	"5/4" (with dotted line divisions)	Bo
Bernstein, Leonard	On the waterfront	1954			Fig. c.2-10	[Cut common time] and 3/4	2+
Shostakovich, Dmitri	Piano Concerto No.2	1957	op.102	3	Second subject (bb***)	7/8	2+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Bernstein, Leonard	West Side Story	1957		No.7: "America"	From b.46	"6/8 (3/4)"	3+
Lutosławski, Witold	Five Songs	1957,8		No. 3: Zima (Winter)	b.1-10	[5/8]	2+
Stravinsky, Igor	Threni, id est Lamentationes Jeremiae Prophetarum	1958		"De Elegia Tertia: 3. Solacium"	bb.2-5	"10/8"	?
Britten, Benjamin	Cantata academica, Carmen basiliense	1959	op.62	Movt 5: Duetto		"5/8"	Bo
Britten, Benjamin	Missa Brevis in D	1959	Op. 63	Gloria		"7/8"	3+
Britten, Benjamin	Missa Brevis in D	1959	Op. 63	Agnus Dei		"5/4"	3+
Copland, Aaron	Nonet	1960			Fig.32	"5/16"	3+
Copland, Aaron	Nonet	1960			Fig.37	"5/4"	3+
Desmond, Paul	Take Five	1960				"5/4"	3+
Brubeck, Dave	Blue Rondo a la Turk	1960			Outer sections	"9/8 (2+2+2+3/ 8)"	2+
Brubeck, Dave	Three's a Crowd	1962				"7/4"	?
Brubeck, Dave	Far More Blue	1961				"5/4"	3+
Brubeck, Dave	Castillian Drums	1962				"5/4"	3+
Brubeck, Dave	Countdown	1962				"5/4"	3+
Brubeck, Dave	Castillian Blues	1962				"5/4"	3+
Brubeck, Dave	Unsquare Dance	1962				"7/4"	2+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Barber, Samuel	Piano concerto	1962		Movt iii, Allegro molto	Start-Fig.8 and Fig.12-end.	"5/8"	"2-
Barber, Samuel	Piano concerto	1962		Movt iii, Allegro molto	Fig.8-12	"5/8"	"3-
Britten, Benjamin	War Requiem	1962	Op.66	2: Dies Irae	Fig.17-18, 19-20, 21-22, 23-24, 52-56.	"7/4"	2+
Britten, Benjamin	War Requiem	1962	Op.66	2: Dies Irae (Confutatis)	Fig.45-8(9)	"5/4"	3+
Britten, Benjamin	War Requiem	1962	Op.66	5: Agnus Dei		"5/16" ("10/ 16")	2+
Britten, Benjamin	War Requiem	1962	Op.66	6: Libera me, boys choir section	Fig.128-131	"2/2 + 3/2" (= 5/2)	2+
Britten, Benjamin	Curlew River	1964	op.71		Fig.30/61	"5/16"	2+
Britten, Benjamin	Curlew River	1964	op.71		Fig.69/143	"7/4"	?
Brubeck, Dave	Time changes	1964		Unisphere		"10/4"	3+
Brubeck, Dave	Time changes	1964		World's Fair	Several passage in this configuration; many exceptions	"3/4+3/4+3/ 4+4/4" [13/ 4]	3+
Bernstein, Leonard	Chichester Psalms	1965		Part 1	b.11-end(117)	"7/4", "[Cut common] + 3/4"	4+
Bernstein, Leonard	Chichester Psalms	1965		Part 3	b.20-57	"10/4"	"2-
Bourgeois, Derek	'Serenade'	1965	op.22		Fig.0-4, 6-end	"11/8"	"3-
Bourgeois, Derek	'Serenade'	1965	op.22		Fig.4-6	"13/8"	"3-

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Reich, Steve	Reed Phase	1966				[5/4]	?
Brubeck, Dave	The light in the wilderness	1968		Movement I	Fig.C-E, G-H, J-K, N-O, P-End	"5/4"	3+
Brubeck, Dave	The light in the wilderness	1968		Movement Iic		"5/4"	3+
Brubeck, Dave	The light in the wilderness	1968		Movement Vb and VI		"5/4"	3+
Brubeck, Dave	The light in the wilderness	1968		Movement VII	Fig.L -N, c.R-T	"4/4 + 3/ 4"=7/4	2+
Brubeck, Dave	The light in the wilderness	1968		Movement VIIIb	Fig.E-R	"4/4+4/4+2/ 4"=10/4	
Brubeck, Dave	The light in the wilderness	1968		Movement VIIIb	Fig.R-V, X-Y	"5/4"	3+
Rautavaara, Einojuhani	Piano Sonata No. 1	1969	op.54	Movt 2	From b.6	"8/8"	3+
Rautavaara, Einojuhani	Piano Sonata No. 2	1970	op.64	Movt 1		"8/8"	3+
Barber, Samuel	The Lovers	1971	op.43	Movt II, Lithe Girl, Brown Girl	Outer sections	"5/8"	Bo
Rutter, John	Gloria	1974		Movt 3	b.135-54 (Fig.31-2)	"5/8"	3+
Brubeck, Dave	La fiesta de la posada	1976		Movement 7: Behold! The holy one.	to fig.F	"7/4"	"2- lin
Brubeck, Dave	La fiesta de la posada	1976		Movement 14: God's Love Made Visible	Except last 4 bars	"5/4"	3+
Ligeti, György	Hungarian Rock (Chaconne)	1978				"9/8" and "2+2+3+2"	"2-
Reich, Steve	Octet (Eight Lines)	1979 (83)				"5/4"	3+

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Ligeti, György	Horn trio	1982		Movt 2, Vivacissimo molto ritmico		4/4 (3+3+2) [sic] and "323" for the ostinato	"3- "3-
Ligeti, György	Horn trio	1982		Movt 4, Lamento		"5/8"	3+
Andriessen, Louis	Trepidus	1983				"5/8"	Bo
Ligeti, György	Études, No.4: "Fanfares"	1985		No. 4	Ostinato and large portions of the other part	"3+2+3/8" (8/8)	"3-
Weir, Judith	Illuminare, Jerusalem	1985			From b.2	"9/8" alt. "6/ 8"=15/8 (5)	3+
Brubeck, Dave	Nocturnes	1987		Going to Sleep		"5/4"	3+
Brubeck, Dave	Nocturnes	1987		Quiet as the Moon		"5/4"	3+
Brubeck, Dave	Nocturnes	1987		Five for Ten Small Fingers		"5/4"	
Maxwell Davies, Peter	Concerto for Trumpet and Orchestra	1988		Movt 1	Start and Fig.D	"4/4+3/8"	"2-
Rihm, Wolfgang	In-schrift	1995			b.191-271	"5/4"	Bo
Ligeti, György	Hamburg Concerto	1998–99, rev. 2003		1: Praeludium		"12/ 8=2+3+4+3/ 8"	2+
Ligeti, György	Hamburg Concerto	1998–99, rev. 2003		3: Aria, Aksak, Hoketus	b.12-end	"9/ 8=4+3+2/8"	2+
Ligeti, György	Hamburg Concerto	1998–99, rev. 2003		5: Spectra		"16/8=3/ 8+3/4+3/ 8+2/4"	3+
Ligeti, György	Hamburg Concerto	1998–99, rev. 2003		7: Hymnus		"5/4"	2+ bar

Composer	Work	Year	Opus/ number	Movement	Bar / range	Time signature	Di
Matthew, Colin	Pluto, the Renewer	2000				"5/4"	3+
Roth, Alec	Ponticelli	2007		Movt 1: 'Flat Bridge'		"10/8"	Mo
Dove, Jonathan	Missa Brevis	2009		Sanctus		"5/8"	3+
Dove, Jonathan	Missa Brevis	2009		Agnus Dei		"5/4"	3+

TWELVE-TONE ANTHOLOGY

Mark Gotham

This page provides a list of rows used in the repertoire in the form of a:

- **Tabular list** of all the rows collected (roughly 1,600);
- **Musical representation** of those rows in ‘open’ values (quarter notes, no stems) and properties labelled;
- **Structured anthology**, re-organising the rows by property (e.g. with a list of the all-interval rows).

As the [twelve-tone part of this textbook](#) is at pains to point out, it’s not always straightforward (or indeed musically relevant) to identify a single main row. Indeed it’s not always clear what counts as ‘serial’. That being the case, no list of this kind can aim to be ‘definitive’. All the same, it’s very useful to see at least some rows gathered together and compared.¹

1. For more on the preparation of this list, please see the open access research publication linked to this dataset: Gotham and Yust, DLfM 2021. The code and latest version of record for the list are hosted in [this repository](#) and the research paper is open access to all when approached from [this contents page](#). In addition to Jason Yust, I would also like to thank the creators of foregoing lists of this kind (notably the Schoenberg-Berg-Webern collection [here](#) and a [wiki here](#)), the hundreds of analysts whose work is represented here, and the scholars who contributed entries to this new, combined and enlarged collection: Elizabeth West Marvin, David Maw, Rachel Mitchell, Sam Reenan, and Laurel Parsons. To contribute your own corrections or new entry to this list, please email me (Mark Gotham) at <FirstName [dot] LastName [at] tu-dortmund [dot] de > with all the relevant information: Row; Composer (Last Name(s), First Name(s)); Composition including opus number; Year; Source (e.g. URL or PDF). The row can be in any consistent text or numerical format such as ‘A-Gs-G-Cs-F-Fs-C-E-Eb-D-B-Bb’ or [0, 11, 10, 4, 8, 9, 3, 7, 6, 5, 2, 1].

Tabular List

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Adorno, Theodor W.	Totenlied auf den Kater	1932-33	0	7	6	3	11	5	8	4	10	9	1	2
Apostel, Hans Erich	Fischerhaus-Serenade, Op.45	1971	0	4	8	3	11	7	1	9	5	2	10	6
Argento, Dominick	A Water Bird Talk, Bird Row	1974-76	0	7	2	1	10	9	3	8	5	4	11	6
Argento, Dominick	A Water Bird Talk, Lecturer Row	1974-76	0	9	5	10	2	6	3	11	8	4	1	7
Argento, Dominick	Evensong: Of Love and Angels	2007	0	11	9	8	5	3	4	1	2	7	10	6
Argento, Dominick	From the Diary of Virginia Woolf	1974	0	7	6	2	11	5	3	1	8	9	4	10
Argento, Dominick	Miss Havisham's Wedding Night	1979	0	2	7	11	10	1	6	5	3	4	8	9
Atterberg, Kurt	Symphony 9 [Bbm], Op.54, 'Sinfonia visionaria'	1955-56	0	1	5	6	7	4	8	11	10	9	2	3
Babbitt, Milton	All Set	1957	0	4	5	11	6	10	7	3	1	2	9	8
Babbitt, Milton	Arie da Capo	1974	0	7	8	6	2	1	10	5	11	9	4	3
Babbitt, Milton	Composition for Four Instruments	1948	0	3	11	2	10	1	7	4	8	5	9	6
Babbitt, Milton	Composition for Four Instruments, row i	1948	0	10	9	8	7	5	11	1	2	3	4	6
Babbitt, Milton	Composition for Four Instruments, row ii	1948	0	9	11	2	4	1	7	10	8	5	3	6
Babbitt, Milton	Composition for Four Instruments, row iii	1948	0	4	3	8	7	11	5	1	2	9	10	6
Babbitt, Milton	Composition for Four Instruments, row iv	1948	0	4	1	8	5	9	3	11	2	7	10	6
Babbitt, Milton	Composition for Synthesizer	1961	0	9	1	8	4	5	7	2	3	6	10	11
Babbitt, Milton	Composition for Tenor and Six Instruments	1960	0	11	7	5	6	1	4	3	10	8	2	9
Babbitt, Milton	Composition for Twelve Instruments	1954	0	1	4	9	5	8	3	10	2	11	6	7
Babbitt, Milton	Composition for Viola and Piano	1950	0	3	4	8	11	7	9	2	1	5	10	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Babbitt, Milton	Du, row i	1951	0	9	2	10	11	1	7	5	4	8	3	6
Babbitt, Milton	Du, row ii	1956	0	5	2	10	9	7	1	3	4	8	11	6
Babbitt, Milton	Groupwise	1983	0	5	4	6	10	11	2	9	3	1	8	7
Babbitt, Milton	My Complements to Roger	1978	0	3	7	8	11	4	2	6	1	9	10	5
Babbitt, Milton	My Ends Are My Beginnings	1978	0	11	4	8	7	3	5	6	9	2	10	1
Babbitt, Milton	Paraphrases	1979	0	11	3	10	8	1	7	5	4	6	2	9
Babbitt, Milton	Partitions	1957	0	7	9	10	2	11	5	8	4	3	1	6
Babbitt, Milton	Philomel	1964	0	1	11	3	8	6	9	10	5	4	7	2
Babbitt, Milton	Post-Partions	1966	0	5	10	9	1	6	11	8	4	2	7	3
Babbitt, Milton	Relata I	1965	0	1	11	2	10	3	9	8	4	6	7	5
Babbitt, Milton	Relata II	1968	0	1	11	2	10	3	9	8	4	6	7	5
Babbitt, Milton	Semi-simple variations	1956	0	8	1	10	9	11	5	3	4	7	2	6
Babbitt, Milton	Sounds and Words	1960	0	9	2	4	8	3	11	10	1	7	5	6
Babbitt, Milton	String Quartet, No.2	1954	0	3	11	4	1	2	8	10	5	9	7	6
Babbitt, Milton	String Quartet, No.3	1970	0	11	6	7	5	1	10	2	9	3	4	8
Babbitt, Milton	String Quartet, No.4	1970	0	2	9	7	11	10	1	8	4	3	5	6
Babbitt, Milton	Tableaux	1972	0	11	4	6	10	5	2	1	7	9	8	3
Babbitt, Milton	The Crowded Air	1988	0	8	5	7	10	6	11	1	9	3	2	4
Babbitt, Milton	The Widow's Lament in Springtime	1951	0	11	9	2	10	7	1	4	8	3	5	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Babbitt, Milton	Three Compositions for Piano, No.1	1947	0	5	7	4	2	3	9	1	8	11	10	6
Babbitt, Milton	Two Sonnets of Gerard Manley Hopkins	1955	0	2	3	4	7	5	11	6	10	9	8	1
Babbitt, Milton	Vision and Prayer	1961	0	11	8	3	7	4	10	9	2	6	1	5
Babbitt, Milton	Woodwind Quartet	1953	0	3	1	2	11	10	8	9	5	7	6	4
Bach, Johann Sebastian	Chromatische Fantasie	1717?	0	3	6	9	11	2	5	8	10	1	4	7
Badger, Christine	aleatoric row, at 17:14; Graz	2013/2/5	0	2	6	11	3	4	5	7	10	1	9	8
Baker, David	"Status Symbol" from "The Black Experience"	1973	0	3	4	7	8	11	1	10	9	6	5	2
Barber, Samuel	Piano Sonata, Op.26	1949	0	8	4	11	3	7	1	9	5	10	2	6
Bartók, Béla	String Quartet, No.4	1928	0	5	6	11	4	9	10	3	8	1	2	7
Bartók, Béla	Violin Concerto, No.2, mvt 1	1937-38	0	2	8	1	9	4	10	6	3	7	11	5
Bartók, Béla	Violin Concerto, No.2, mvt 3	1937-38	0	8	2	9	1	4	10	7	6	3	11	5
Beecroft, Norma	Improvvisazioni Concertanti, No.1	1961	0	1	11	9	3	2	7	6	10	8	4	5
Bennett, Richard Rodney	Five Studies for Piano	1962	0	3	5	6	11	9	4	2	7	8	10	1
Bennett, Richard Rodney	Symphony	1965	0	2	9	8	3	5	6	1	7	11	10	4
Berg, Alban	Altenberg Lieder	1912	0	1	11	10	2	9	3	8	7	6	5	4
Berg, Alban	Chamber Concerto, mvts 1, 3	1923-25	0	1	3	8	4	9	10	7	6	5	11	2
Berg, Alban	Chamber Concerto, mvts 2, 3	1923-25	0	11	10	4	5	9	7	1	2	6	8	3
Berg, Alban	Der Wein	1929	0	2	3	5	7	8	11	4	6	10	9	1
Berg, Alban	Lulu, (no character)	1927-35	0	5	2	7	9	6	8	10	3	1	4	11
Berg, Alban	Lulu, Acrobat/Athlete	1927-35	0	5	7	6	11	3	4	2	9	8	10	1

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Berg, Alban	Lulu, Act II, Scene I. (Every 5th Note of Transposed Primary Row)	1927-35	0	9	3	2	11	4	6	1	7	10	5	8
Berg, Alban	Lulu, Alwa	1927-35	0	8	5	10	7	1	6	4	11	2	3	9
Berg, Alban	Lulu, Chorale row	1927-35	0	5	1	2	3	9	8	10	4	11	6	7
Berg, Alban	Lulu, Countess Geschwitz	1927-35	0	5	2	10	1	7	8	6	11	4	9	3
Berg, Alban	Lulu, Dr. Schön	1927-35	0	5	9	10	4	7	6	11	1	2	8	3
Berg, Alban	Lulu, Lulu (title character) row	1927-35	0	2	3	5	7	9	1	10	11	4	6	8
Berg, Alban	Lulu, Primary / Main / Basic Row	1934	0	4	5	2	7	9	6	8	11	10	3	1
Berg, Alban	Lulu, Schigolch	1927-35	0	2	3	1	4	5	6	7	8	9	11	10
Berg, Alban	Lulu, Schoolboy row	1927-35	0	2	6	10	4	7	8	3	5	9	11	1
Berg, Alban	Lulu, permutation of main row	1927-35	0	4	2	7	9	6	8	11	3	1	5	10
Berg, Alban	Lulu, whole-tone row	1927-35	0	2	4	6	10	8	11	7	9	1	3	5
Berg, Alban	Lyric Suite, Primary Row / mvt I	1925-26	0	11	7	4	2	9	3	8	10	1	5	6
Berg, Alban	Lyric Suite, mvt I	1925-26	0	2	4	5	7	9	6	8	10	11	1	3
Berg, Alban	Lyric Suite, mvt I, m.7-9	1925-26	0	3	7	8	2	1	9	6	4	11	5	10
Berg, Alban	Lyric Suite, mvt III	1925-26	0	11	7	1	2	9	3	8	10	4	5	6
Berg, Alban	Lyric Suite, mvt V and VI	1925-26	0	1	4	3	5	6	11	7	8	9	10	2
Berg, Alban	Lyric Suite, mvt VI	1925-26	0	2	4	7	9	11	6	8	10	1	3	5
Berg, Alban	Lyric Suite, mvt VI, row 2	1925-26	0	11	8	9	7	6	1	5	4	3	2	10
Berg, Alban	Schliesse mir die Augen Beide	1907	0	11	7	4	2	9	3	8	10	1	5	6
Berg, Alban	Violin Concerto	1935	0	3	7	11	2	5	9	1	4	6	8	10
Berg, Alban	Wozzeck, Act I, Scene 4 "Passacaglia"	1914-22	0	8	4	10	9	3	1	7	6	2	5	11
Berger, Arthur	Chamber Music for Thirteen Players	1956	0	1	11	7	10	9	6	5	8	4	2	3

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Berio, Luciano	Chamber Music	1953	0	9	3	5	7	10	2	11	4	6	8	1
Berio, Luciano	Cinque Variazioni	1952-53	0	2	4	1	3	5	8	10	6	7	9	11
Berio, Luciano	Sequenza I	1958	0	11	10	9	8	7	4	6	5	3	1	2
Bischof, Rainer	'Und so sink ich leise in mich selbst hinein'. Österreichischer Liederzyklus für Mezzosopran und Violine, Op.17	1982-1983	0	6	5	11	4	9	3	2	8	7	1	10
Bischof, Rainer	Sonatine für Klarinette solo, Op.1	1969	0	5	4	10	6	7	1	9	11	2	8	3
Boulez, Pierre	1st Piano Sonata	1946,49	0	8	11	9	10	5	6	4	3	1	2	7
Boulez, Pierre	2nd Piano Sonata	1948	0	7	1	6	11	3	5	8	9	10	4	2
Boulez, Pierre	2nd Piano Sonata, mvt II, Section 1	1948	0	2	1	11	3	9	8	10	7	6	5	4
Boulez, Pierre	3rd Piano Sonata	1957	0	1	7	2	4	3	6	8	5	10	9	11
Boulez, Pierre	Le Marteau sans Maître (alternative view)	1953-55	0	2	11	10	7	8	6	9	5	1	4	3
Boulez, Pierre	Le Marteau sans Maître, cycle of Bel Édifice et les pressentiments	1953-55	0	10	1	11	3	7	2	4	8	6	9	5
Boulez, Pierre	Le Marteau sans Maître, cycle of Bourreaux de solitude	1953-55	0	1	2	3	4	5	6	7	8	9	10	11
Boulez, Pierre	Le Marteau sans Maître, cycle of L'Artisanat furieux	1953-55	0	10	1	2	6	3	7	4	5	8	11	9
Boulez, Pierre	Le Soleil des eaux, series I	1965	0	6	10	2	5	1	7	11	3	4	8	9
Boulez, Pierre	Le Soleil des eaux, series II	1965	0	6	10	2	5	1	4	7	11	8	3	9
Boulez, Pierre	Le Soleil des eaux, series III	1965	0	11	7	2	6	5	4	8	10	1	3	9
Boulez, Pierre	Notations	1945-	0	2	7	6	1	8	4	9	5	11	10	3
Boulez, Pierre	Pli selon pli	1958,67,71	0	1	8	6	7	9	4	5	11	3	2	10
Boulez, Pierre	Sonatine	1946,49	0	1	5	11	4	8	9	3	10	2	7	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Boulez, Pierre	Structures Ia	1952	0	11	6	5	4	3	1	10	9	7	2	8
Britten, Benjamin	Missa Brevis in D, Op.63	1959	0	5	2	9	10	3	6	1	4	11	8	7
Britten, Benjamin	The Turn of the Screw	1954	0	5	2	7	4	9	6	11	8	1	10	3
Cage, John	Sonata for Clarinet	1933	0	1	10	11	9	7	6	5	4	8	3	2
Cage, John	Sonata for Clarinet, mvt 2	1933	0	11	9	10	8	6	5	4	3	7	2	1
Cage, John	Two pieces for Piano	1935	0	11	8	3	4	2	9	7	1	5	10	6
Carlos, Juan	Canciones y Baladas, Balada II	1936	0	4	10	6	3	8	7	2	5	9	1	11
Carter, Elliott	A Symphony of Three Orchestras	1976	0	8	7	10	4	5	2	9	11	3	1	6
Carter, Elliott	Caténaires	2006	0	8	5	3	7	9	10	4	11	2	1	6
Carter, Elliott	Night Fantasies	1982	0	10	3	11	8	7	1	2	5	9	4	6
Carter, Elliott	Piano Concerto, Orchestra	1964-65	0	7	4	11	6	10	3	9	1	8	5	2
Carter, Elliott	Piano Concerto, Soloist	1964-65	0	8	4	9	10	3	1	6	11	2	7	5
Carter, Elliott	String Quartet, No.2 (sketch) 1	1958	0	4	8	3	7	11	6	10	2	9	1	5
Carter, Elliott	String Quartet, No.2 (sketch) 2	1958	0	8	4	3	11	7	6	2	10	9	5	1
Carter, Elliott	String Quartet, No.2 (sketch) 3	1958	0	2	4	6	8	10	1	3	5	7	9	11
Carter, Elliott	String Quartet, No.3	1973	0	11	2	9	5	3	4	8	10	7	1	6
Carter, Elliott	Variations for Orchestra (sketch)	1955	0	8	4	9	11	2	1	5	10	3	6	7
Coltrane, John	Miles Mode	1962	0	3	5	2	7	9	10	8	1	11	6	4
Copland, Aaron	Connotations, row 1	1962	0	1	3	6	2	9	8	5	10	4	11	7
Copland, Aaron	Connotations, row 2	1962	0	7	9	6	2	3	8	11	10	4	5	1
Copland, Aaron	Inscape, ("Row 2")	1967	0	7	3	9	2	4	6	10	5	8	11	1
Copland, Aaron	Inscape, ("Y form" or "Row 1")	1967	0	4	3	11	2	7	6	8	10	9	5	1

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Copland, Aaron	Piano Fantasy	1952-57	0	7	2	10	8	3	6	4	11	9	1	5
Cordero, Roque	Concerto for Violin, mvt 2A	1962	0	11	6	4	7	8	5	9	3	10	1	2
Cordero, Roque	Concerto for Violin, mvt 2B	1962	0	5	3	11	6	8	7	2	1	4	9	10
Cordero, Roque	Soliloquios	1975	0	1	5	11	3	2	9	8	4	10	6	7
Cordero, Roque	Sonata breve	1966	0	1	4	11	10	7	5	8	9	6	3	2
Cordero, Roque	Tres mensajes breves	1966	0	11	10	7	1	2	3	6	5	4	8	9
Cordero, Roque	Violin Concerto mvt 1-3	1962	0	11	6	4	8	7	5	1	3	2	10	9
Crosse, Gordon	Elegy for Small Orchestra, Op.1	1959-61	0	11	3	1	9	10	5	6	2	4	8	7
Dallapiccola, Luigi	'Intermezzo' from the 'Ciaccona' (of 'Ciaccona, intermezzo e adagio')	1945	0	5	6	3	8	9	7	11	10	2	1	4
Dallapiccola, Luigi	An Mathilde	1955	0	1	10	4	6	5	3	9	2	8	7	11
Dallapiccola, Luigi	Canti di Liberationi, No.2	1951-1955	0	5	8	3	1	9	10	4	2	11	7	6
Dallapiccola, Luigi	Canti di Liberazione	1951-55	0	1	5	8	10	4	3	7	9	2	11	6
Dallapiccola, Luigi	Cinque canti	1956	0	11	5	8	6	2	7	3	1	4	10	9
Dallapiccola, Luigi	Cinque fragment di Saffo, No.4	1942	0	2	8	6	7	9	10	3	1	11	4	5
Dallapiccola, Luigi	Commiato	1972	0	6	5	3	9	11	10	8	7	1	2	4
Dallapiccola, Luigi	Dialoghi	1959-60	0	1	10	2	6	4	5	3	7	11	8	9
Dallapiccola, Luigi	Due studi, 'Fanfare'	1951	0	1	7	9	10	3	4	2	8	11	6	5
Dallapiccola, Luigi	Goethe-Lieder, No.2	1953	0	1	11	9	3	8	6	7	2	5	4	10
Dallapiccola, Luigi	Il Prigioniero, "Hope"	1949	0	1	2	3	11	5	4	10	6	7	9	8

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Dallapiccola, Luigi	Il Prigioniero, "Liberty"	1949	0	2	5	8	10	1	3	6	9	11	4	7
Dallapiccola, Luigi	Il prigioniero, "Prayer"	1949	0	3	6	11	9	2	1	7	8	4	5	10
Dallapiccola, Luigi	Job	1950	0	1	5	7	8	11	2	10	4	6	9	3
Dallapiccola, Luigi	Liriche greche c: Sex Carmina Alcaeï	1943	0	3	5	6	2	9	8	7	4	1	10	11
Dallapiccola, Luigi	Parole di San Paolo	1964	0	8	9	10	4	3	6	7	5	11	2	1
Dallapiccola, Luigi	Piccola musica notturna	1954	0	9	1	3	4	11	2	8	7	5	10	6
Dallapiccola, Luigi	Preghiere	1962	0	11	2	3	8	9	7	6	1	5	4	10
Dallapiccola, Luigi	Quaderno musicale di Annalibera	1952	0	1	5	8	10	4	3	7	9	2	11	6
Dallapiccola, Luigi	Quattro liriche di Antonio Machado, i, iv	1948	0	3	5	6	8	9	11	10	7	4	2	1
Dallapiccola, Luigi	Quattro liriche di Antonio Machado, ii	1948	0	1	4	6	7	9	10	11	2	3	5	8
Dallapiccola, Luigi	Requiescant	1957-58	0	2	1	3	4	6	7	9	8	10	5	11
Dallapiccola, Luigi	Requiescant (alternative view)	1957-1958	0	2	1	7	11	8	9	6	10	4	3	5
Dallapiccola, Luigi	Sicut umbra	1970	0	1	2	8	6	5	3	9	4	7	10	11
Dallapiccola, Luigi	Tempus, 'Exhortatio'	1970-71	0	11	9	3	5	6	4	7	8	2	1	10
Dallapiccola, Luigi	Tempus, 'Ploratus'	1970-71	0	1	7	6	10	4	3	2	5	11	9	8
Dallapiccola, Luigi	Tre poemi	1948	0	8	9	6	3	1	2	11	7	5	4	10
Dallapiccola, Luigi	Ulisse [opera]	1960-1968	0	2	1	3	9	8	11	10	4	6	5	7
Dallapiccola, Luigi	Variazioni per orchestra	1954	0	1	5	8	10	4	3	7	9	2	11	6
David, Johann Nepomuk	Sonata for violin, Op.58, No.1	1963	0	2	3	9	11	10	5	8	1	6	4	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
David, Johann Nepomuk	Symphony, No.8, Op.59	1964-1965	0	5	9	2	6	11	3	4	7	8	10	1
Davies, Peter Maxwell	Five Pieces for Piano, Op.2, No.1	1956	0	6	11	10	1	3	5	8	7	2	4	9
Davies, Peter Maxwell	Five Pieces for Piano, Op.2, No.1 (first row)	1955-56	0	6	11	10	1	3	5	8	7	2	4	9
Davies, Peter Maxwell	Five Pieces for Piano, Op.2, No.1 (second row)	1955-56	0	6	1	2	11	9	7	4	5	10	8	3
Davies, Peter Maxwell	Five Pieces for Piano, Op.2, No.2	1956	0	7	11	1	3	5	8	6	4	9	10	2
Davies, Peter Maxwell	Sonata for Trumpet and Piano, Op.1	1955	0	7	6	2	11	10	8	9	1	5	3	4
Denisov, Edison	Concerto for Guitar and Orchestra, Row 1	1991	0	6	10	4	8	2	3	9	1	7	11	5
Denisov, Edison	Concerto for Guitar and Orchestra, Row 2	1991	0	11	5	8	9	10	6	7	1	2	4	3
Denisov, Edison	Five Etudes for Solo Bassoon, row A	1983	0	6	1	7	8	3	2	9	10	5	11	4
Denisov, Edison	Five Etudes for Solo Bassoon, row B	1983	0	11	6	5	4	10	9	3	2	7	1	8
Denisov, Edison	Five Etudes for Solo Bassoon, row C	1983	0	6	11	5	4	10	9	3	2	7	1	8
Denisov, Edison	Five Etudes for Solo Bassoon, row D	1983	0	6	1	7	8	3	2	9	10	11	5	4
Denisov, Edison	Five Etudes for Solo Bassoon, row E	1983	0	1	7	6	5	11	10	4	3	8	2	9
Denisov, Edison	Five Etudes for Solo Bassoon, row F	1983	0	6	1	7	3	2	8	9	10	5	11	4
Denisov, Edison	Five Etudes for Solo Bassoon, row G	1983	0	11	5	10	4	3	9	8	2	1	6	7
Denisov, Edison	Five Etudes for Solo Bassoon, row H	1983	0	6	1	2	8	3	7	9	10	5	11	4
Denisov, Edison	Five Etudes for Solo Bassoon, row I	1983	0	6	1	7	2	8	3	10	5	11	9	4
Denisov, Edison	Five Etudes for Solo Bassoon, row J	1983	0	6	5	11	4	10	9	3	2	7	1	8
Denisov, Edison	Octet for Winds, mvt 2, row A	1991	0	1	3	2	4	5	8	7	6	11	9	10

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Denisov, Edison	Octet for Winds, mvt 2, row B	1991	0	6	11	5	4	10	9	3	2	8	1	7
Denisov, Edison	Sonata for Alto Saxophone and Piano, mvt 3, row A	1970	0	1	10	9	11	6	7	8	5	4	2	3
Denisov, Edison	Sonata for Alto Saxophone and Piano, mvt 3, row B	1970	0	4	7	11	3	6	9	2	5	8	1	10
Denisov, Edison	Variations	1961	0	1	9	6	8	10	4	3	7	11	5	2
Dessau, Paul	>Guernica< for piano	1937	0	7	6	2	10	11	5	9	1	3	4	8
Dessau, Paul	Les Voix	1939	0	11	6	8	9	3	4	10	5	7	2	1
Diamond, David	The World of Paul Klee, frame I	1958	0	5	8	4	9	3	1	11	2	6	10	7
Diamond, David	The World of Paul Klee, frame I, II	1958	0	7	11	3	4	10	6	8	9	1	5	2
Dobbins, Bill	Concerto for Jazz Orchestra	1999	0	9	7	4	3	1	10	11	8	6	5	2
Dzubay, David	Di,Con[ver(gence,sions)]	1988	0	9	8	4	7	6	1	10	3	5	11	2
Eder, Helmut	Concerto for violin and orchestra, Op.32	1960	0	9	6	2	11	3	8	1	7	5	10	4
Eisler, Hanns	>Spruch< for voice and piano	1939	0	3	11	9	5	8	4	1	2	10	7	6
Eisler, Hanns	An den Schlaf	1939	0	8	2	10	11	5	6	1	9	3	7	4
Eisler, Hanns	Chamber Symphony / Film music for "White Flood", row 1	1940	0	1	2	3	11	7	6	5	9	8	10	4
Eisler, Hanns	Chamber Symphony / Film music for "White Flood", row 2	1940	0	8	2	10	11	5	6	1	4	9	7	3
Eisler, Hanns	Der Zweck der Musik	1939	0	2	4	5	7	9	6	8	10	11	1	3
Eisler, Hanns	Deutsche Symphonie, mvt 4	1936-47	0	10	5	6	11	7	1	4	2	8	9	3
Eisler, Hanns	Deutsche Symphonie, mvt 5	1936-47	0	1	3	5	8	9	6	11	10	4	2	7
Eisler, Hanns	Deutsche Symphonie, mvt 7	1936-47	0	11	8	5	2	1	4	3	10	7	6	9

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Eisler, Hanns	Deutsche Symphonie, mvt 8	1936-47	0	3	1	11	2	10	8	9	6	7	5	4
Eisler, Hanns	Deutsche Symphonie, mvt 9	1936-47	0	4	1	10	8	6	3	11	9	2	5	7
Eisler, Hanns	Deutsche Symphonie, mvts 1, 10	1936-47	0	10	6	1	11	7	5	8	9	3	4	2
Eisler, Hanns	Deutsche Symphonie, mvts 2, 6	1936-47	0	3	11	9	5	8	4	7	6	2	1	10
Eisler, Hanns	Five Pieces for Orchestra, mvt 1	1938-40	0	6	2	3	10	9	11	5	8	7	1	4
Eisler, Hanns	Five Pieces for Orchestra, mvt 2	1938-40	0	2	3	1	11	7	5	4	8	10	9	6
Eisler, Hanns	Five Pieces for Orchestra, mvt 3	1938-40	0	3	2	1	5	4	6	9	8	11	10	7
Eisler, Hanns	Five Pieces for Orchestra, mvt 4	1938-40	0	10	9	8	6	7	3	4	5	11	1	2
Eisler, Hanns	Five Pieces for Orchestra, mvt 5	1938-40	0	2	6	4	10	9	11	1	7	5	8	3
Eisler, Hanns	Gegen den Krieg, Op.55	1936	0	3	2	5	4	7	6	8	9	10	1	11
Eisler, Hanns	Kleine Symphonie, Op.29, mvt 1	1931	0	10	11	8	5	4	1	2	3	9	7	6
Eisler, Hanns	Man lebt von einem Tage zu dem andern ("Kantate im Exil")	1937	0	10	11	3	1	8	7	4	2	6	9	5
Eisler, Hanns	Nonet (No. 1) / Film music for "The Living Land"	1939	0	3	5	7	10	4	2	9	8	6	11	1
Eisler, Hanns	Palmström, Op.5, No.2	1924-25	0	1	11	7	10	8	6	4	2	5	3	9
Eisler, Hanns	Palmström, Op.5, No.4	1924-25	0	11	2	8	3	9	6	7	10	1	4	5
Eisler, Hanns	Palmström, Op.5, No.5	1924-25	0	10	11	9	8	1	7	6	5	3	4	2
Eisler, Hanns	Praeludium und Fuge über B-A-C-H for String Trio, Op.46	1934	0	11	2	1	4	3	6	5	8	7	10	9
Eisler, Hanns	Sonata for Piano, No.2 ("in Form von Variationen"), Op.6, row variant 1	1924-25	0	4	6	3	2	1	9	10	7	8	5	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Eisler, Hanns	Sonata for Piano, No.2 ("in Form von Variationen"), Op.6, row variant 2	1924-25	0	4	3	2	6	1	9	10	7	8	5	11
Eisler, Hanns	Sonata for Piano, No.2 ("in Form von Variationen"), Op.6, row variant 3	1924-25	0	4	3	2	1	9	10	6	7	8	5	11
Eisler, Hanns	Sonata for Piano, No.2 ("in Form von Variationen"), Op.6, row variant 4	1924-25	0	4	3	2	9	6	10	1	7	5	8	11
Eisler, Hanns	Sonata for Piano, No.2 ("in Form von Variationen"), Op.6, row variant 5	1924-25	0	3	2	4	6	1	9	10	7	8	5	11
Eisler, Hanns	Sonata for violin and piano ("Reisesonate")	1937	0	5	9	4	2	3	1	11	10	6	7	8
Eisler, Hanns	Sonatina for Piano ("Gradus ad parnassum"), Op.44	1934	0	2	3	5	7	8	11	10	9	1	6	4
Eisler, Hanns	String Quartet	1938	0	9	3	2	11	1	4	5	10	7	8	6
Eisler, Hanns	Suite for Orchestra, No.1, mvt 4	1930	0	4	2	3	1	11	7	10	9	8	6	5
Eisler, Hanns	Variations for Piano	1941	0	3	10	6	5	8	1	11	2	4	7	9
Eisler, Hanns	Vierzehn Arten den Regen zu beschreiben / Film music for "Regen"	1941	0	6	7	4	5	3	2	1	11	9	10	8
Eisler, Hanns	Zwei Elegien, No.1 ("In die Städte kam ich")	1937	0	10	5	1	2	7	6	8	9	3	4	11
Eisler, Hanns	Zwei Elegien, No.2 (An die Überlebenden)	1937	0	1	4	3	2	6	8	11	10	9	5	7
Eröd, Ivan	Die Seidenraupen	1964-1968	0	4	6	3	1	10	8	11	9	5	2	7
Evans, Bill	Twelve Tone Tune	1971	0	10	2	3	1	11	4	6	9	8	5	7
Evans, Bill	Twelve Tone Tune Two	1972	0	9	11	1	10	3	2	6	4	5	8	7
Fano, Michel	Sonata for Two Pianos	1951	0	6	10	7	9	8	3	2	4	1	5	11
Ferneyhough, Brian	Superscriptio	1981	0	3	5	6	1	11	8	9	2	4	7	10
Fine, Irving	Fantasia for String Trio	1957	0	2	6	3	1	11	8	9	4	5	10	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Fine, Vivian	Chaconne for piano	1947	0	11	1	10	2	9	3	8	4	7	5	6
Fine, Vivian	Four Songs, No.1, "The Lover in Winter Plaineth For The Spring"	1933	0	10	2	7	6	9	11	8	4	5	1	3
Fine, Vivian	Four Songs, No.2, "Comfort To A Youth That Had Lost His Love"	1933	0	1	2	6	9	10	11	3	5	4	7	8
Finney, Ross Lee	Concerto for Alto Sax	1974	0	1	3	4	6	9	11	10	8	7	5	2
Finney, Ross Lee	Fantasy in Two Movements for solo violin	1958	0	1	3	5	4	2	11	10	8	6	7	9
Finney, Ross Lee	Sonata Quasi una Fantasia	1961	0	1	3	2	4	5	6	7	9	8	10	11
Florey, Hans	'Achteck' für Flöte, Violine und Klavier	1991/4/5	0	7	8	9	2	6	11	10	3	1	5	4
Florey, Hans	'Die Blume der Blumen' für Gesang und Viola	1983/9/19	0	3	4	8	9	6	1	7	10	11	2	5
Florey, Hans	'Fort, fort sind meine Rosen' für Gesang und Instrument	1985/7/29	0	7	6	3	5	9	2	10	8	4	1	11
Florey, Hans	'Jünglingstrauer' für Singstimme und Klavier	1983/10/16	0	11	2	8	9	4	10	1	6	5	3	7
Florey, Hans	Bildentwurf	1959	0	7	5	4	9	3	8	10	2	11	1	6
Florey, Hans	Die Aussicht	1986/8/2	0	9	11	8	2	10	5	6	7	4	3	1
Florey, Hans	Duo mit Schloßreihe	1998/11/14	0	6	9	7	5	11	2	3	10	8	1	4
Florey, Hans	Fragment für Gesang und Melodieinstrument	1986/1/5	0	6	3	4	11	10	9	5	1	7	8	2
Florey, Hans	Fünfstimmiger Kanon mit Krebs (für Gerhard Zeller)	1985/6/27	0	3	10	6	1	5	11	2	9	7	4	8
Florey, Hans	Fünfstimmiger Kanon mit Sonnenquadrat	1985/3/19	0	9	7	2	10	6	1	4	5	8	3	11
Florey, Hans	Grabgesang	2006/3/21	0	2	8	5	10	11	4	1	6	3	9	7
Florey, Hans	Griechisch-lateinisches Quadrat der Ordnung 4 mit Fuge in Klangnotation	2001/1977	0	9	3	7	4	10	2	6	1	8	11	5
Florey, Hans	Hexaeder für Klavier	1986/1/21	0	9	4	8	5	10	11	3	2	6	1	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Florey, Hans	Hälfte des Lebens	1986/11/29	0	3	4	1	7	11	6	9	10	8	2	5
Florey, Hans	I Ging	1980/10	0	7	2	10	11	6	5	1	9	8	4	3
Florey, Hans	Im Mondlicht	1988/1/5	0	1	4	6	5	3	11	10	9	7	8	3
Florey, Hans	Im Winter	1983/9/6	0	6	7	10	1	8	2	9	4	3	11	5
Florey, Hans	Kanonvariationen	1992/6	0	1	4	6	5	3	11	10	9	7	8	2
Florey, Hans	Klavierstück	1982/2/22	0	1	11	10	9	6	4	8	5	7	2	3
Florey, Hans	Kleiner Doppelkanon	1991/11/19	0	4	6	3	8	9	7	2	1	5	11	10
Florey, Hans	Magische Klangordnung	1978/11/7	0	5	7	4	1	2	3	9	10	6	8	11
Florey, Hans	Magischer Würfel mit 6 Spiegelpunkten	1983/1982	0	10	1	7	4	6	5	8	3	9	2	11
Florey, Hans	Magisches Quadrat der Ordnung 3	1992/1973	0	4	6	3	8	9	7	2	1	5	11	10
Florey, Hans	Polare Doppelzeichen-Kreise	1991/11/21	0	2	11	4	5	3	10	9	1	7	6	8
Florey, Hans	Sechs Kanonzyklen einunddesselben magischen Quadrates	1982/9	0	10	1	7	4	6	5	8	3	9	2	11
Florey, Hans	Trigramme	1991/10/15	0	8	9	7	6	4	3	5	10	11	1	2
Florey, Hans	Triptychon	2005/6/23	0	8	9	3	7	2	1	10	5	6	11	4
Florey, Hans	Zwölftonspiel für Streichquartett. 3. Dezember 1965	1965/12/3	0	10	2	5	3	4	1	8	9	6	7	11
Fortner, Wolfgang	Sieben Elegien	1951	0	10	5	8	1	11	9	6	7	4	2	3
Frankel, Benjamin	The Curse of the Werewolf	1961	0	3	2	1	4	8	11	5	10	7	6	9
Gerhard, Roberto	Capriccio for Solo Flute	1949	0	11	9	3	1	10	8	6	4	7	2	5
Gerhard, Roberto	Chaconne for Unaccompanied Violin	1959	0	11	4	2	1	3	9	10	8	6	5	7
Gerhard, Roberto	Concert for 8	1962	0	8	11	2	1	4	9	6	3	10	5	7
Gerhard, Roberto	Concerto for Harpsichord, String Orchestra, and Percussion	1955-56	0	2	8	7	11	5	1	4	3	6	9	10

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Gerhard, Roberto	Concerto for Piano and String Orchestra	1951	0	4	1	11	10	3	6	5	9	8	2	7
Gerhard, Roberto	Concerto for Violin and Orchestra	1942-43	0	8	7	1	11	10	5	9	4	6	3	2
Gerhard, Roberto	Gemini	1966	0	11	3	1	5	4	8	6	7	2	9	10
Gerhard, Roberto	Hymnody	1963	0	10	11	8	2	9	4	5	1	6	7	3
Gerhard, Roberto	Leo	1969	0	2	1	6	5	7	3	8	9	10	4	11
Gerhard, Roberto	Libra	1968	0	6	1	7	2	8	4	9	5	10	11	3
Gerhard, Roberto	Nonet	1956-57	0	11	1	3	5	4	10	8	2	7	9	6
Gerhard, Roberto	Sonata for Cello and Piano	1956	0	2	10	11	5	6	4	3	7	8	1	9
Gerhard, Roberto	String Quartet	1950-55	0	7	8	2	6	10	9	11	4	5	1	3
Gerhard, Roberto	String Quartet, No.2	1961	0	1	5	2	8	7	10	9	6	11	4	3
Gerhard, Roberto	Symphony, No.1	1952-53	0	11	8	5	10	9	6	3	4	2	1	7
Gerhard, Roberto	Symphony, No.2	1957-59	0	8	1	7	5	6	10	11	2	3	9	4
Gerhard, Roberto	The Plague	1963-64	0	1	9	11	8	10	4	5	6	2	3	7
Gerhard, Roberto	Three Impromptus	1950	0	8	1	10	4	6	7	5	3	2	9	11
Geßler, Florian	Die Dinge des Lebens (Klavierquartett)	11/2010	0	9	3	1	7	2	5	11	4	10	8	6
Gielen, Michael	Six Songs, for bass, violin, viola, clarinet, bass clarinet, and piano	1958	0	5	1	4	2	3	9	8	10	7	11	6
Ginastera, Alberto	Cantata para América Mágica, Op.27	1960	0	7	6	5	10	11	8	1	2	9	4	3
Ginastera, Alberto	Don Rodrigo, Op.31, Row Class 1	1963-64	0	1	6	7	8	2	10	11	5	4	9	3
Ginastera, Alberto	Don Rodrigo, Op.31, Row Class 2	1963-64	0	11	2	3	4	1	6	5	8	9	10	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Ginastera, Alberto	Don Rodrigo, Op.31, Row Class 3	1963-64	0	5	6	11	2	1	8	7	10	4	9	3
Ginastera, Alberto	Don Rodrigo, Op.31, Row Class 4	1963-64	0	9	10	11	6	5	8	7	2	3	4	1
Ginastera, Alberto	Don Rodrigo, Op.31, Row Class 5	1963-64	0	1	7	6	5	11	2	8	9	10	4	3
Ginastera, Alberto	Don Rodrigo, Op.31, Row Class 6	1963-64	0	11	1	2	5	4	6	7	10	8	9	3
Ginastera, Alberto	Don Rodrigo, Op.31, Row Class 7	1963-64	0	1	8	2	7	6	5	11	9	10	4	3
Ginastera, Alberto	Don Rodrigo, Op.31, Row Class 8	1963-64	0	1	7	6	8	9	3	2	4	5	11	10
Ginastera, Alberto	Don Rodrigo, Op.31, Row Class 9	1963-64	0	11	3	4	7	10	6	5	9	1	2	8
Ginastera, Alberto	Piano Concerto, No.1, Op.28	1961	0	11	5	1	8	2	7	6	10	4	9	3
Ginastera, Alberto	Quintet, Op.29, Row Class III 1	1963	0	11	1	8	2	7	10	3	9	4	6	5
Ginastera, Alberto	Quintet, Op.29, Row Class III 2	1963	0	11	1	8	2	7	5	6	4	9	3	10
Ginastera, Alberto	Quintet, Op.29, Row Class V	1963	0	5	4	7	3	2	6	9	8	1	10	11
Ginastera, Alberto	Quintet, Op.29, Row Class VII 1	1963	0	9	10	11	4	3	6	2	1	5	8	7
Ginastera, Alberto	Quintet, Op.29, Row Class VII 2	1963	0	11	1	8	2	7	5	6	4	9	3	10
Ginastera, Alberto	Quintet, Op.29, Row Class VII S	1963	0	11	1	10	2	9	3	8	4	7	5	6
Ginastera, Alberto	Quintet, Op.29, mvt.III	1963	0	7	3	10	2	6	9	1	4	8	11	5
Ginastera, Alberto	Sonata for Cello and Piano, Op.49	1979	0	3	2	1	10	11	8	9	5	4	7	6
Ginastera, Alberto	Sonata for Guitar, Op.47, mvts II and III, Row Class II 1	1976	0	11	10	9	8	7	6	5	4	3	2	1
Ginastera, Alberto	Sonata for Guitar, Op.47, mvts II and III, Row Class II 2	1976	0	3	6	9	2	5	8	11	4	7	10	1

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Ginastera, Alberto	Sonata for Guitar, Op.47, mvts II and III, Row Class II 3	1976	0	9	3	2	11	6	5	1	8	7	4	10
Ginastera, Alberto	Sonata for Guitar, Op.47, mvts II and III, Row Class II 4	1976	0	2	1	5	3	4	7	8	6	10	9	11
Ginastera, Alberto	Sonata for Guitar, Op.47, mvts II and III, Row Class II 5	1976	0	7	1	6	4	11	5	10	8	3	9	2
Ginastera, Alberto	Sonata for Guitar, Op.47, mvts II and III, Row Class II 6	1976	0	11	4	3	8	7	1	2	9	10	5	6
Ginastera, Alberto	Sonata for Guitar, Op.47, mvts II and III, Row Class II 7	1976	0	9	10	11	8	7	6	3	4	5	2	1
Ginastera, Alberto	Sonata for Guitar, Op.47, mvts II and III, Row Class III	1976	0	11	7	4	2	9	3	8	10	1	5	6
Ginastera, Alberto	Sonata for Guitar, Op.47, mvts II and III, Row Class III S	1976	0	6	11	5	8	2	7	1	4	10	3	9
Ginastera, Alberto	String Quartet, No.2, Op.26	1958	0	5	11	2	8	1	9	10	7	4	3	6
Ginastera, Alberto	Turbæ ad Passionem Gregorianam, Op.43, mvt II	1974	0	5	1	7	6	11	8	2	3	4	9	10
Ginastera, Alberto	Violin Concerto, Op.30	1963	0	11	2	3	4	1	6	5	8	9	10	7
Goehr, Alexander	Little Symphony, Op.15	1963	0	3	7	10	6	4	5	2	9	8	11	1
Goehr, Alexander	Piano Trio, Op.20	1966	0	6	7	4	3	8	5	9	11	2	10	1
Goehr, Alexander	Sonata in One Movement, Op.2	1953-55	0	2	7	1	4	10	6	9	11	8	5	3
Goehr, Alexander	Violin Concerto, Op.13	1962	0	8	2	1	3	11	5	10	7	6	4	9
Goeyvaerts, Karel	'Opus 2 for 13 Instruments' aka 'Nummer 2'	1951	0	7	6	5	8	9	4	3	10	11	2	1
Goeyvaerts, Karel	Sonata for Two Pianos, aka 'Opus 1', 'Nummer 1'	1950-51	0	8	1	11	10	4	6	5	2	7	3	9

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Goeyvaerts, Karel	Violin concerto, No.2	1951/1950	0	11	7	1	2	9	10	8	5	6	3	4
Gotham, Mark	4x4x4x4, row 1	2021	0	2	6	10	5	3	8	9	11	7	4	1
Gotham, Mark	4x4x4x4, row 2	2021	0	2	6	10	11	9	8	3	5	1	4	7
Gotham, Mark	4x4x4x4, row 3	2021	0	2	6	10	7	4	11	9	8	3	5	1
Gotham, Mark	4x4x4x4, row 4	2021	0	2	6	10	1	4	5	3	8	9	11	7
Gotham, Mark	Move On!	2022	0	4	3	10	6	9	1	5	2	8	11	7
Hamel, Peter Michael	'Klangspirale' für 13 Spieler oder drei Orchestergruppen	1977	0	10	5	9	3	4	1	6	8	11	2	7
Harrison, Lou	A Twelve-Tone Morning After to Amuse Henry	1944-45	0	2	3	4	9	8	7	10	11	6	5	1
Harrison, Lou	Rapunzel	1952	0	11	4	3	7	6	10	9	2	1	8	5
Harrison, Lou	Suite for Piano	1943	0	1	6	2	5	7	11	4	9	8	10	3
Harrison, Lou	Symphony on G	1947-64	0	1	5	4	3	10	11	7	6	2	9	8
Harrison, Lou	Untitled Piano Piece	1937	0	10	4	3	9	7	2	8	6	1	11	5
Hartmann, Karl Amadeus	Symphony, No.4	1947-1948	0	1	3	2	11	4	5	10	7	6	8	9
Hauer, Jose Matthias	XXXII. Zwölftonspiel; für Violine, Bratsche und Cello	1946/8/19	0	2	6	1	10	9	5	8	11	7	4	3
Hauer, Josef Matthias	'Almanach 1957' [Zwölftonspiel] für vier Violinen	1956	0	2	6	5	1	9	8	3	7	4	10	11
Hauer, Josef Matthias	'Atonale Musik'. Klavierstücke 1922., Op.20	1920-1922	0	7	4	9	5	8	3	11	2	6	1	10
Hauer, Josef Matthias	'Der Menschen Weg', Op.67	1952/1934	0	8	5	4	10	2	7	9	1	3	11	6
Hauer, Josef Matthias	'Die schwarze Spinne', Op.62	1932/7/27	0	4	10	1	5	8	11	2	7	9	6	3

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	'Durch Dick und Dünn zum Staatsvertrag'. Marsch für Klavier zu vier Händen	1955/5/20	0	4	5	1	8	11	3	9	6	10	7	2
Hauer, Josef Matthias	'Emilie vor ihrem Brauttag' (Friedrich Hölderlin) für Altsolo und Orchester, Op.58	1928/11/9-28	0	8	3	4	11	6	9	10	2	1	5	7
Hauer, Josef Matthias	'Empedokles', dramatische Gesänge in zwei Teilen für Soli Männerchor und Orchester; Opus 68	1935/6-09	0	6	10	5	7	9	1	4	11	8	3	2
Hauer, Josef Matthias	'Kaleidoskop' für Orchester	1956/8/20	0	9	6	7	3	8	2	4	11	1	5	10
Hauer, Josef Matthias	'Musik für Schule und Haus I' 22. September 1956. für zwei Violinen und Klavier	1956/9/22	0	5	1	3	6	11	7	8	2	10	4	9
Hauer, Josef Matthias	'Musik für Schule und Haus II' 22. September 1956. für Violine, Bratsche und Klavier	1956/9/22	0	7	8	1	6	5	10	2	11	9	3	4
Hauer, Josef Matthias	'Salambo', opera after Gustave Flaubert;., Op.60	1929/5-8	0	6	9	2	8	10	4	7	1	11	3	5
Hauer, Josef Matthias	'Tanz tibetanischer Mönche' im langsamen 3/4 Takt) [Zwölftonspiel]. 8. September 1956	1956/9/8	0	7	8	6	3	1	11	2	10	5	9	4
Hauer, Josef Matthias	'Wandlungen' (chamber-oratorio for stage or concert, for six solo-voices, choir and orchestra; after words of Friedrich Hölderlin), Op.53	1927/12/5	0	5	11	4	10	1	6	8	9	3	7	2
Hauer, Josef Matthias	1. canonic Example from the theoretical work 'Zwölftontechnik'	1925/10	0	1	4	6	5	3	11	10	9	7	8	2
Hauer, Josef Matthias	Apokalyptische Phantasie, Op.5	1913/ September-Oktober/ 16.9.-23.10	0	1	11	9	6	10	4	8	2	5	7	3
Hauer, Josef Matthias	Baustein	1920	0	8	11	1	6	10	4	2	3	5	9	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Divertimento für kleines Orchester, Op.61	1930/5/5	0	7	5	1	2	11	6	4	8	10	3	9
Hauer, Josef Matthias	Erste Suite für Orchester	1924/6	0	7	5	10	1	11	9	4	6	2	8	3
Hauer, Josef Matthias	Fünfte Tanzfantasie für kleines Orchester, Opus 66	1933/12/17	0	10	4	7	8	11	6	2	5	9	3	1
Hauer, Josef Matthias	Harmonie - Melodie - Rhythmus - in kristallischer Bindung - im vierfachen Kontrapunkt [Zwölftonspiel] für Zwölftonorchester	1956/8/23	0	2	10	9	6	5	1	4	7	11	8	3
Hauer, Josef Matthias	Hausmusik [Zwölftonspiel] für Klavier zu vier Händen. September 1958	1958/9/11	0	9	6	11	4	1	10	5	2	8	3	7
Hauer, Josef Matthias	Hausmusik [Zwölftonspiel] für zwei Violinen und Klavier	1955/4/6	0	1	5	3	7	10	9	6	11	4	2	8
Hauer, Josef Matthias	Hölderlinrezitation	1949/4/30	0	4	1	2	11	7	5	10	3	6	8	9
Hauer, Josef Matthias	Kammermusik [Zwölftonspiel] für Flöte, Oboe, Baßklarinette, Fagott, zwei Violinen, Bratsche, Cello und Klavier zu vier Händen. 24. Jänner 1957	1957/1/24	0	9	3	7	5	10	1	6	11	4	2	8
Hauer, Josef Matthias	Klavierkonzert, Op.55	1928/4-5	0	1	9	2	10	3	5	11	7	8	4	6
Hauer, Josef Matthias	Klavierstücke mit Überschriften nach Worten von Friedrich Hölderlin, Op.25 ;, No.10	1923	0	6	11	10	9	5	2	3	7	1	4	8
Hauer, Josef Matthias	Labyrinthischer Tanz [Zwölftonspiel] für Klavier zu vier Händen. 16. November 1952	1952/11/16	0	3	8	7	2	10	6	1	11	9	4	5
Hauer, Josef Matthias	Langsamer Walzer [Zwölftonspiel] für Orchester. 10. Jänner 1957	1957/1/10	0	8	10	2	3	6	1	9	7	4	11	5

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Langsamer Walzer [Zwölftonspiel] für Orchester. 19. Jänner 1957	1957/1/19	0	10	1	5	7	2	9	11	6	3	8	4
Hauer, Josef Matthias	Langsamer Walzer [Zwölftonspiel] für zwei Violinen, Bratsche, Cello und Klavier zu zwei Händen	1955/9/24	0	6	2	11	10	7	3	4	5	9	1	8
Hauer, Josef Matthias	Lateinische Messe, Op.46 für gemischten Chor, Orchester und Orgel	1926	0	8	5	4	11	7	1	3	10	2	6	9
Hauer, Josef Matthias	Nomos	1919	0	5	7	3	9	6	11	2	8	4	1	10
Hauer, Josef Matthias	Nomos, Op.19 (bb.1-36)	1919/8/25-29	0	5	7	3	9	6	11	2	8	4	1	10
Hauer, Josef Matthias	Nomos, Op.19 (bb.101-102)	1919/8/25-29	0	7	4	2	1	10	9	11	8	6	3	5
Hauer, Josef Matthias	Nomos, Op.19 (bb.103-105)	1919/8/25-29	0	3	9	10	8	1	6	7	2	11	5	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.106-108)	1919/8/25-29	0	10	6	1	7	4	9	5	3	8	11	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.111-113)	1919/8/25-29	0	5	9	8	4	3	10	2	1	7	6	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.117-118)	1919/8/25-29	0	4	5	11	7	10	3	9	6	2	1	8
Hauer, Josef Matthias	Nomos, Op.19 (bb.119-120)	1919/8/25-29	0	10	8	6	5	7	9	2	3	1	11	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.123-124)	1919/8/25-29	0	8	11	5	3	7	4	9	1	6	10	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.125-126)	1919/8/25-29	0	11	1	10	6	8	9	5	7	3	2	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.129-130)	1919/8/25-29	0	9	10	4	3	7	6	2	1	8	11	5
Hauer, Josef Matthias	Nomos, Op.19 (bb.131-132)	1919/8/25-29	0	9	8	2	11	3	6	5	10	7	4	1
Hauer, Josef Matthias	Nomos, Op.19 (bb.133-134)	1919/8/25-29	0	8	5	11	2	7	4	6	3	1	10	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.134-137)	1919/8/25-29	0	2	1	4	5	9	6	8	10	7	11	3

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Nomos, Op.19 (bb.136-138)	1919/8/25-29	0	1	9	8	4	7	3	6	5	11	10	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.138-140)	1919/8/25-29	0	3	4	2	5	6	8	7	10	11	1	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.139-141)	1919/8/25-29	0	2	10	1	11	9	8	5	6	4	7	3
Hauer, Josef Matthias	Nomos, Op.19 (bb.141-142)	1919/8/25-29	0	5	3	4	1	11	2	6	8	9	10	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.141-143)	1919/8/25-29	0	10	11	3	5	6	7	2	1	4	8	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.142-143)	1919/8/25-29	0	11	10	1	5	3	8	6	9	4	7	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.143-145)	1919/8/25-29	0	9	10	2	1	11	4	6	7	5	8	3
Hauer, Josef Matthias	Nomos, Op.19 (bb.148-150)	1919/8/25-29	0	6	5	3	2	7	8	4	1	11	9	10
Hauer, Josef Matthias	Nomos, Op.19 (bb.151-153)	1919/8/25-29	0	7	2	4	6	1	5	3	9	10	8	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.154-155)	1919/8/25-29	0	5	6	4	9	1	2	7	10	11	8	3
Hauer, Josef Matthias	Nomos, Op.19 (bb.159-161)	1919/8/25-29	0	5	1	8	10	4	6	7	3	9	11	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.171-174)	1919/8/25-29	0	7	1	3	9	6	8	11	10	5	4	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.175-178)	1919/8/25-29	0	10	1	2	6	5	3	4	8	9	7	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.180-185)	1919/8/25-29	0	1	3	11	6	7	8	5	4	9	10	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.186-191)	1919/8/25-29	0	4	3	9	7	5	2	6	8	11	1	10
Hauer, Josef Matthias	Nomos, Op.19 (bb.192-193)	1919/8/25-29	0	9	6	2	8	4	7	10	1	3	5	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.194-195)	1919/8/25-29	0	4	2	3	6	9	5	1	8	7	11	10
Hauer, Josef Matthias	Nomos, Op.19 (bb.196-197)	1919/8/25-29	0	2	8	6	11	5	4	10	7	3	1	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.198-201)	1919/8/25-29	0	8	9	11	3	5	6	1	2	7	10	4

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Nomos, Op.19 (bb.202-203)	1919/8/25-29	0	1	3	10	7	9	2	11	4	6	8	5
Hauer, Josef Matthias	Nomos, Op.19 (bb.204-207)	1919/8/25-29	0	2	3	1	9	7	6	4	11	5	10	8
Hauer, Josef Matthias	Nomos, Op.19 (bb.208-212)	1919/8/25-29	0	9	7	2	5	1	10	6	11	4	3	8
Hauer, Josef Matthias	Nomos, Op.19 (bb.213-216)	1919/8/25-29	0	2	6	1	10	4	5	8	11	7	3	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.215-219)	1919/8/25-29	0	3	8	2	6	5	4	1	10	11	9	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.220-224)	1919/8/25-29	0	10	7	4	5	8	3	11	9	2	1	6
Hauer, Josef Matthias	Nomos, Op.19 (bb.224-228)	1919/8/25-29	0	1	9	3	4	5	10	11	6	2	8	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.228-230)	1919/8/25-29	0	2	9	6	5	10	7	3	8	1	4	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.231-233)	1919/8/25-29	0	6	10	3	2	8	9	5	4	1	11	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.234-237)	1919/8/25-29	0	11	3	1	7	4	9	6	5	10	2	8
Hauer, Josef Matthias	Nomos, Op.19 (bb.238-240)	1919/8/25-29	0	6	11	9	2	1	5	7	8	10	4	3
Hauer, Josef Matthias	Nomos, Op.19 (bb.241-243)	1919/8/25-29	0	2	8	1	4	9	5	6	3	11	10	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.244-246)	1919/8/25-29	0	9	7	10	11	4	6	8	1	2	3	5
Hauer, Josef Matthias	Nomos, Op.19 (bb.247-250)	1919/8/25-29	0	9	6	4	11	7	5	10	3	8	2	1
Hauer, Josef Matthias	Nomos, Op.19 (bb.251-254)	1919/8/25-29	0	9	8	1	4	3	5	7	6	2	11	10
Hauer, Josef Matthias	Nomos, Op.19 (bb.255-257)	1919/8/25-29	0	7	2	6	5	10	3	4	11	8	1	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.257-262)	1919/8/25-29	0	7	3	8	4	2	9	1	11	6	10	5
Hauer, Josef Matthias	Nomos, Op.19 (bb.262-263)	1919/8/25-29	0	11	2	5	1	6	9	7	10	3	4	8
Hauer, Josef Matthias	Nomos, Op.19 (bb.264-267)	1919/8/25-29	0	7	5	4	1	8	3	9	2	6	10	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Nomos, Op.19 (bb.272-276)	1919/8/25-29	0	1	5	3	7	2	8	10	4	6	11	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.280-283)	1919/8/25-29	0	5	6	9	7	4	3	8	11	1	10	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.284-287)	1919/8/25-29	0	1	11	7	6	4	10	5	2	8	3	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.288-291)	1919/8/25-29	0	2	10	7	4	6	11	3	5	1	8	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.292-294)	1919/8/25-29	0	9	2	6	3	5	10	1	11	7	4	8
Hauer, Josef Matthias	Nomos, Op.19 (bb.297-300)	1919/8/25-29	0	11	8	6	5	10	1	4	3	9	2	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.301-305)	1919/8/25-29	0	10	2	9	8	1	5	6	11	3	7	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.306-309)	1919/8/25-29	0	2	7	8	1	4	9	10	3	6	5	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.307-309)	1919/8/25-29	0	4	9	3	2	5	11	1	10	7	6	8
Hauer, Josef Matthias	Nomos, Op.19 (bb.315-317)	1919/8/25-29	0	8	1	3	7	10	4	5	11	2	9	6
Hauer, Josef Matthias	Nomos, Op.19 (bb.321-324)	1919/8/25-29	0	6	10	1	3	5	9	4	2	8	11	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.325-328)	1919/8/25-29	0	5	4	2	7	6	3	11	1	8	10	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.328-332)	1919/8/25-29	0	3	2	7	6	10	9	11	8	5	1	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.331-334)	1919/8/25-29	0	4	3	2	1	11	7	10	5	6	8	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.337-338)	1919/8/25-29	0	1	11	5	4	3	8	9	2	10	6	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.348-353)	1919/8/25-29	0	11	9	5	10	4	6	8	3	2	1	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.356-358)	1919/8/25-29	0	6	9	5	4	2	11	3	10	8	7	1
Hauer, Josef Matthias	Nomos, Op.19 (bb.358-361)	1919/8/25-29	0	10	8	1	11	7	2	6	5	9	4	3
Hauer, Josef Matthias	Nomos, Op.19 (bb.362-365)	1919/8/25-29	0	7	5	3	10	8	4	2	9	6	11	1

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Nomos, Op.19 (bb.366-371)	1919/8/25-29	0	5	1	7	3	2	4	8	11	6	10	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.37-39)	1919/8/25-29	0	8	5	1	9	2	4	6	10	3	7	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.372-375)	1919/8/25-29	0	8	6	1	10	11	5	9	7	4	3	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.376-378)	1919/8/25-29	0	11	9	3	4	8	7	10	2	1	6	5
Hauer, Josef Matthias	Nomos, Op.19 (bb.379-382)	1919/8/25-29	0	7	3	10	5	6	4	1	2	9	11	8
Hauer, Josef Matthias	Nomos, Op.19 (bb.383-386)	1919/8/25-29	0	3	1	4	10	8	11	2	5	7	9	6
Hauer, Josef Matthias	Nomos, Op.19 (bb.387-390)	1919/8/25-29	0	3	7	4	10	1	11	9	6	8	2	5
Hauer, Josef Matthias	Nomos, Op.19 (bb.391-394)	1919/8/25-29	0	10	11	9	7	4	8	5	1	3	6	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.395-402)	1919/8/25-29	0	2	7	10	6	5	8	9	11	3	1	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.40-42)	1919/8/25-29	0	10	1	11	7	2	6	5	3	8	9	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.403-409)	1919/8/25-29	0	11	2	10	8	1	5	3	4	6	7	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.411-414)	1919/8/25-29	0	2	8	3	5	6	7	4	9	10	1	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.422-425)	1919/8/25-29	0	6	4	2	10	9	8	5	11	7	1	3
Hauer, Josef Matthias	Nomos, Op.19 (bb.425-427)	1919/8/25-29	0	8	10	7	4	2	3	5	6	11	1	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.428-429)	1919/8/25-29	0	10	4	6	5	3	1	9	7	8	2	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.430-432)	1919/8/25-29	0	6	8	10	9	2	7	1	3	4	5	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.433-435)	1919/8/25-29	0	3	11	4	9	5	8	6	7	10	1	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.438-441)	1919/8/25-29	0	1	10	8	9	4	3	5	7	11	6	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.441-445)	1919/8/25-29	0	1	9	8	10	4	6	5	7	2	3	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Nomos, Op.19 (bb.45-47)	1919/8/25-29	0	10	6	1	5	4	11	8	2	3	7	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.451-453)	1919/8/25-29	0	2	4	1	6	11	3	8	9	7	5	10
Hauer, Josef Matthias	Nomos, Op.19 (bb.452-455)	1919/8/25-29	0	5	7	8	1	2	3	4	6	11	10	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.455-456)	1919/8/25-29	0	5	9	4	6	1	10	3	7	2	8	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.457-458)	1919/8/25-29	0	3	4	5	8	1	6	11	9	10	2	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.459-460)	1919/8/25-29	0	9	1	8	5	2	3	11	7	10	6	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.46-51)	1919/8/25-29	0	11	10	2	6	9	1	8	3	7	4	5
Hauer, Josef Matthias	Nomos, Op.19 (bb.463-464)	1919/8/25-29	0	4	6	7	3	9	1	10	8	11	5	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.467-471)	1919/8/25-29	0	5	9	1	7	2	10	4	11	8	3	6
Hauer, Josef Matthias	Nomos, Op.19 (bb.471-472)	1919/8/25-29	0	3	11	1	6	9	2	8	5	7	10	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.473-474)	1919/8/25-29	0	6	9	1	3	11	8	4	5	7	10	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.475-479)	1919/8/25-29	0	9	10	6	7	5	2	3	8	4	1	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.479-483)	1919/8/25-29	0	6	10	9	7	8	11	4	5	3	2	1
Hauer, Josef Matthias	Nomos, Op.19 (bb.486-490)	1919/8/25-29	0	10	1	4	9	5	6	8	7	3	2	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.490-494)	1919/8/25-29	0	5	11	6	9	2	8	7	10	4	1	3
Hauer, Josef Matthias	Nomos, Op.19 (bb.494-496)	1919/8/25-29	0	7	8	5	6	11	2	3	9	4	1	10
Hauer, Josef Matthias	Nomos, Op.19 (bb.496-498)	1919/8/25-29	0	10	9	4	3	7	5	8	1	2	6	11
Hauer, Josef Matthias	Nomos, Op.19 (bb.498-501)	1919/8/25-29	0	3	1	10	7	6	2	11	8	5	4	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.50-53)	1919/8/25-29	0	2	10	4	5	3	6	7	1	8	9	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Nomos, Op.19 (bb.501-503)	1919/8/25-29	0	5	7	1	3	2	6	10	11	8	9	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.503-507)	1919/8/25-29	0	10	1	2	3	5	7	11	4	8	9	6
Hauer, Josef Matthias	Nomos, Op.19 (bb.509-511)	1919/8/25-29	0	10	11	7	3	6	1	8	2	5	9	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.511-514)	1919/8/25-29	0	10	1	4	6	2	9	7	11	8	5	3
Hauer, Josef Matthias	Nomos, Op.19 (bb.517-521)	1919/8/25-29	0	2	10	11	6	4	5	1	3	9	8	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.52-56)	1919/8/25-29	0	3	2	9	5	4	8	1	7	10	11	6
Hauer, Josef Matthias	Nomos, Op.19 (bb.522-526)	1919/8/25-29	0	8	1	6	3	11	10	2	9	4	5	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.525-527)	1919/8/25-29	0	10	3	9	7	1	11	2	6	4	8	5
Hauer, Josef Matthias	Nomos, Op.19 (bb.528-531)	1919/8/25-29	0	6	7	5	8	10	9	11	4	2	1	3
Hauer, Josef Matthias	Nomos, Op.19 (bb.55-59)	1919/8/25-29	0	11	1	4	3	9	10	8	7	6	5	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.60-63)	1919/8/25-29	0	4	1	2	9	8	10	5	11	3	6	7
Hauer, Josef Matthias	Nomos, Op.19 (bb.64-67)	1919/8/25-29	0	6	9	11	8	5	4	3	1	2	7	10
Hauer, Josef Matthias	Nomos, Op.19 (bb.68-71)	1919/8/25-29	0	5	6	10	7	9	4	1	2	8	11	3
Hauer, Josef Matthias	Nomos, Op.19 (bb.72-73)	1919/8/25-29	0	1	7	11	4	3	9	6	5	2	10	8
Hauer, Josef Matthias	Nomos, Op.19 (bb.73-78)	1919/8/25-29	0	8	7	2	4	11	1	3	6	5	10	9
Hauer, Josef Matthias	Nomos, Op.19 (bb.82-83)	1919/8/25-29	0	2	11	8	5	10	9	1	7	3	4	6
Hauer, Josef Matthias	Nomos, Op.19 (bb.84-87)	1919/8/25-29	0	10	1	11	5	3	2	6	7	8	9	4
Hauer, Josef Matthias	Nomos, Op.19 (bb.87-90)	1919/8/25-29	0	1	11	9	8	7	10	6	4	3	5	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.91-92)	1919/8/25-29	0	4	10	1	2	7	6	8	5	9	11	3

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Nomos, Op.19 (bb.93-94)	1919/8/25-29	0	1	10	8	6	2	9	4	11	7	5	3
Hauer, Josef Matthias	Nomos, Op.19 (bb.95-96)	1919/8/25-29	0	1	4	7	8	6	11	9	10	5	3	2
Hauer, Josef Matthias	Nomos, Op.19 (bb.97-98)	1919/8/25-29	0	9	8	7	4	3	2	10	1	11	5	6
Hauer, Josef Matthias	Nomos, Op.19 (bb.99-100)	1919/8/25-29	0	5	3	9	1	10	4	11	8	7	2	6
Hauer, Josef Matthias	Nomos, Op.19 (row 1)	1919/8/25-29	0	8	9	5	4	6	10	11	7	1	2	3
Hauer, Josef Matthias	Nomos, Op.19 (row 2)	1919/8/25-29	0	6	10	4	3	2	8	7	11	9	5	1
Hauer, Josef Matthias	Paraphonie [Zwölftonspiel] für Bratsche und Klavier	1947/4/24	0	4	10	5	8	1	11	7	2	9	6	3
Hauer, Josef Matthias	Romantische Phantasie für Orchester	1925/6	0	10	8	5	1	9	4	11	3	7	6	2
Hauer, Josef Matthias	Sakraler Tanz [Zwölftonspiel] für Orchester	1957/3/2	0	3	10	8	5	2	9	1	11	6	4	7
Hauer, Josef Matthias	Schulmusik für zwei Klaviere. 3. Oktober 1958	1958/10/3	0	9	6	11	4	1	10	5	2	8	3	7
Hauer, Josef Matthias	Sechste Suite für Orchester, Op.47	1926	0	9	6	2	8	3	10	11	7	4	5	1
Hauer, Josef Matthias	Sieben Charakterstücke mit Überschriften für Violine allein, Op.56	1928/5/17	0	7	10	11	4	6	8	3	5	2	9	1
Hauer, Josef Matthias	Sinfonietta in drei Sätzen (Symphonische Stücke für großes Orchester), Op.50	1927	0	1	3	5	10	9	6	11	2	4	8	7
Hauer, Josef Matthias	Streichquartett [Zwölftonspiel]. 27. August 1956	1956/8/27	0	6	11	8	3	7	2	10	4	1	9	5
Hauer, Josef Matthias	Symphonische Stücke für Streichorchester, Klavier und Harmonium, Op.49	1926/12	0	4	6	3	2	8	1	11	10	7	9	5

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Tanz [Zwölftonspiel] im langsamen 3/4 Takt für Klavier zu vier Händen. 26. Mai 1958	1958/5/26	0	2	9	6	1	4	10	3	7	5	11	8
Hauer, Josef Matthias	Tanz [Zwölftonspiel] im langsamen 3/4 Takt für Violine, Bratsche und Klavier zu vier Händen. 6. September 1958	1958/9/6	0	9	6	11	4	1	10	5	2	8	3	7
Hauer, Josef Matthias	Tanz [Zwölftonspiel] im langsamen 3/4 Takt für zwei Violinen, zwei Bratschen und Klavier zu zwei Händen	1958/6/9	0	9	3	7	4	10	2	6	1	8	11	5
Hauer, Josef Matthias	Tanz [Zwölftonspiel] im langsamen 4/4 Takt für zwei Violinen, zwei Bratschen und Klavier. August 1958	1958/8/28	0	8	3	11	2	7	5	9	1	6	4	10
Hauer, Josef Matthias	Tanz für Violine allein	1954	0	7	3	4	10	9	2	8	11	1	6	5
Hauer, Josef Matthias	Tanz im langsamen 3/4 Takt [Zwölftonspiel] für zwei Violinen, zwei Bratschen und Klavier zu zwei Händen	1958/6/9	0	3	10	2	11	6	8	7	4	9	1	5
Hauer, Josef Matthias	VIII. Zwölftonspiel für Orchester. Juni 1943	1943/6/18	0	5	10	8	4	2	11	9	3	1	7	6
Hauer, Josef Matthias	Vierte Tanzsuite für neun Soloinstrumente	1937	0	5	2	6	4	11	10	7	9	3	8	1
Hauer, Josef Matthias	Violinkonzert, Op.54 (9. März - 6. April 1928)	1928/3-4	0	7	6	8	4	11	1	10	5	9	2	3
Hauer, Josef Matthias	XV. Zwölftönespiel für Orchester	1944/4/16 & 23	0	9	8	3	1	11	5	6	7	10	2	4

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	XXI. Zwölftonspiel für Orchester; mit einer Zwölftonreihe, die in sechs Tropen steht, und vom Kulturreferenten der Stadt Wien Dr. Viktor Matejka gewählt wurde. Erster Teil 2,4-Takt (Halbe = 50) mit achttaktigen Perioden; zweiter Teil im 3/4 Takt (punktierte Halbe = 40) mit sechstaktigen Perioden	1945/6/23	0	3	4	9	11	10	1	7	6	2	5	8
Hauer, Josef Matthias	XXII. Zwölftonspiel für Klavier	1946	0	2	11	6	7	10	1	3	8	4	9	5
Hauer, Josef Matthias	XXIII. Zwölftonspiel für Klavierquintett	1946	0	4	11	9	10	2	6	3	7	5	8	1
Hauer, Josef Matthias	XXIV. Zwölftonspiel für Klavier	1946/2/1	0	2	9	3	8	1	4	7	11	5	6	10
Hauer, Josef Matthias	XXIX. Zwölftonspiel für Cembalo; mit der Sokolowski-Reihe zu Bachs Geburtstag	1946	0	11	2	1	4	3	10	5	8	9	6	7
Hauer, Josef Matthias	XXXII. Zwölftonspiel für Violine, zwei Bratschen und Cello (1/ 2)	1946/8/12	0	9	6	10	11	2	7	3	1	4	5	8
Hauer, Josef Matthias	XXXII. Zwölftonspiel für Violine, zwei Bratschen und Cello (2/ 2)	1946/8/12	0	7	4	3	11	2	5	1	10	9	6	8
Hauer, Josef Matthias	XXXII. Zwölftonspiel; für Violine, Bratsche und Cello	1946/8/19	0	3	7	4	1	5	6	9	2	10	8	11
Hauer, Josef Matthias	Zwölftonmusik [Zwölftonspiel] für Klavier zu vier Händen. Februar 1959 (Fragment)	1959/2	0	9	3	7	4	10	2	6	1	8	11	5
Hauer, Josef Matthias	Zwölftonmusik für Orchester, Op.86	1939/7/16	0	2	6	3	11	8	10	9	5	7	1	4

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Zwölftonspiel (Langsamer Walzer) 8. Oktober 1956; für zwei Violinen, Bratsche, Cello und Klavier zu vier Händen	1956/10/8	0	1	10	9	3	8	5	6	11	2	4	7
Hauer, Josef Matthias	Zwölftonspiel (Weihnachten 1947) für Klarinette, Violine, Bratsche, Cello und Klavier	1948/6/2	0	6	2	10	8	3	11	4	9	7	5	1
Hauer, Josef Matthias	Zwölftonspiel 10. Juli 1957; für Klavier zu vier Händen	1956/7/10	0	8	10	6	2	11	1	3	9	4	7	5
Hauer, Josef Matthias	Zwölftonspiel 15. Juni 1957; für Flöte, Oboe, Bassklarinette, Fagott, 2 Violinen, Viola, Violoncello & Klavier vierhändig	1957/6/15	0	8	11	6	9	5	7	1	3	2	4	10
Hauer, Josef Matthias	Zwölftonspiel 15. Juni 1957; für Flöte, Oboe, Bassklarinette, Fagott, zwei Violinen, Viola, Violoncello & Klavier vierhändig	1957/6/15	0	6	4	8	3	11	9	2	7	1	10	5
Hauer, Josef Matthias	Zwölftonspiel 17. August 1957; für zwei Violinen und Klavier	1957/8/17	0	5	8	4	9	3	11	7	2	6	1	10
Hauer, Josef Matthias	Zwölftonspiel 17. September 1956; für zwei Violinen, Bratsche, Cello und Klavier zu zwei Händen	1956/9/17	0	5	7	1	6	3	9	8	2	10	4	11
Hauer, Josef Matthias	Zwölftonspiel 18. Mai 1958; für Streichsextett	1958/5/18	0	5	1	8	2	6	4	11	9	7	3	10
Hauer, Josef Matthias	Zwölftonspiel 2. Juni 1948 für Streichquartett und Klavier	1948/6/2	0	3	10	6	2	11	1	4	7	9	5	8
Hauer, Josef Matthias	Zwölftonspiel 22. Mai 1958; für zwei Violinen, Bratsche, Cello und Klavier zu zwei Händen	1958/5/22	0	9	6	11	4	1	10	5	2	8	3	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Zwölftonspiel 26. April 1958; für zwei Violinen, Bratsche, Cello und Klavier zu zwei Händen	1958/4/26	0	2	7	11	3	5	8	1	4	9	6	10
Hauer, Josef Matthias	Zwölftonspiel 26. August 1948; für Violine und Klavier	1948/8/26	0	9	8	5	10	2	11	6	3	7	4	1
Hauer, Josef Matthias	Zwölftonspiel 26. Juli 1957, für Flöte, Oboe, Bassklarinette, Fagott und Streichquartett	1957/7/26	0	4	1	6	8	2	10	7	3	9	11	5
Hauer, Josef Matthias	Zwölftonspiel 28. August 1948; für Violine und Klavier	1948/8/28	0	9	6	2	3	10	8	5	4	7	11	1
Hauer, Josef Matthias	Zwölftonspiel 3. Mai 1958; für Streichsextett	1958/5/3	0	4	10	3	7	1	8	2	11	6	9	5
Hauer, Josef Matthias	Zwölftonspiel 31. August 1948; für Violine (Flöte) und Klavier	1948/8/28	0	9	6	2	3	10	8	5	4	7	11	1
Hauer, Josef Matthias	Zwölftonspiel 31. August 1948; für Violine und Klavier; 2. Fassung	1948/8/28	0	9	6	2	3	10	8	5	4	7	11	1
Hauer, Josef Matthias	Zwölftonspiel 5. September 1957; für Violine, Bratsche und Klavier	1957/9/5	0	4	2	9	10	6	11	1	7	3	8	5
Hauer, Josef Matthias	Zwölftonspiel 7. April 1957; für zwei Violinen, Bratsche, Cello und Klavier zu vier Händen	1957/4/7	0	6	2	9	10	4	11	3	7	1	5	8
Hauer, Josef Matthias	Zwölftonspiel 8. Juni 1957; für Klavier zu vier Händen	1957/7/8	0	5	11	4	9	2	6	3	10	8	1	7
Hauer, Josef Matthias	Zwölftonspiel 9. September 1957; für vier Solostimmen [S, A, T, B], Violine, Bratsche und Klavier	1957/9/9	0	4	2	9	10	6	11	1	7	3	8	5
Hauer, Josef Matthias	Zwölftonspiel April 1956; für Klavier zu vier Händen	1956/4/22	0	5	7	2	8	4	10	3	9	11	6	1
Hauer, Josef Matthias	Zwölftonspiel Jänner 1957; für zwei Violinen, Bratsche und Cello	1957/1/30	0	10	6	2	8	3	5	7	9	4	1	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Zwölftonspiel März 1958; für Kammerorchester	1958/3/21	0	5	10	4	1	7	2	11	8	3	6	9
Hauer, Josef Matthias	Zwölftonspiel November 1957; für zwei Violinen und Klavier	1957/10/10	0	6	3	9	1	5	11	8	10	7	2	4
Hauer, Josef Matthias	Zwölftonspiel Oktober 1956; für Klavier zu vier Händen	1956/10/22	0	9	6	2	8	3	10	5	1	11	7	4
Hauer, Josef Matthias	Zwölftonspiel Oktober 1957; für Heimorchester	1957/10	0	2	4	10	9	3	6	11	7	1	5	8
Hauer, Josef Matthias	Zwölftonspiel für Cembalo oder Klavier. 13. Juni 1947	1947/7/13	0	5	10	4	7	6	2	1	9	8	3	11
Hauer, Josef Matthias	Zwölftonspiel für Flöte, Fagott (Baßklarinette), zwei Violinen, Bratsche und Cello. Jänner 1958	1958/1	0	10	8	5	2	9	6	3	1	11	7	4
Hauer, Josef Matthias	Zwölftonspiel für Flöte, Horn, Violine, Bratsche, Cello und Klavier	1953 od. 1954	0	10	7	2	8	6	3	4	9	11	1	5
Hauer, Josef Matthias	Zwölftonspiel für Gitarre. 24. 7. 1949	1949/7/24	0	6	10	2	5	9	1	4	7	3	11	8
Hauer, Josef Matthias	Zwölftonspiel für Hausorchester (Klavier zu vier Händen, Violine, Cello und Akkordeon)	1955/2/25	0	1	10	2	9	4	11	5	3	8	6	7
Hauer, Josef Matthias	Zwölftonspiel für Hausorchester (für Klavier zu vier Händen und Harmonium). 26. Juni 1954	1954/6/26	0	9	5	3	8	10	6	2	4	7	11	1
Hauer, Josef Matthias	Zwölftonspiel für Klavier und Streichquartett	1947/7	0	9	3	10	2	5	8	6	1	11	7	4
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen	1958/9/1	0	9	6	11	4	1	10	5	2	8	3	7
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen und Akkordeon (Hausorchester)	1955/3/14	0	7	2	9	6	4	11	3	10	8	1	5
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen und Harmonium	1952/7/31	0	9	6	10	8	5	1	4	2	11	3	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen und Streichquartett	1951/11/28	0	7	2	10	6	8	3	11	9	4	1	5
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen, Violine, Bratsche, Cello und Kontrabaß (melischer Entwurf vom 29.8.1954)	1954/9/8	0	4	2	7	9	6	8	3	11	5	10	1
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen, mit einer Zwölftonreihe von Nikolaus Fheodoroff. 10. Juli 1952	1952/7/10	0	10	6	8	9	7	11	3	1	5	2	4
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen, mit einer Zwölftonreihe von Nikolaus Fheodoroff. 8. Juli 1952	1952/7/8	0	2	10	6	8	7	5	9	11	3	1	4
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen, zwei Violinen, Bratsche und Cello	1954/10/24	0	1	4	9	6	11	2	10	8	5	7	3
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen, zwei Violinen, Bratsche und Cello. 19. Oktober 1954	1954/10/19	0	6	11	2	1	5	3	8	10	7	9	4
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen. 13. März 1952	1952/3/13	0	5	9	10	8	1	4	3	6	7	11	2
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen. 16. Oktober 1955	1955/10/16	0	4	6	3	2	7	10	1	9	5	8	11
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen. 2. Mai 1952	1952/5/2	0	4	6	10	11	7	9	2	8	1	3	5
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen. 24. Juni 1952	1952/6/24	0	6	10	7	9	3	4	1	8	5	11	2
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen. 26. Juni 1952	1952/6/26	0	6	2	10	9	5	3	4	8	7	11	1
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen. 28. Juli 1952	1952/7/28	0	11	9	4	1	6	10	5	2	7	8	3

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen. 30. Juni 1952, I	1952/6/30	0	2	10	4	11	8	1	7	5	3	6	9
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen. 5. Juli 1952	1952/7/5	0	2	3	10	4	7	6	1	9	8	5	11
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen. 9. April 1952	1952/4/9	0	10	8	6	1	7	9	3	2	11	5	4
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen. Mai 1955	1955/5/7	0	6	11	4	2	9	3	1	5	7	10	8
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu vier Händen; mit einer Zwölftonreihe von Dr. Fritz Racek	1954/8/22	0	2	9	11	4	3	6	1	10	8	5	7
Hauer, Josef Matthias	Zwölftonspiel für Klavier zu zwei Händen. Neujahr 1947 (mit einer Zwölftonreihe von Ernst Hartmann)	1947/1/1	0	10	6	3	7	4	9	2	8	11	1	5
Hauer, Josef Matthias	Zwölftonspiel für Klavier. 11. Juni 1955	1955/6/11	0	6	11	4	2	9	3	1	5	7	10	8
Hauer, Josef Matthias	Zwölftonspiel für Klavier. 17. Juli 1952	1952/7/17	0	6	4	9	2	10	7	11	1	8	5	3
Hauer, Josef Matthias	Zwölftonspiel für Klavier. 19. Februar 1953	1953/2/19	0	6	9	11	1	10	2	4	5	7	3	8
Hauer, Josef Matthias	Zwölftonspiel für Klavier. 2. Juni 1955	1955/6/2	0	10	2	7	3	6	4	8	1	9	11	5
Hauer, Josef Matthias	Zwölftonspiel für Klavier. 24. Dezember 1946	1946/12/24	0	1	2	6	10	5	11	4	3	9	7	8
Hauer, Josef Matthias	Zwölftonspiel für Klavier. 3. Februar 1954	1954/2/3	0	9	4	2	8	11	1	5	3	6	10	7
Hauer, Josef Matthias	Zwölftonspiel für Klavier. 7. Juni 1955	1955/6/7	0	4	10	7	11	8	3	1	5	6	2	9
Hauer, Josef Matthias	Zwölftonspiel für Klavier. März 1953	1953/3/2	0	6	8	7	5	10	2	3	11	4	9	1
Hauer, Josef Matthias	Zwölftonspiel für Klavier. September 1956	1956/9/4	0	8	11	6	3	5	1	10	7	4	2	9

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Zwölftonspiel für Oechester. 28. 9. 1954	1954/9/28	0	8	9	6	10	4	11	1	2	5	3	7
Hauer, Josef Matthias	Zwölftonspiel für Orchester (August 1957)	1957/8/9	0	9	4	6	11	3	2	8	5	1	7	10
Hauer, Josef Matthias	Zwölftonspiel für Orchester. 28. 9. 1954	1954/9/28	0	5	7	4	6	1	9	3	8	11	10	2
Hauer, Josef Matthias	Zwölftonspiel für Orchester. September 1957	1957/9/22	0	8	6	10	5	7	2	4	1	9	11	3
Hauer, Josef Matthias	Zwölftonspiel für Streichquartett	1948/10/4	0	3	7	2	9	6	4	10	1	8	11	5
Hauer, Josef Matthias	Zwölftonspiel für Violine allein mit einer Zwölftonreihe von Dr. Ernst Weidinger	1948/8/23	0	9	8	5	10	2	11	6	3	7	4	1
Hauer, Josef Matthias	Zwölftonspiel für Violine und Cembalo [Klavier]. 27. August 1948	1948/8/27	0	9	6	2	3	10	8	5	4	7	11	1
Hauer, Josef Matthias	Zwölftonspiel für Violine und Cembalo. 22.Juli 1948	1948/7/22	0	6	1	8	5	9	2	7	10	3	11	4
Hauer, Josef Matthias	Zwölftonspiel für Violine und Klavier	1954	0	10	7	2	8	6	3	4	9	11	1	5
Hauer, Josef Matthias	Zwölftonspiel für Violine und Klavier. 15.Juni 1955	1955/6/15	0	6	3	2	11	4	1	9	7	10	5	8
Hauer, Josef Matthias	Zwölftonspiel für Violine und Klavier. 2. September 1956	1956/9/2	0	6	8	1	10	5	9	3	11	4	7	2
Hauer, Josef Matthias	Zwölftonspiel für Violine und Klavier. 3. April 1955	1955/4/3	0	2	6	4	9	10	5	3	7	8	11	1
Hauer, Josef Matthias	Zwölftonspiel für Violine, Cello und Klavier zu vier Händen	1957/8/13	0	10	6	1	8	3	11	7	2	5	9	4
Hauer, Josef Matthias	Zwölftonspiel für Violine, Viola und Klavier. September 1957	1957/9	0	5	9	4	7	10	3	6	1	11	8	2
Hauer, Josef Matthias	Zwölftonspiel für fünf Instrumente (Klavierquintett)	1951/9/15	0	4	2	11	7	10	6	9	3	8	1	5

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	Zwölftonspiel für fünf Violinen. 16. August 1950	1950/8/16	0	7	3	6	1	11	4	10	5	2	8	9
Hauer, Josef Matthias	Zwölftonspiel für fünf Violinen. Mai 1955	1955/5	0	7	11	8	5	1	3	9	4	10	6	2
Hauer, Josef Matthias	Zwölftonspiel für kleinen Chor und Klavier. Ostern 1947	1947/4	0	7	2	5	1	4	8	10	3	11	9	6
Hauer, Josef Matthias	Zwölftonspiel für zwei Violinen	1954/2/10	0	2	3	11	1	10	8	6	4	9	7	5
Hauer, Josef Matthias	Zwölftonspiel für zwei Violinen und zwei Violinen und zwei Bratschen. 11. Oktober 1956	1956/10/11	0	10	1	3	2	9	5	6	4	8	11	7
Hauer, Josef Matthias	Zwölftonspiel für zwei Violinen, Bratsche und Cello ('Ins Räumliche übertragen'). 3. September 1953	1953/9/3	0	10	7	2	8	6	3	4	9	11	1	5
Hauer, Josef Matthias	Zwölftonspiel für zwei Violinen, Bratsche und Cello. 12. Jänner 1954	1954/1/12	0	11	10	1	9	4	5	6	2	7	8	3
Hauer, Josef Matthias	Zwölftonspiel für zwei Violinen, Bratsche und Cello. Jänner 1948	1948/1	0	1	7	2	11	3	8	5	6	4	9	10
Hauer, Josef Matthias	Zwölftonspiel für zwei Violinen, Bratsche, Cello und Klavier	1956/1/19	0	6	9	11	4	3	7	5	2	8	10	1
Hauer, Josef Matthias	Zwölftonspiel für zwei Violinen, Bratsche, Cello und Klavier. 16. April 1958	1958/4/16	0	3	8	2	9	1	11	5	7	4	6	10
Hauer, Josef Matthias	Zwölftonspiel in drei Teilen für zwei Violinen, Bratsche und Cello. 31. Juli 1953	1953/7/31	0	10	7	2	8	6	3	4	9	11	1	5
Hauer, Josef Matthias	Zwölftonspiel. 20. Mai 1956	1956/5/20	0	2	5	8	10	9	11	6	4	7	3	1
Hauer, Josef Matthias	[Zwölftonspiel] 'Johann Sebastian Bach hat das Wohltemperierte Klavier im Himmel vollendet ...'	1952/11/2	0	10	5	4	2	9	8	1	3	11	6	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hauer, Josef Matthias	twelve-tone-row-example	1920	0	2	5	11	1	10	4	8	7	3	6	9
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.1	1979/9	0	1	2	3	4	5	11	10	9	8	7	6
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.10	1979/9	0	4	6	7	8	10	9	5	3	2	1	11
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.11	1979/9	0	4	5	6	8	9	7	3	2	1	11	10
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.12	1979/9	0	3	6	7	9	10	11	8	5	4	2	1
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.13	1979/9	0	3	5	7	8	10	9	6	4	2	1	11
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.14	1979/9	0	2	5	7	8	10	11	9	6	4	3	1
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.15	1979/9	0	1	3	6	7	9	11	10	8	5	4	2
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.16	1979/9	0	1	3	5	7	10	9	8	6	4	2	11
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.17	1979/9	0	1	3	5	8	9	7	6	4	2	11	10

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.18	1979/9	0	3	4	6	9	10	11	8	7	5	2	1
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.19	1979/9	0	1	4	5	8	9	11	10	7	6	3	2
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.2	1979/9	0	1	2	3	4	10	9	8	7	6	5	11
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.20	1979/9	0	1	2	5	7	8	11	10	9	6	4	3
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.21	1979/9	0	1	2	5	6	10	9	8	7	4	3	11
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.22	1979/9	0	1	2	4	8	9	7	6	5	3	11	10
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.23	1979/9	0	3	4	5	9	10	11	8	7	6	2	1
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.24	1979/9	0	3	4	7	8	10	9	6	5	2	1	11
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.25	1979/9	0	3	5	6	8	9	7	4	2	1	11	10

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.26	1979/9	0	3	4	6	7	8	5	2	1	11	10	9
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.27	1979/9	0	2	4	5	6	7	3	1	11	10	9	8
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.28	1979/9	0	5	7	8	9	10	11	6	4	3	2	1
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.29	1979/9	0	1	6	7	8	9	11	10	5	4	3	2
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.3	1979/9	0	2	3	4	5	10	11	9	8	7	6	1
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.30	1979/9	0	1	2	6	7	8	11	10	9	5	4	3
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.31	1979/9	0	1	2	3	6	7	11	10	9	8	5	4
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.32	1979/9	0	1	2	3	4	6	11	10	9	8	7	5
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.4	1979/9	0	2	3	4	8	10	9	7	6	5	1	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.5	1979/9	0	2	4	5	8	10	11	9	7	6	3	1
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.6	1979/9	0	2	4	6	8	10	9	7	5	3	1	11
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.7	1979/9	0	2	4	6	8	9	7	5	3	1	11	10
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.8	1979/9	0	2	4	6	7	8	5	3	1	11	10	9
Hendler, Maximilian	'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.9	1979/9	0	4	6	8	9	10	11	7	5	3	2	1
Hendler, Maximilian	Vier Miniaturen für Klarinette, Op.51	1982/4/26	0	3	5	11	8	6	10	2	4	1	9	7
Hendler, Maximilian	aus dem >Liederbuch für Annemarie< 'Zur Nachbarin' (Text: Herwig von Kreutzbruck), Op.56-2	1982/8/29	0	9	4	7	11	10	8	1	5	3	2	6
Hendler, Maximilian	aus den fünf Liedern nach Texten von Elisabeth Pöschl : 'Sonnenaufgang' für Singstimme und Klavier, Op.44-1	1981/12	0	11	2	1	5	6	4	3	8	7	9	10
Hendler, Maximilian	aus den fünf Liedern nach Texten von Karl Hans Haysen für Singstimme und Klavier : 'Erkenntnis', Op.45-2	1982/1	0	9	2	4	7	11	8	10	5	1	6	3
Hindemith, Paul	Ludus Tonalis	1942	0	7	5	9	4	3	8	2	10	1	11	6
Huber, Klaus	Zwei Sätze	1958	0	3	1	10	11	8	6	9	7	2	4	5

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Husa, Karel	Hudba pro Prahu 1968	1968	0	8	2	1	7	9	6	10	3	11	5	4
Husa, Karel	Mosaïques	1960	0	6	4	3	2	9	10	5	7	8	11	1
Husa, Karel	Poème for Viola and Chamber Orchestra, mvt 1	1959	0	6	5	7	8	11	9	10	3	4	2	1
Husa, Karel	Poème for Viola and Chamber Orchestra, mvt 2	1959	0	1	11	10	5	8	6	7	9	3	2	4
Husa, Karel	Poème for Viola and Chamber Orchestra, mvt 3	1959	0	3	1	2	4	10	9	11	7	8	6	5
Höller, York	Der Meister und Margarita	1984-89	0	1	4	6	3	5	9	8	11	10	7	2
Ives, Charles	On the Antipodes	1915-23	0	3	11	8	4	7	10	9	6	2	5	1
Ives, Charles	String Quartet, No.2, mvt 2	1913	0	1	2	11	3	7	10	4	6	8	9	5
Ives, Charles	Tone Roads, No.1	1911	0	10	3	4	2	7	6	9	8	11	1	5
Ives, Charles	Tone Roads, No.3	1915	0	11	1	3	2	10	5	8	4	7	6	9
Jelinek, Hanns	Zwölftonwerk, Op.15	1947-1957	0	10	5	7	3	6	1	8	11	9	2	4
Johnston, Ben	String Quartet, No.6	1980	0	5	10	9	3	7	11	6	1	2	8	4
Johnston, Ben	String Quartet, No.7, mov. 2	1984	0	5	10	8	4	7	2	6	1	11	3	9
Jung, Joachim		1994	0	11	3	10	2	1	7	8	4	9	5	6
Kahn, Erich Itor	Bagatelle für Rene Leibowitz	1940/2/20	0	1	2	4	6	3	10	11	5	7	9	8
Kahn, Erich Itor	Short Piano Piece	1951	0	3	11	10	8	6	2	7	9	4	5	1
Kalodiki, Georgia	Six Sketches for piano	2004	0	7	6	1	2	9	8	3	4	11	5	10
Klein, Fritz	Die Maschine: Eine extonale Selbstsatire, Op.1	1921	0	11	7	4	2	9	3	8	10	1	5	6
Klein, Fritz	Variations for Piano	1924	0	1	5	11	8	4	9	3	2	10	7	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Klein, Fritz Heinrich	Die Maschine. Eine extonale Selbstsatire von Heautontimorumenus., Op.1 (Das Maschinen-Thema)	1921	0	5	7	9	3	2	11	6	8	10	4	1
Klein, Fritz Heinrich	Variationen, Op.14	1924	0	11	7	4	2	9	3	8	10	1	5	6
Klenau, Paul von	Elisabeth von England	1939/1938	0	2	8	11	7	1	4	10	3	6	5	9
Kokkonen, Joonas	Cello Concerto, mov. 2, row "II/A"	1969	0	2	7	4	3	5	6	1	11	8	10	9
Kokkonen, Joonas	Cello Concerto, mov. 2, row "II/B"	1969	0	2	3	1	4	5	7	8	6	9	10	11
Kokkonen, Joonas	Cello Concerto, mov. 2, row "II/C"	1969	0	9	11	10	7	2	6	3	5	4	1	8
Kokkonen, Joonas	Symphonic Sketches, mov. 3, row "III/A"	1968	0	2	1	3	8	7	5	6	4	11	9	10
Kokkonen, Joonas	Woodwind Quintet, mov. 1, rows "I/A" and "I/B"	1973,75	0	2	11	9	10	1	3	6	4	5	7	8
Krenek	Monologue for Solo Clarinet, Op.157	1956	0	1	11	2	10	5	4	7	6	3	8	9
Krenek, Ernst	Eight Piano Pieces	1946	0	10	1	7	6	11	5	8	3	9	2	4
Krenek, Ernst	Four Songs, Op.112	1946-1947	0	7	3	11	10	1	2	4	6	5	9	8
Krenek, Ernst	Kafka-songs, Op.82	1938-1939	0	11	9	5	4	2	6	3	10	8	7	1
Krenek, Ernst	Karl V	1938	0	3	1	6	2	10	9	8	11	7	5	4
Krenek, Ernst	Karl V, King Francis Row	1938	0	10	5	6	11	3	9	4	2	7	1	8
Krenek, Ernst	Kette, Kreis, und Spiegel (Circle, Chain and Mirror), Op.160	1956-57	0	5	6	9	8	4	10	7	11	3	1	2
Krenek, Ernst	Lamentatio Jeremiae Prophetarum, Op.93, row 1	1941	0	2	4	5	8	10	6	7	9	11	1	3
Krenek, Ernst	Lamentatio Jeremiae Prophetarum, Op.93, row 2	1941	0	2	3	6	8	10	5	7	9	11	1	4
Krenek, Ernst	Lamentatio Jeremiae Prophetarum, Op.93, row 3	1941	0	1	4	6	8	10	5	7	9	11	2	3
Krenek, Ernst	Lamentatio Jeremiae Prophetarum, Op.93, row 4	1941	0	3	5	7	9	11	6	8	10	1	2	4

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Krenek, Ernst	Lamentatio Jeremiae Prophetae, Op.93, row 5	1941	0	2	4	6	8	9	5	7	10	11	1	3
Krenek, Ernst	Lamentatio Jeremiae Prophetae, Op.93, row 6	1941	0	2	4	6	7	10	5	8	9	11	1	3
Krenek, Ernst	Quaestio temporis, Op.170	1959	0	3	11	4	2	1	7	8	10	5	9	6
Krenek, Ernst	Sechs Vermessene, Op.168	1958	0	3	1	6	2	4	10	5	9	7	8	11
Krenek, Ernst	Sestina, Op.161	1957	0	8	11	10	4	6	7	1	5	3	9	2
Krenek, Ernst	Sonata for Viola and Piano, Op.117	1948	0	10	3	6	2	1	11	9	5	8	7	4
Krenek, Ernst	Sonata, No.3, Op.92, No.4	1942	0	10	5	8	3	2	6	7	1	9	11	4
Krenek, Ernst	Sonatine for Flute and Viola, Op.92/2a	1942	0	11	9	2	1	8	7	6	4	5	3	10
Krenek, Ernst	String Quartet, No.6, Op.78	1936	0	10	11	8	1	9	3	7	2	4	6	5
Krenek, Ernst	String Quartet, No.7, Op.96	1943-44	0	7	6	11	9	1	4	10	8	5	2	3
Krenek, Ernst	Studies in Counterpoint	1940	0	4	3	11	10	9	1	7	8	6	2	5
Krenek, Ernst	Studies in Counterpoint (i)	1937	0	4	3	11	10	9	1	7	8	6	2	5
Krenek, Ernst	Studies in Counterpoint (ii)	1937	0	3	10	4	9	11	8	7	5	1	2	6
Krenek, Ernst	Suite, Op.84 for solo cello	1939	0	4	3	11	10	9	1	7	8	6	2	5
Krenek, Ernst	Symeon, der Stylit	1935-1936	0	3	10	4	9	11	8	7	5	1	2	6
Krenek, Ernst	Symphonic Elegy for String Orchestra, Op.105	1946	0	1	9	11	10	2	3	7	6	8	4	5
Krenek, Ernst	Symphonic Piece for string Orchestra, Op.86	1939	0	3	4	10	2	9	11	8	7	5	1	6
Krenek, Ernst	Twelve Short Piano-Pieces, Op.83	1938	0	9	4	5	6	7	3	10	1	8	11	2
Krenek, Ernst	Zwölf Variationen in Drei Sätzen	1937	0	1	3	10	2	5	11	7	4	9	6	8
Krenek, Ernst	Zwölf Variationen in Drei Sätzen, Op.79	1957/1940/1937	0	1	3	10	2	5	11	7	4	9	8	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Krenek, Ernst	concert for organ and string-orchestra, Op.230	1979/1-2	0	11	8	4	3	6	7	5	2	9	10	1
Krenek, Ernst	twelve-tone-row in a display case of 'Steinerner Saal' in the 'Musikverein' of Vienna	1985/8/8	0	3	5	4	8	9	6	10	11	1	7	2
Kukuck, Felicitas	'Der Gottesknecht': 6. Kantate	1959	0	11	10	1	2	3	8	9	6	5	7	4
Kukuck, Felicitas	'Wo bist Du Trost'; motet	1974	0	11	10	7	6	1	2	5	4	3	9	8
Kurtág, György	The Sayings of Péter Bornemisza, Op.7	1963	0	11	7	8	9	1	2	10	3	4	5	6
Lachenmann, Helmut	Mouvement (- vor der Erstarrung) für Ensemble	1982-1984	0	10	11	7	8	2	5	3	1	9	4	6
Lackner, Peter	'An alle Außerirdischen'. Kanon für drei Singstimmen, Kontrabaß und Klavier	1995/9	0	4	9	7	11	2	5	1	8	10	6	3
Lackner, Peter	'Davongeflogene Seelen' für Singstimme, Violoncello und Klavier	1991	0	10	4	7	6	1	9	11	5	2	3	8
Lackner, Peter	'Der Winter'	2005/11/20	0	6	3	5	9	11	7	1	4	2	10	8
Lackner, Peter	'Drei Dinge' für Singstimme und Klavier	1982/7	0	4	2	11	7	10	1	5	9	3	6	8
Lackner, Peter	'Es fiel ein Reif in der Frühlingsnacht' für Singstimme und ein Melodie-Instrument	1984/11/13	0	9	4	7	2	5	1	8	10	11	3	6
Lackner, Peter	'Euphorbia obesa'. Kanon für Oboe, Englischhorn und Fagott.	2000/4/16	0	10	2	6	8	4	1	9	11	3	7	5
Lackner, Peter	'Flügelaltar' für Klavier	1983/7/15	0	9	11	10	2	7	1	8	4	5	3	6
Lackner, Peter	'Hexentanz' für Violine und Klavier	1986/9/2	0	3	5	7	8	4	1	10	11	2	6	9
Lackner, Peter	'INKE TAN MAGROV' für Singstimme und Klavier	1997/3/27	0	6	5	10	8	3	7	1	2	9	11	4

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Lackner, Peter	'Lied des Harfenmädchens II' für Flöte, Klarinette, Posaune, Violine, Cello und Klavier	2005/10/19	0	3	5	11	7	10	1	8	4	9	6	2
Lackner, Peter	'Lied des Harfenmädchens' für Frauenstimme und Klavier		0	3	5	11	7	10	1	8	4	9	6	2
Lackner, Peter	'So lebe wohl' für Singstimme und Klavier	1986/2/25	0	2	3	8	10	7	6	5	1	11	9	4
Lackner, Peter	'Ständchen' für zwei Violinen und zwei Bratschen. 1913,2013	2013/1989	0	4	2	8	11	7	10	5	9	1	3	6
Lackner, Peter	'Venus-Quadrat' für Violine und Klavier	1985/10/20	0	7	2	5	9	10	11	6	8	4	3	1
Lackner, Peter	'Wo ist der Freund' (erstes Lied aus dem Zyklus 'Wilde Erdbeeren' für Singstimme und Klavier)	1989/9/13	0	3	6	2	9	11	7	4	1	5	10	8
Lackner, Peter	1. Kanonzyklus	1994/4/7	0	7	5	9	1	3	11	8	4	6	10	2
Lackner, Peter	2. Kanonzyklus	1993/7	0	10	2	7	9	5	11	3	1	8	4	6
Lackner, Peter	3. Kanonzyklus	1994/1/1	0	6	8	10	1	3	5	11	9	7	4	2
Lackner, Peter	4. Kanonzyklus	1991/7/21	0	5	3	7	11	1	9	4	6	2	10	8
Lackner, Peter	5. Kanonzyklus	1994/6	0	7	11	9	1	3	5	8	10	6	2	4
Lackner, Peter	AGNI MEI (Kanon für Klavier. 5. Juni 2015)	2015/6/5	0	4	10	11	1	2	8	7	3	6	9	5
Lackner, Peter	Das Buch der Wandlungen I für Frauenstimmen und,oder Klavier	1998/4/16	0	8	3	5	1	10	7	11	4	2	6	9
Lackner, Peter	Florianische Reihe	1995/4/16	0	3	9	7	4	11	5	2	8	6	1	10
Lackner, Peter	INITIUM TRIPLEX. 28. Juni 2016; für drei Tasteninstrumente	2016/6/28	0	1	2	3	4	5	6	7	8	9	10	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Lackner, Peter	INKE TAN MAGROV für Singstimme und Klavier (zweites Lied aus dem Zyklus 'Wilde Erdbeeren')	1990	0	2	9	5	8	11	3	1	6	10	7	4
Lackner, Peter	KANON für A, O & Gsellmanns Weltmaschine. 8. Oktober 1958,2008	2008	0	8	10	4	2	6	9	1	11	5	7	3
Lackner, Peter	Kanon 'kgV(3,5,7)'	1986/5/5	0	3	10	9	6	5	2	11	4	8	1	7
Lackner, Peter	Kanon T2 à 6	1992	0	5	2	7	4	9	6	11	8	1	10	3
Lackner, Peter	Kanon T3 à 4	1992	0	2	7	3	5	10	6	8	1	9	11	4
Lackner, Peter	Kanon T4 á 3	1992	0	5	7	2	4	9	11	6	8	1	3	10
Lackner, Peter	Kanon T6 á 2	1992	0	10	8	3	1	5	6	4	2	9	7	11
Lackner, Peter	Kanon for 836017	2010/9/24	0	2	10	7	5	1	3	9	11	4	6	8
Lackner, Peter	Kanon für B. L., 7. Oktober 2017	2017/10/7	0	9	10	5	3	7	11	2	1	6	8	4
Lackner, Peter	Kanon für Blockflötenquartett. April 2005	2005/4/27	0	10	11	3	1	2	8	7	9	5	4	6
Lackner, Peter	Kanon für Bläsersextett. Mai 1995,1996	1996/1995/5	0	9	7	3	10	1	6	8	2	11	5	4
Lackner, Peter	Kanon für Cello und Klavier	1989	0	2	9	10	6	5	1	11	4	3	7	8
Lackner, Peter	Kanon für Flöte solo und N. N.	2011/6/19	0	3	7	10	2	5	11	8	4	1	9	6
Lackner, Peter	Kanon für Flöte und Elektronik. Februar 1999	1999/2	0	10	2	7	9	5	11	3	1	8	4	6
Lackner, Peter	Kanon für Flöte, Akkordeon, zwei Violinen, Bratsche und Klavier	2002/11/17	0	5	3	7	11	1	9	4	6	2	10	8
Lackner, Peter	Kanon für Hammerklavier. März 2016	2016/3/23-24	0	2	1	5	7	3	11	9	10	6	4	8

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Lackner, Peter	Kanon für Kammerorchester	1989	0	9	11	6	2	4	7	10	8	1	5	3
Lackner, Peter	Kanon für Klavier	1989/27/6	0	6	8	10	1	3	5	11	9	7	4	2
Lackner, Peter	Kanon für Klavier zu vier Händen	1988	0	10	5	3	7	8	6	4	11	9	1	2
Lackner, Peter	Kanon für Klavier zu vier Händen. 12. Juni 1996	1996/6/12	0	4	2	8	11	10	5	1	3	9	6	7
Lackner, Peter	Kanon für Klavier zu vier Händen. Frühling 1984	1984	0	1	10	7	9	4	5	11	8	6	2	3
Lackner, Peter	Kanon für Klavier. 15. Juni 1992	1992/6/15	0	10	3	8	6	5	2	1	11	4	9	7
Lackner, Peter	Kanon für Klavier. 21. Juni 1998	1998/6/21	0	7	6	5	1	4	3	8	9	10	2	11
Lackner, Peter	Kanon für Klavier. 26. Juni 1983	1983/6/26	0	7	5	9	4	8	6	1	11	3	10	2
Lackner, Peter	Kanon für Klavier. 27. Juni, 26. September 2002	2002/9/6	0	9	4	1	2	8	7	10	3	6	5	11
Lackner, Peter	Kanon für Klavier. 5. April 1989	1989/4/5	0	2	9	10	6	5	1	11	4	3	7	8
Lackner, Peter	Kanon für Klavier. April 2000	2000/4	0	5	3	7	11	1	9	4	6	2	10	8
Lackner, Peter	Kanon für Klavierquartett	1991/3/21	0	8	6	11	3	9	1	5	7	2	10	4
Lackner, Peter	Kanon für Klavierquartett. 27. April 1991	1991/4/27	0	6	3	5	9	11	7	1	4	2	10	8
Lackner, Peter	Kanon für Klavierquartett. 27. Juni 1991	1991/6/27	0	2	6	9	11	3	7	5	1	10	8	4
Lackner, Peter	Kanon für Klaviertrio		0	2	4	9	5	7	3	1	11	6	10	8
Lackner, Peter	Kanon für Orgel, zweimanualiges Cembalo oder Klavier	1982/10/30	0	7	2	11	4	9	6	8	1	5	3	10
Lackner, Peter	Kanon für Orgel. 21. November 1994, 4. Februar 1995	95/1994	0	8	5	1	4	9	2	11	7	3	10	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Lackner, Peter	Kanon für Schrammel-Quartett. November 2002	2002/11	0	4	6	3	11	9	1	5	8	2	10	7
Lackner, Peter	Kanon für Schwegel und zwei Geigen	1989/6/2	0	6	4	2	10	8	9	3	5	7	11	1
Lackner, Peter	Kanon für Schwegel, diatonisches Hackbrett und Violine		0	8	4	10	6	2	5	1	9	3	11	7
Lackner, Peter	Kanon für Schwegelpfeife in A und Geige	1991/1	0	9	7	2	10	4	3	6	8	1	5	11
Lackner, Peter	Kanon für Streichquartett	1989	0	9	3	5	1	11	7	10	4	2	6	8
Lackner, Peter	Kanon für Streichquartett und Orgel. 21. November 1993	1993/11/21	0	10	2	5	4	7	1	11	3	9	8	6
Lackner, Peter	Kanon für Streichquartett. 18. Mai 1993	1993/5/18	0	11	4	7	1	10	5	6	2	3	9	8
Lackner, Peter	Kanon für Streichquartett. 22.September 2003	2003/9/22	0	8	10	4	2	6	9	1	11	5	7	3
Lackner, Peter	Kanon für Streichquartett. 3. Jänner 1990	1990/1/3	0	6	4	8	11	3	1	7	9	5	2	10
Lackner, Peter	Kanon für Streichquartett. 5. Dezember 1992	1992/12/5	0	5	9	4	11	8	2	7	1	10	3	6
Lackner, Peter	Kanon für Tenor-Hackbrett. 19. März 2014	2014/3/19	0	8	4	6	9	1	11	3	7	5	2	10
Lackner, Peter	Kanon für Violine solo	1988/11/16	0	11	2	7	10	9	3	4	1	8	5	6
Lackner, Peter	Kanon für Violine und Violoncello	1989/4/12	0	2	9	10	6	5	1	11	4	3	7	8
Lackner, Peter	Kanon für Violine, Bratsche und Klavier	1989/7	0	4	2	8	11	7	10	5	9	1	3	6
Lackner, Peter	Kanon für Violine, Viola und Akkordeon. 11. Juni 2007	2007/6/11	0	11	1	2	3	10	4	9	8	7	5	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Lackner, Peter	Kanon für Violine, Violoncello und Akkordeon (Harmonium). 25. Oktober 1995	1995/10/25	0	2	1	7	6	5	3	4	10	9	11	8
Lackner, Peter	Kanon für acht Instrumente. Dezember 1991, März 2007	2007/1991	0	11	3	10	6	2	7	8	4	9	1	5
Lackner, Peter	Kanon für drei Bratschen	1991/12/31	0	11	3	10	6	2	7	8	4	9	1	5
Lackner, Peter	Kanon für drei Klaviere. 28. 6. 2016	2016/6/28	0	1	2	3	4	5	6	7	8	9	10	11
Lackner, Peter	Kanon für drei Violinen I, II August 1998	1998/8	0	2	10	4	8	6	1	9	11	5	3	7
Lackner, Peter	Kanon für sechs Instrumente. 16. März 2009	2009/3/16	0	7	6	3	2	10	1	8	11	5	4	9
Lackner, Peter	Kanon für sechs Posaunen. Herbst 1996	1996	0	9	1	6	4	8	11	2	10	7	5	3
Lackner, Peter	Kanon für zwei Gitarren. September 2001	2001/9/9	0	5	3	9	11	6	7	2	4	10	8	1
Lackner, Peter	Kanon für zwei Singstimmen und Ensemble zur Skulpturengruppe LEM von Axel Kirchmayr und einem Text von Hannes Walzl. September 2004	2004/9	0	2	9	10	5	7	1	11	4	3	8	6
Lackner, Peter	Kanon für zwei Singstimmen zu vier Texten für Kanons von Hannes Walzl	2006/9	0	11	2	1	8	6	10	7	3	4	5	9
Lackner, Peter	Kanon für zwei Trompeten, Horn, Posaune und Tuba. 1. Mai 1993	1993/5/1	0	1	2	10	3	5	11	9	4	8	7	6
Lackner, Peter	Kanon für zwei Violinen	1988/4/23	0	7	4	5	9	2	3	8	11	10	6	1
Lackner, Peter	Kanon für zwei Violinen und Klavier. 1. Dezember 2004	2004/12/1	0	10	2	6	8	4	1	9	11	3	7	5

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Lackner, Peter	Kanon für zwei Violinen und Klavier. Frühjahr 1984	1984	0	1	10	7	9	4	5	11	8	6	2	3
Lackner, Peter	Kanon für zwei Violinen. Frühjahr 1992	1992/3	0	2	4	7	9	11	5	3	1	10	8	6
Lackner, Peter	Kanon à 3	1992/9/9	0	11	6	10	2	7	3	4	9	5	1	8
Lackner, Peter	Kanon à 4 - 'Für Harald Friepertinger zum 50. Geburtstag'	2015/8/22	0	10	3	6	5	8	1	11	9	4	7	2
Lackner, Peter	Kanon á 4	2012/1989	0	4	2	8	11	7	10	5	9	1	3	6
Lackner, Peter	Kanon á 5 für Klaus Chudoba	1993/1/28	0	2	10	8	6	11	3	1	5	7	9	4
Lackner, Peter	Kanon-Polska für zwei Bratschen. 6. Juni 1993	1993/6/6	0	6	3	1	10	8	5	11	2	4	7	9
Lackner, Peter	Krebs-Kanon à 4	1993/3/2	0	8	5	7	3	9	1	11	2	6	4	10
Lackner, Peter	Moebius-Band für Flöte, Violine, Violoncello und Klavier	1989	0	3	6	2	9	11	7	4	1	5	10	8
Lackner, Peter	Moebius-Band für sechs Violinen	1989	0	3	6	2	9	11	7	4	1	5	10	8
Lackner, Peter	Moebiusband I für zwei Melodieinstrumente	1988/7/20	0	6	8	2	7	1	11	5	3	9	4	10
Lackner, Peter	Moebiusband für Violine und Klavier (Chinesenfolter I)	1989/3/3	0	2	4	6	10	5	1	11	9	7	3	8
Lackner, Peter	Reihenspiel für Orgel	1982/8-9	0	9	6	11	5	4	10	7	2	1	8	3
Lackner, Peter	Salambo-Kanon (à 4); Bad Aussee, 2. Februar 2008	2008/2/12	0	6	9	2	8	10	4	7	1	11	3	5
Lackner, Peter	Sponsions-Kanon	2007/1/5	0	4	1	10	3	7	9	5	8	11	6	2
Lackner, Peter	TACET (drittes Lied aus dem Zyklus 'Wilde Erdbeeren')	1990	0	2	9	5	8	11	4	7	10	6	1	3
Lackner, Peter	Trauermusik für Fagott, Kontrafagott und Pauke	1989/2	0	6	2	8	10	4	11	5	9	3	1	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Lackner, Peter	Vier Klavierstücke 1988	1988	0	1	10	11	8	7	9	5	6	4	2	3
Lackner, Peter	kgV (3,4) [zweistimmiger Kanon für Klavier]	1987	0	10	2	3	5	7	1	11	9	8	4	6
Lang, Bernhard	'Der Golem' nach Gustav Meyrink	2014	0	4	7	8	11	3	5	2	9	1	10	6
Lang, Bernhard	'Küstenlinien'; für zwei Klaviere und doppeltes Schlagwerk	1992	0	9	7	4	5	11	2	1	8	10	3	6
Lang, Bernhard	Der Reigen	2012	0	5	1	4	2	3	9	8	10	7	11	6
Lang, Bernhard	HIOB Musiktheater für Orchester, Chor und Solisten	2017-2022	0	9	11	10	5	8	6	7	2	3	1	4
Lang, Bernhard	Hemma (Music Theatre Hemma Klagenfurt 2015)	2014/6/24	0	5	10	2	3	1	7	9	8	4	11	6
Lang, Bernhard	Monadologie XIII a; 'The Saucy Maid'	2011-2012	0	1	5	2	4	9	3	10	8	11	7	6
Lang, Klaus	'Von der Ligurischen Küste zum Trasimenischen See'; Trauermusik für Violine und Klavier	1993	0	5	9	8	10	7	1	4	2	3	11	6
Leibowitz, René	String Quartet, No.3, Op.26	1951	0	8	9	7	6	1	2	5	4	10	11	3
Leibowitz, René	Trois pièces pour piano, Op.19	1949	0	4	3	1	2	5	6	9	10	8	7	11
Lewin, David	Just a Minute, Roger	1978	0	11	4	5	7	3	2	6	8	1	10	9
Li, Bao-Shu	Träumerei of Jiuzhai Gou		0	5	7	2	4	11	9	6	3	1	8	10
Ligeti, György	Le Grand Macabre	1975-77,96	0	6	5	11	10	4	9	3	2	8	7	1
Liszt, Franz	Eine Faust Symphonie	1854/1853	0	4	8	11	3	7	10	2	6	9	1	5
Lu, Shi-Lin	A Family of Red-Crowned Cranes		0	2	9	7	4	6	11	8	1	3	10	5
Lu, Yen	A Bird Flying By	1988	0	6	3	4	8	7	11	5	10	2	9	1
Luo, Zhong-Rong	Chang'e		0	7	5	2	10	9	3	4	8	11	1	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Luo, Zhong-Rong	Dusk, row 1		0	2	7	5	10	8	6	3	1	11	9	4
Luo, Zhong-Rong	Dusk, row 2		0	3	7	5	8	10	1	11	6	2	4	9
Luo, Zhong-Rong	Evening		0	2	7	5	10	8	6	3	1	11	9	4
Luo, Zhong-Rong	Morning Glory		0	2	5	9	7	10	3	11	1	4	6	8
Luo, Zhong-Rong	Picking lotus flowers at the riverside	1979	0	2	5	7	10	3	1	4	6	9	11	8
Luo, Zhong-Rong	Sonatina, mvt 2		0	2	5	7	4	11	6	8	1	3	9	10
Luo, Zhong-Rong	Sonatina, mvt 3		0	2	7	4	11	8	5	9	10	1	3	6
Luo, Zhong-Rong	String Quartet, No.2	1985	0	3	5	10	6	8	11	1	9	2	4	7
Luo, Zhong-Rong	String Quartet, No.3, row 1	1996	0	2	4	7	5	10	8	1	6	3	9	11
Luo, Zhong-Rong	String Quartet, No.3, row 2	1996	0	2	5	7	4	11	6	8	1	3	9	10
Luo, Zhong-Rong	String Quartet, No.3, row 3	1996	0	2	7	9	11	1	3	6	10	4	5	8
Luo, Zhong-Rong	String Quartet, No.3, row 4	1996	0	3	7	10	1	8	5	9	11	2	4	6
Luo, Zhong-Rong	Three Piano Pieces, "Arabeque", row 1		0	2	5	10	6	1	3	8	11	9	7	4
Luo, Zhong-Rong	Three Piano Pieces, "Arabeque", row 2		0	2	7	9	11	4	6	8	1	3	10	5
Luo, Zhong-Rong	Three Piano Pieces, "Reverie"		0	5	10	8	3	11	1	6	9	2	4	7
Lutosławski, Witold	Musique Funébre (Funeral Music)	1954-58	0	6	5	11	10	4	3	9	8	2	1	7
Lutyens, Elisabeth	Essence Of Our Happinesses, Op.69, mvt II, Part I	1968	0	11	1	10	2	3	8	9	5	6	4	7
Lutyens, Elisabeth	Five Little Pieces for Clarinet and Piano	1945	0	8	4	1	10	2	9	3	5	6	11	7
Lutyens, Elisabeth	Islands, Op.80	1970	0	11	7	3	8	10	9	6	4	5	1	2

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Lutyens, Elisabeth	Motet (Excerpta Tractati Logico-Philosophici), Op.27	1951	0	11	3	7	8	4	2	6	5	1	9	10
Lutyens, Elisabeth	O Saisons, O Châteaux!	1946	0	11	10	4	8	9	3	7	6	5	2	1
Lutyens, Elisabeth	Présages, Op.53	1965	0	1	11	2	10	8	5	3	4	7	9	6
Lutyens, Elisabeth	Quincunx, Op.44	1960	0	6	11	1	5	2	7	3	4	9	10	8
Lutyens, Elisabeth	Six Tempi for 10 Instruments, Op.42	1957	0	6	7	8	5	3	4	11	10	9	1	2
Lutyens, Elisabeth	The Numbered, Altered Primary Row (swap pitches 2 and 3)	1967	0	11	10	1	2	9	3	4	8	5	7	6
Lutyens, Elisabeth	The Numbered, Primary Row	1967	0	10	11	1	2	9	3	4	8	5	7	6
Lutyens, Elisabeth	The Valley of Hatsu'se	1965	0	6	11	10	8	7	9	1	3	2	4	5
Lutyens, Elisabeth	Three Improvisations for Piano Solo	1948	0	6	9	7	8	3	4	1	10	5	11	2
Lutyens, Elisabeth	Time Off? Not a Ghost of a Chance!, Op.68	1967-68	0	11	1	5	2	4	9	8	3	7	6	10
Maderna, Bruno	Improvvisazione N. 1	1951-1952	0	11	4	8	3	2	7	6	1	5	10	9
Maderna, Bruno	Musica su due dimensioni	1952	0	2	9	4	6	11	8	10	1	3	5	7
Maderna, Bruno	Quartetto	1955	0	7	2	3	6	9	10	1	4	5	8	11
Maderna, Bruno	Streichquartett (Basisreihe 1)	1955	0	7	2	3	6	9	10	1	4	5	8	11
Maderna, Bruno	Streichquartett (Basisreihe 2)	1955	0	7	10	1	6	3	11	4	9	2	5	8
Mamlök, Ursula	Five Intermezzi for guitar solo	1984-90	0	3	6	11	2	5	1	10	7	4	8	9
Mamlök, Ursula	Haiku Settings, No.5	1967	0	11	8	7	4	3	5	6	9	10	1	2
Mamlök, Ursula	Panta Rhei	1981	0	7	4	11	8	3	10	9	6	2	5	1

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Mamlök, Ursula	Panta Rhei, secondary row (mvt 4, Piano)	1981	0	11	8	3	4	7	2	1	6	9	10	5
Mamlök, Ursula	Variations for Solo Flute, theme	1961	0	2	1	11	7	3	5	6	4	10	8	9
Martin, Frank	Petite complainte	1941	0	11	10	6	2	4	5	9	8	7	3	1
Martino, Donald	Fantasy Variations	1962	0	3	1	10	2	8	11	5	6	9	7	4
Martino, Donald	Notturmo (Row A)	1973	0	11	10	2	6	1	5	9	4	8	3	7
Martino, Donald	Notturmo (Row B)	1973	0	7	11	10	9	8	2	1	6	3	4	5
Matthias, Hauer Josef	Zwölftonspiel für Holzbläser, Streicher und Klavier. April 1951	1951/4/27	0	4	9	11	7	2	3	6	8	10	5	1
Matthias, Josef	Salambo, Op.60	1929	0	6	9	2	8	10	4	7	1	11	3	5
Messiaen, Olivier	Le Merle noir	1951	0	5	11	6	1	9	7	3	4	2	8	10
Messiaen, Olivier	Livre d'orgue	1951	0	1	11	2	10	3	9	4	8	5	7	6
Messiaen, Olivier	Mode de valeurs et d'intensités, Series 1	1949	0	11	6	5	4	3	1	10	9	7	2	8
Messiaen, Olivier	Mode de valeurs et d'intensités, Series 3	1949	0	11	6	4	3	9	5	2	8	1	7	10
Messiaen, Olivier	Mode de valeurs et d'intensités, Series 2	1949	0	5	3	1	10	9	8	7	6	4	11	2
Mittendorfer, Josef	aleatoric row	2012/12/28	0	2	7	1	8	6	10	5	4	11	3	9
Moevs, Robert	Ludi Praeteriti: Games of the Past for two pianos	1976	0	11	8	7	6	3	2	1	9	10	4	5
Moevs, Robert	Musica da Camera	1965	0	1	11	3	4	2	9	10	8	7	5	6
Moevs, Robert	Three Pieces for violin and piano, mvt II	1982	0	4	8	9	3	2	10	11	7	6	5	1
Morris, Robert	14 Little Piano Pieces	2002	0	5	1	9	10	11	2	7	3	4	6	8
Morris, Robert	Along a Rocky Path	1993	0	9	10	3	4	2	8	1	6	7	11	5

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Morris, Robert	Arabesque	1979	0	6	7	1	3	10	8	9	4	5	11	2
Morris, Robert	Arc	1988	0	1	8	2	4	3	11	10	6	7	5	9
Morris, Robert	Badlands	1991	0	5	6	9	4	7	1	8	3	11	2	10
Morris, Robert	Beautiful Beast	2007	0	1	3	6	5	10	7	4	9	8	11	2
Morris, Robert	Broken Consort in Three Parts, Row 1	1994	0	1	3	7	11	10	2	8	6	5	9	4
Morris, Robert	Broken Consort in Three Parts, Row 2	1994	0	11	3	10	6	7	9	1	5	4	8	2
Morris, Robert	Broken Consort in Three Parts, Row 3	1994	0	11	3	9	7	6	10	5	1	2	4	8
Morris, Robert	Brush	2011	0	11	6	10	7	8	3	2	5	4	9	1
Morris, Robert	By Far	1995	0	1	4	11	3	2	6	7	5	10	8	9
Morris, Robert	Canonic Variations	1992	0	3	11	1	4	8	5	6	9	10	2	7
Morris, Robert	Clash	1987	0	3	11	10	8	1	7	9	2	6	4	5
Morris, Robert	Cold Mountain Songs	1993	0	1	2	5	6	3	7	8	10	9	11	4
Morris, Robert	Concerto for Piano and Strings	1994	0	1	6	11	7	5	10	8	4	3	2	9
Morris, Robert	Concerto for Piano and Winds	1988	0	1	4	7	8	10	11	2	5	6	9	3
Morris, Robert	Cuts	1984	0	10	11	7	3	8	6	9	4	5	1	2
Morris, Robert	Entanglements	1998	0	3	10	5	11	6	1	7	9	2	8	4
Morris, Robert	Exchanges	1982	0	4	3	1	9	5	8	6	2	10	11	7
Morris, Robert	Four Fold Heart Sutra	1984	0	6	7	2	11	1	10	4	9	5	8	3
Morris, Robert	Four Play Nine	2012	0	3	2	1	8	7	10	5	4	11	6	9

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Morris, Robert	Four Tangled Groves	2008	0	8	11	2	7	9	10	5	4	1	3	6
Morris, Robert	Four or Five Mirrors	1990	0	11	2	3	7	1	6	5	9	8	10	4
Morris, Robert	In Variations	1981	0	2	9	11	5	3	4	6	10	8	7	1
Morris, Robert	Inscape	1996	0	1	10	7	11	5	9	4	2	3	8	6
Morris, Robert	Inter Alia	1980	0	1	11	5	3	4	9	10	8	2	7	6
Morris, Robert	Knot Lilacs	2006	0	1	4	2	9	5	11	3	8	10	7	6
Morris, Robert	MA	1992	0	1	5	6	4	11	8	7	9	2	10	3
Morris, Robert	Night Sky Scroll	1985	0	11	4	3	9	5	8	2	1	7	6	10
Morris, Robert	Not Lilacs	1974	0	1	4	2	9	5	11	3	8	10	7	6
Morris, Robert	On the Go	1999	0	9	2	3	5	8	10	11	1	4	7	6
Morris, Robert	Out and Out	1989	0	11	6	3	7	9	5	8	1	2	10	4
Morris, Robert	Pari Passu, row 1	1988	0	6	10	11	2	3	9	1	7	8	4	5
Morris, Robert	Refrains	1995	0	3	4	2	6	10	1	8	11	7	5	9
Morris, Robert	Roundelay, row 1	2007	0	7	4	11	9	2	6	3	10	5	8	1
Morris, Robert	Roundelay, row 2	2007	0	5	9	7	8	10	4	11	1	6	2	3
Morris, Robert	Roundelay, row 3	2007	0	10	9	3	4	6	8	11	2	7	1	5
Morris, Robert	Roundelay, row 4	2007	0	3	11	10	7	2	6	9	5	4	1	8
Morris, Robert	Roundelay, row 5	2007	0	3	11	4	1	2	8	10	5	9	7	6
Morris, Robert	Roundelay, row 6	2007	0	10	5	11	4	6	8	7	2	3	9	1

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Morris, Robert	Something New	1998	0	9	4	8	11	7	3	6	10	5	2	1
Morris, Robert	Strange Flowers, Occasional Storms	2008	0	1	8	3	5	4	10	6	9	7	11	2
Morris, Robert	Sung Song	2002	0	3	7	6	9	2	10	5	1	8	4	11
Morris, Robert	Terrane	1989	0	11	1	3	2	5	6	4	9	7	8	10
Morris, Robert	Three Musicians	1989	0	9	7	6	8	1	11	2	4	5	3	10
Morris, Robert	Tigers and Lilies	1979	0	1	7	2	8	10	5	3	4	9	6	11
Morris, Robert	Tournament for 12 trombones	1981	0	7	6	4	11	8	5	9	1	3	2	10
Morris, Robert	Traces	1990	0	11	10	4	9	6	3	8	5	7	2	1
Morris, Robert	Twelve Bell Canons	2004	0	11	2	10	3	5	9	1	4	7	8	6
Morris, Robert	Tête-à-Tête	1999	0	3	11	10	1	8	2	6	9	5	4	7
Morris, Robert	Vignette	1999	0	3	11	10	7	6	5	2	1	8	9	4
Morris, Robert	Zoe	1996	0	8	6	3	1	9	7	10	4	2	5	11
Morris, Robert	...gradually...	2010	0	1	8	3	5	4	6	7	9	11	2	10
Musgrave, Thea	Triptych, Song 1	1959	0	11	9	6	5	2	10	1	8	7	3	4
Nichols, Jeff	...its darkening opposite, or Set Portrait in a Convex Mirror	2008	0	4	8	7	11	2	3	6	1	9	10	5
Nierhaus, Gerhard	'Achat' für Streichorchester (bzw. Streichsextett und Orgel)	1993/12/5	0	4	3	11	2	6	5	9	8	7	10	1
Nierhaus, Gerhard	'Polg' - für Orchester	1991	0	3	1	7	11	2	10	4	8	5	9	6
Nono, Luigi	Canti per tredici	1955	0	1	11	2	10	3	9	4	8	5	7	6
Nono, Luigi	Composizione per orchestra, No.1	1951	0	1	7	6	2	8	4	3	5	10	11	9

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Nono, Luigi	Cori di Didone	1958	0	1	11	2	10	3	9	4	8	5	7	6
Nono, Luigi	Ha venido	1960	0	6	1	7	2	8	3	9	4	10	5	11
Nono, Luigi	Il canto sospeso	1955-56	0	1	11	2	10	3	9	4	8	5	7	6
Nono, Luigi	Incontri	1955	0	2	3	8	9	6	4	5	7	11	1	10
Nono, Luigi	Intolleranza, Alto	1960	0	6	7	1	2	8	9	3	4	10	11	5
Nono, Luigi	Intolleranza, Baritone	1960	0	2	7	9	4	6	11	1	8	10	3	5
Nono, Luigi	Intolleranza, Soprano 1	1960	0	3	4	7	8	5	6	9	10	1	2	11
Nono, Luigi	Intolleranza, Soprano 2	1960	0	1	2	7	6	11	10	5	4	9	8	3
Nono, Luigi	Intolleranza, Tenor 1	1960	0	6	11	5	10	4	9	3	8	2	7	1
Nono, Luigi	Intolleranza, Tenor 2	1960	0	1	3	2	4	5	7	6	8	9	11	10
Nono, Luigi	La terra e la compagna (sketch), Series 1	1957	0	1	11	2	10	3	9	4	8	5	7	6
Nono, Luigi	La terra e la compagna (sketch), Series 2	1957	0	6	1	7	11	5	2	8	10	4	3	9
Nono, Luigi	La terra e la compagna (sketch), Series 3	1957	0	9	6	3	1	4	7	10	11	8	5	2
Nono, Luigi	La terra e la compagna (sketch), Series 4	1957	0	2	9	5	6	8	3	11	1	10	4	7
Nono, Luigi	La terra e la compagna (sketch), Series 5	1957	0	7	2	4	9	10	5	1	6	11	8	3
Nono, Luigi	La terra e la compagna (sketch), Series 6	1957	0	3	7	8	2	11	4	6	9	1	10	5
Nono, Luigi	La terra e la compagna (sketch), Series 7	1957	0	5	3	10	7	1	8	9	2	6	11	4
Nono, Luigi	La terra e la compagna (sketch), Series 8	1957	0	4	5	11	3	6	10	2	7	9	1	8
Nono, Luigi	Sarà dolce tacere	1960	0	10	5	3	8	6	1	11	4	2	9	7
Nono, Luigi	Variazioni canoniche sulla serie dell'Op.41 di Arnold Schönberg	1950	0	1	9	8	4	5	7	6	10	11	3	2
Panufnik, Andrzej	Sinfonia di Sfere (Symphony, No.5), Chord 1	1975	0	4	8	11	3	7	10	2	6	9	1	5
Panufnik, Andrzej	Sinfonia di Sfere (Symphony, No.5), Chord 2	1975	0	3	6	9	11	2	5	8	10	1	4	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Papageorgiou, Dimitri	'Jarra Jarra' for six block flutes	1988	0	5	3	2	6	8	7	11	1	10	9	4
Papaioannou, Yannis	12 Inventions and Toccatta	1958	0	2	5	6	1	3	8	9	11	7	4	10
Papaioannou, Yannis	Pygmalion	1952	0	2	7	5	8	11	9	6	10	3	1	4
Papaioannou, Yannis	Sonata	1958	0	2	9	8	1	6	4	3	11	10	7	5
Papaioannou, Yannis	Songs of the Lake, No.1	1950	0	8	5	7	6	11	2	10	1	3	9	4
Papaioannou, Yannis	Songs of the Lake, No.2	1950	0	7	4	6	5	1	9	2	8	10	3	11
Papaioannou, Yannis	Songs of the Lake, No.3	1950	0	11	8	1	6	7	2	10	3	4	9	5
Papaioannou, Yannis	Songs of the Lake, No.4	1950	0	5	11	9	6	10	7	2	3	1	4	8
Papaioannou, Yannis	Songs of the Lake, basic series	1950	0	4	5	9	8	3	11	10	2	1	6	7
Papaioannou, Yannis	Suite, "XP"	1958	0	4	2	1	6	8	3	9	7	10	5	11
Papaioannou, Yannis	Suite, "YP"	1958	0	10	9	8	1	4	5	7	3	6	2	11
Papaioannou, Yannis	Suite, Basic row	1958	0	1	3	10	4	6	9	5	2	8	7	11
Papaioannou, Yannis	Symphony, No.3	1953	0	1	5	6	9	11	8	7	3	10	2	4
Payne, Antony	Miniature Variations on a Theme of E.L.	1984	0	6	11	10	8	7	9	1	3	2	4	5
Pentland, Barbara	String Quartet, No.3	1969	0	11	3	6	5	9	10	8	1	2	7	4
Perle, George	First string quartet		0	1	3	6	10	9	8	7	4	5	11	2
Piston, Walter	Symphony, No.8	1965	0	1	4	5	8	7	6	3	2	9	11	10
Pousseur, Henri	Trois Chants Sacrés	1951	0	10	11	4	1	5	9	6	3	7	2	8
Preßl, Hermann Markus	'A 5' für Bassklarinette, Vibraphon und drei Bratschen	1985/10/11	0	6	5	8	10	7	3	2	4	9	1	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Preßl, Hermann Markus	'Arsis' für 84 Singstimmen und 48 Instrumente	1988	0	1	4	7	8	11	2	9	10	6	5	3
Preßl, Hermann Markus	'N.N.,8' für Klavier und Orgel	1986/8	0	1	8	11	3	9	6	5	7	2	4	10
Preßl, Hermann Markus	'Sonnenuntergänge nach meinem Tode'; Fünf Haikus nach Günther Klinge für Sprechgesang, Alt-Saxophon und Crotales	1994/7	0	4	7	9	8	2	6	10	5	11	1	3
Preßl, Hermann Markus	'Zisterne' für Alt-Blockflöte allein	1994/7/17	0	10	6	3	11	8	2	1	7	9	5	4
Preßl, Hermann Markus	6. Symphonie aus Es	1990	0	6	1	7	5	8	9	11	3	2	4	10
Preßl, Hermann Markus	Fier Fafeln für Fier Fiolen	1994/6/13	0	10	5	4	7	3	9	2	11	6	8	1
Preßl, Hermann Markus	Finstersonnen	1994/7	0	3	9	6	11	5	1	2	7	8	10	4
Preßl, Hermann Markus	Ithaka	1994/8/1	0	9	7	10	6	4	2	5	8	3	1	11
Preßl, Hermann Markus	N. N. 50; 'Die Zeremonie des Abschieds'	1992/6/17	0	9	4	2	7	5	8	1	6	3	11	10
Preßl, Hermann Markus	N. N. 59 oder 'Der Ortsverlasser' für Cembalo und Orgelpositiv	1992/8/31	0	10	3	7	8	9	4	5	6	2	11	1
Preßl, Herrmann Markus	Fier Fafeln für Fier Fiolen	1994/6/13	0	7	8	11	9	4	6	10	1	5	3	2
Pärt, Arvo	Diagrams	1964	0	11	2	1	3	4	9	10	7	8	6	5
Pärt, Arvo	Perpetuum Mobile	1963	0	11	10	5	6	9	7	1	2	8	3	4
Pärt, Arvo	Symphony, No.1	1963	0	1	2	7	6	3	5	11	10	4	9	8
Pärt, Arvo	Symphony, No.2	1966	0	3	1	2	4	7	5	6	8	11	9	10

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Reynolds, Roger	Ambages	1965	0	1	4	5	7	6	8	9	10	11	2	3
Riegebauer, Sigrid	Toccata	1987	0	3	1	2	11	10	4	5	8	7	9	6
Rinner, Ernst Christian	Missa DO-SI-MI-LA	1989	0	11	4	9	3	2	10	1	8	7	5	6
Rochberg, George	Sonata-Fantasia	1956	0	11	10	4	5	6	9	8	7	1	2	3
Rochberg, George	String Quartet, No.2 with soprano solo	1961	0	11	6	5	1	2	8	7	3	4	9	10
Rochberg, George	Symphony, No.2	1955-56	0	8	1	4	9	5	6	2	3	10	11	7
Rochberg, George	Twelve Bagatelles, i	1952	0	1	7	11	5	4	10	2	6	3	8	9
Ross, Eric	Sotto Passaggio, Op.53	2002	0	11	4	6	9	8	10	1	5	2	3	7
Ruggles, Carl	Evocations II (Series X)	1941	0	1	7	2	8	9	11	10	5	6	4	3
Sande, Henrik	'Volkslied' für zwei Singstimmen und Klavier. 24. 12. 2015	2015/12/24	0	2	4	5	7	9	10	8	6	3	1	11
Sande, Henrik	4032 Töne für Klavier sechshändig	1999/11/24	0	7	2	9	4	11	6	1	8	3	10	5
Santoro, Claudio	A Menina Boba, "A Menina Exausta"	1945,71	0	5	10	7	3	11	1	8	2	9	6	4
Santoro, Claudio	A Menina Boba, "Asa Ferida"	1945	0	9	10	11	3	5	4	6	2	7	8	1
Santoro, Claudio	Invenções a duas vozes (Two-Part inventions)	1942	0	2	3	6	7	11	1	9	4	8	5	10
Santoro, Claudio	Peças para Piano	1943	0	11	4	5	1	9	2	3	7	8	6	10
Santoro, Claudio	Preludes 18-20	1963	0	9	1	3	2	8	10	4	6	5	7	11
Santoro, Claudio	Six Piano Pieces	1946	0	10	4	1	11	2	5	6	3	9	7	8
Santoro, Claudio	Sonata 1942	1942	0	2	3	6	7	11	1	9	4	8	5	10
Santoro, Claudio	Sonata, No.1	1945	0	10	3	8	11	1	2	9	7	4	5	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Santoro, Claudio	Sonatina, No.2	1963	0	11	1	5	6	3	7	8	9	2	4	10
Schiske, Karl	Symphony, No.4	1955	0	8	11	3	2	6	1	9	4	5	7	10
Schlerath, Ute		2012/1/1	0	5	3	9	10	2	8	4	1	7	11	6
Schmid, Erich	Bagatellen for Piano, Op.14	1943	0	1	5	2	6	7	4	8	10	3	9	11
Schmid, Erich	Canon ("Herrn Dr. Anton Webern in Ehrfurcht als Willkommensgruss gewidmet")	1943	0	10	4	5	8	11	1	7	9	3	6	2
Schmid, Erich	Notturmo, Op.10, mvt 1	1935	0	4	6	3	9	8	5	11	1	2	10	7
Schnittke, Alfred	Concerto Grosso, No.1, mvt 2	1977	0	11	2	1	8	7	10	9	6	5	4	3
Schnittke, Alfred	Concerto Grosso, No.3	1985	0	5	1	4	10	8	11	9	3	6	2	7
Schnittke, Alfred	Concerto Grosso, No.3, (mvt 3, 4), row 10	1985	0	3	4	11	10	1	2	9	7	8	5	6
Schnittke, Alfred	Concerto Grosso, No.3, (mvt 3, 4), row 6	1985	0	11	2	1	9	10	7	8	4	3	6	5
Schnittke, Alfred	Concerto Grosso, No.3, (mvt 3, 4), row 7	1985	0	3	11	9	10	1	4	2	7	8	5	6
Schnittke, Alfred	Concerto Grosso, No.3, (mvt 3, 4), row 8	1985	0	11	7	9	10	8	6	5	3	4	1	2
Schnittke, Alfred	Concerto Grosso, No.3, (mvt 3, 4), row 9	1985	0	11	2	1	9	6	7	8	10	3	5	4
Schnittke, Alfred	Concerto Grosso, No.3, monogram 1	1985	0	5	1	4	10	8	11	9	3	6	2	7
Schnittke, Alfred	Concerto Grosso, No.3, monogram 2	1985	0	8	9	7	5	2	3	4	6	11	10	1
Schnittke, Alfred	Concerto Grosso, No.3, monogram 3	1985	0	11	2	1	3	4	10	9	7	8	5	6
Schnittke, Alfred	Concerto Grosso, No.3, monogram 4	1985	0	9	10	7	5	4	2	3	1	11	8	6
Schnittke, Alfred	Concerto Grosso, No.3, monogram 5	1985	0	1	7	10	4	11	5	6	9	8	2	3
Schnittke, Alfred	Concerto, No.2 for Violin and Chamber Orchestra	1966	0	11	1	2	10	3	4	9	5	6	8	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Schnittke, Alfred	Improvisation and Fugue for piano	1965	0	8	11	3	9	2	5	7	6	10	1	4
Schnittke, Alfred	Piano Sonata, No.1, mvt 2, mm. 72-76	1987	0	6	5	11	10	4	3	9	8	2	1	7
Schnittke, Alfred	Serenade	1968	0	1	7	3	10	9	8	6	5	11	4	2
Schnittke, Alfred	Sonata, No.1 for Violin and Piano, mvt 1	1963	0	3	6	10	2	11	8	5	9	1	4	7
Schnittke, Alfred	Sonata, No.1 for Violin and Piano, mvt 2	1963	0	3	7	10	2	11	6	9	1	4	8	5
Schnittke, Alfred	Sonata, No.1 for Violin and Piano, mvt 3	1963	0	4	7	11	2	6	9	10	1	5	8	3
Schnittke, Alfred	Sonata, No.1 for Violin and Piano, mvt 4	1963	0	4	7	3	6	10	9	5	1	2	8	11
Schnittke, Alfred	Sonata, No.2 for Cello and Piano, mvt 2	1994	0	2	3	1	4	5	11	10	7	9	8	6
Schnittke, Alfred	Sonata, No.2 for Cello and Piano, mvt 2, new row	1994	0	3	6	9	10	1	4	7	8	11	2	5
Schnittke, Alfred	Sonata, No.3 for Violin and Piano, mvt 4	1994	0	3	5	4	6	7	8	2	1	9	10	11
Schnittke, Alfred	String Quartet, No.1	1966	0	2	1	10	3	11	5	9	4	7	8	6
Schnittke, Alfred	String Quartet, No.4	1989	0	11	10	1	3	2	4	9	8	6	5	7
Schnittke, Alfred	String Quartet, No.4, mvt 2, m.190	1989	0	1	6	5	3	4	11	10	8	9	2	7
Schnittke, Alfred	String Quartet, No.4, mvt 2, m.40	1989	0	5	10	3	2	7	8	1	6	11	4	9
Schnittke, Alfred	String Quartet, No.4, mvt 4, m.122	1989	0	1	11	2	10	3	4	9	8	7	6	5
Schnittke, Alfred	String Quartet, No.4, mvt 4, m.31	1989	0	11	9	10	8	7	6	5	3	4	2	1
Schnittke, Alfred	Symphony, No.7, mvt 3, row X	1993	0	1	10	11	2	3	9	4	5	8	7	6
Schnittke, Alfred	Symphony, No.7, mvt 3, row y	1993	0	1	11	10	8	9	7	6	5	4	3	2
Schnittke, Alfred	Viola Concerto	1985	0	11	5	2	1	6	3	8	7	4	10	9

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Schnittke, Alfred	Violin Sonata 2	1968	0	10	11	9	6	8	7	5	4	1	2	3
Schoenberg, Arnold	A Survivor From Warsaw, Op.46	1947	0	1	6	2	10	9	5	4	11	3	7	8
Schoenberg, Arnold	A Survivor From Warsaw, Op.46 (alternative)	1947	0	1	6	2	10	9	4	7	3	8	11	5
Schoenberg, Arnold	Accompaniment to a Film Scene, Op.34	1930	0	3	11	1	10	9	6	8	7	5	2	4
Schoenberg, Arnold	Die Jakobsleiter	1917,22	0	1	4	3	7	6	11	2	10	9	5	8
Schoenberg, Arnold	Fantasy for Piano Four Hands, I	Year unknown	0	4	2	5	3	7	11	10	1	8	9	6
Schoenberg, Arnold	Fantasy for Piano Four Hands, II (fragment)	Year unknown	0	3	6	1	7	8	2	5	11	4	10	9
Schoenberg, Arnold	Fantasy for Violin and Piano, Op.47	1949	0	11	3	1	7	9	5	6	2	4	10	8
Schoenberg, Arnold	Five Piano Pieces, Op.23, No.5	1920,23	0	8	10	6	7	5	9	1	3	2	11	4
Schoenberg, Arnold	Four Pieces for Mixed Chorus, No.1, Op.27, No.1	1925	0	11	8	2	1	7	9	10	4	3	5	6
Schoenberg, Arnold	Four Pieces for Mixed Chorus, No.2, Op.27, No.2	1925	0	11	4	10	2	8	3	7	6	5	9	1
Schoenberg, Arnold	Four Pieces for Mixed Chorus, No.3, Op.27, No.3	1925	0	11	7	9	10	8	4	5	1	3	2	6
Schoenberg, Arnold	Four Pieces for Mixed Chorus, No.4, Op.27, No.4	1925	0	2	9	5	7	3	10	11	1	8	4	6
Schoenberg, Arnold	Israel Exists Again	1949	0	3	4	9	11	5	2	1	10	8	6	7
Schoenberg, Arnold	Modern Psalms, The First Psalm, Op.50c	1950	0	11	8	4	7	3	1	5	2	6	9	10
Schoenberg, Arnold	Moses und Aron	1930-32	0	1	7	5	6	4	10	8	9	11	2	3
Schoenberg, Arnold	Ode To Napoleon Buonaparte, Op.41 (view 1)	1942	0	11	3	4	8	7	2	1	5	6	10	9

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Schoenberg, Arnold	Ode To Napoleon Buonaparte, Op.41 (view 2)	1942	0	1	9	8	4	5	7	6	10	11	3	2
Schoenberg, Arnold	Piano Concerto, Op.42	1942	0	7	11	2	1	9	3	5	10	6	8	4
Schoenberg, Arnold	Prelude To A Suite From "Genesis", Op.44	1945	0	8	4	7	6	2	1	10	3	5	11	9
Schoenberg, Arnold	Psalm 130, De Profundis (unfinished), Op.50B	1950	0	6	5	1	11	7	4	8	9	3	2	10
Schoenberg, Arnold	Serenade, mvt 4, "Sonett", Op.24	1922-23	0	10	11	7	8	9	4	2	5	1	3	6
Schoenberg, Arnold	Serenade, mvt 5, "Tanzscene", Op.24	1920-23	0	1	3	6	7	9	8	10	11	2	4	5
Schoenberg, Arnold	Six Pieces for Male Chorus, No.1, Op.35	1930	0	9	1	3	2	11	6	8	7	4	10	5
Schoenberg, Arnold	Six Pieces for Male Chorus, No.2, Op.35	1930	0	3	1	7	6	8	11	5	4	9	10	2
Schoenberg, Arnold	Six Pieces for Male Chorus, No.3, Op.35	1930	0	3	4	5	2	9	6	7	1	8	11	10
Schoenberg, Arnold	Six Pieces for Male Chorus, No.5, Op.35	1930	0	6	9	1	2	10	7	3	11	5	4	8
Schoenberg, Arnold	Sonata For Organ	1941	0	6	10	2	8	1	7	5	9	4	11	3
Schoenberg, Arnold	String Quartet, No.3, Op.30	1927	0	9	8	2	5	10	11	4	3	6	1	7
Schoenberg, Arnold	String Quartet, No.4, Op.37	1936	0	11	7	8	3	1	2	10	6	5	4	9
Schoenberg, Arnold	String Trio, Op.45	1946	0	8	1	7	2	11	9	6	4	5	3	10
Schoenberg, Arnold	Suite for Piano, Op.25	1921-23	0	1	3	9	2	11	4	10	7	8	5	6
Schoenberg, Arnold	Suite, Op.29	1925	0	4	3	7	11	8	9	6	5	1	2	10
Schoenberg, Arnold	Three Satires for Mixed Chorus, No.1, Op.28, No.1	1925	0	4	7	1	9	11	5	3	2	6	8	10
Schoenberg, Arnold	Three Satires for Mixed Chorus, No.3, Op.28, No.3	1925,26	0	1	11	3	9	5	2	4	10	6	8	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Schoenberg, Arnold	Three Songs, No.1, "Sommermud", Op.48	1933	0	1	11	5	2	4	3	9	10	6	8	7
Schoenberg, Arnold	Three Songs, No.2, "Tot", Op.48	1933	0	1	7	11	8	2	6	5	10	9	3	4
Schoenberg, Arnold	Three Songs, No.3, "Madchenlied", Op.48	1933	0	6	8	10	2	4	9	5	3	11	7	1
Schoenberg, Arnold	Three Times a Thousand Years, Op.50a	1949	0	2	11	9	10	4	3	7	5	6	8	1
Schoenberg, Arnold	Two Piano Pieces, No.1, Op.33a	1928	0	7	2	1	11	8	3	5	9	10	4	6
Schoenberg, Arnold	Two Piano Pieces, No.2, Op.33b	1931	0	2	6	4	10	9	7	11	8	5	1	3
Schoenberg, Arnold	Variations for Orchestra, Op.31	1926-28	0	6	8	5	7	11	4	3	9	10	1	2
Schoenberg, Arnold	Violin Concerto, Op.36	1934,36	0	1	6	2	7	9	3	4	10	11	5	8
Schoenberg, Arnold	Violin Phantasy, Op.47	1949	0	11	3	1	7	9	6	2	10	5	8	4
Schoenberg, Arnold	Von Heute Auf Morgen, Op.32	1929	0	1	7	11	9	3	6	5	2	10	8	4
Schoenberg, Arnold	Wind Quintet, Op.26	1923-24	0	4	6	8	10	9	7	11	1	3	5	2
Schollum, Robert	Oktett in acht skizzen, Op.63	1959	0	9	2	3	10	11	8	7	4	6	5	1
Schreiner, Thomas	Stück für drei Violinen	1992/6/7	0	2	1	7	4	10	9	6	8	5	3	11
Schuller, Gunther	Transformation	1957	0	2	4	3	8	11	9	6	5	10	7	1
Schwantner, Joseph	"New Morning for the World"	1982	0	11	7	3	6	10	2	1	9	5	4	8
Schwantner, Joseph	...and the mountains rising nowhere	1977	0	11	8	7	4	3	2	1	10	9	6	5
Schwantner, Joseph	Elixir (Consortium VIII)	1975	0	8	4	3	7	11	10	6	9	5	1	2
Schwantner, Joseph	Elixir (Consortium VIII), m.22	1975	0	1	4	5	8	9	6	7	10	11	2	3
Schwantner, Joseph	In Aeternum (Derived Row)	1973	0	3	11	2	10	1	7	4	8	5	9	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Schwantner, Joseph	In Aeternum (Principal Row)	1973	0	4	11	6	10	5	1	9	2	7	3	8
Schwantner, Joseph	Modus Caelestis (A)	1972	0	6	7	1	11	5	4	10	8	2	3	9
Schwantner, Joseph	Modus Caelestis (R)	1972	0	6	7	2	4	1	9	11	3	5	8	10
Schwantner, Joseph	Modus Caelestis (m. 39)	1972	0	6	11	10	5	9	4	8	3	2	7	1
Schwantner, Joseph	Wild Angels of the Open Hills, 2, "Angels of the Shadowed Ancient Land," m. 11	1977	0	11	3	2	10	9	5	4	1	7	8	6
Schwantner, Joseph	Wild Angels of the Open Hills, 2, "Angels of the Shadowed Ancient Land," m. 21	1977	0	8	9	11	3	7	6	5	2	4	10	1
Searle, Humphrey	Toccata alla Passacaglia, Op.31	1957	0	5	6	1	10	7	9	8	3	2	4	11
Seiber, Mátyás	Concert Piece for Violin and Piano	1953-54	0	1	7	6	11	10	4	5	9	8	2	3
Seiber, Mátyás	Sonata for Violin and Piano	1960	0	1	11	10	7	6	8	9	4	3	5	2
Seiber, Mátyás	String Quartet, No.2	1934-35	0	2	3	1	4	11	5	10	7	9	8	6
Seiber, Mátyás	String Quartet, No.2, mvt 3	1934-35	0	2	3	1	4	9	5	11	10	7	6	8
Seiber, Mátyás	Ulysses	1950	0	3	4	7	8	11	1	10	9	6	5	2
Sengtschmid, Johann	Meditation für Orgel, Op.43a	1980	0	6	3	1	10	8	5	2	11	9	7	4
Sengtschmid, Johann	Scherzo für Blockflötenquartett, Op.28	1967	0	7	9	4	6	1	8	2	11	5	3	10
Sessions, Roger	Piano Sonata, No.3, mvt 2	1965	0	1	5	4	8	2	11	10	6	7	3	9
Sessions, Roger	Piano Sonata, No.3, mvt.1	1965	0	9	1	10	4	11	8	5	3	6	2	7
Sessions, Roger	When Lilacs Last in the Dooryard Bloom'd	1970	0	2	4	10	5	8	9	1	11	7	6	3

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Shapey, Ralph	String Quartet, No.9	1995	0	8	9	3	5	1	2	6	4	10	11	7
Shostakovich, Dmitri	String Quartet, No.12, Opening	1968	0	5	11	10	2	7	6	3	4	9	8	1
Shostakovich, Dmitri	String Quartet, No.13 B-flat minor (Op.138)	1970/8/10	0	3	8	7	11	2	6	5	4	10	9	1
Shostakovich, Dmitri	Symphony, No.14, mov. I	1969	0	11	9	4	3	10	8	7	5	6	1	2
Shostakovich, Dmitri	Symphony, No.14, mov. III	1969	0	5	2	7	10	1	11	4	6	8	9	3
Slonimsky, Nicholas	No. 1214a Thirds (Twelve-Tone Patterns)	1947	0	4	8	11	3	7	6	10	2	5	9	1
Slonimsky, Nicholas	No. 1215a Fourths (Twelve-Tone Patterns)	1947	0	5	10	3	8	1	7	2	9	4	11	6
Slonimsky, Nicholas	No. 1216a Fouthths (Twelve-Tone Patterns)	1947	0	5	10	3	7	2	9	4	8	1	6	11
Slonimsky, Nicholas	No. 1217a Fourths (Twelve-Tone Patterns)	1947	0	5	10	3	11	6	1	8	4	9	2	7
Slonimsky, Nicholas	No. 1218a Fourths (Twelve-Tone Patterns)	1947	0	5	10	3	8	1	6	11	4	9	2	7
Slonimsky, Nicholas	No. 1219a Fourths (Twelve-Tone Patterns)	1947	0	5	2	7	4	9	6	11	8	1	10	3
Slonimsky, Nicholas	No. 1220a Fifths (Twelve-Tone Patterns)	1947	0	7	2	9	4	11	6	1	8	3	10	5
Slonimsky, Nicholas	No. 1221a Fifths (Twelve-Tone Patterns)	1947	0	7	2	9	4	11	6	1	8	3	10	5
Slonimsky, Nicholas	No. 1222aFifths (Twelve-Tone Patterns)	1947	0	7	2	9	4	11	6	1	8	3	10	5
Slonimsky, Nicholas	No. 1223a Sixths (Twelve-Tone Patterns)	1947	0	8	4	1	5	9	6	2	10	7	11	3
Slonimsky, Nicholas	No. 1224a Sixths (Twelve-Tone Patterns)	1947	0	9	6	3	7	10	1	4	8	5	2	11
Slonimsky, Nicholas	No. 1225a Sixths (Twelve-Tone Patterns)	1947	0	8	4	7	11	3	6	2	10	1	5	9
Slonimsky, Nicholas	No. 1226a Minor Sevenths (Twelve-Tone Patterns)	1947	0	10	8	2	4	6	1	11	9	3	5	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1227a Minor Sevenths (Twelve-Tone Patterns)	1947	0	10	4	2	8	6	1	11	9	7	5	3
Slonimsky, Nicholas	No. 1228a Minor Sevenths (Twelve-Tone Patterns)	1947	0	10	2	4	8	6	11	1	5	3	7	9
Slonimsky, Nicholas	No. 1229a Major Sevenths (Twelve-Tone Patterns)	1947	0	11	10	9	8	7	1	2	3	4	5	6
Slonimsky, Nicholas	No. 1230a Major Sevenths (Twelve-Tone Patterns)	1947	0	11	3	4	8	7	1	2	6	5	9	10
Slonimsky, Nicholas	No. 1231a Major Sevenths (Twelve-Tone Patterns)	1947	0	11	4	3	8	7	1	2	9	10	5	6
Slonimsky, Nicholas	No. 1232a (Twelve-Tone Spirals)	1947	0	11	1	10	2	9	3	8	4	7	5	6
Slonimsky, Nicholas	No. 1233a (Twelve-Tone Spirals)	1947	0	11	1	10	2	9	3	8	4	7	5	6
Slonimsky, Nicholas	No. 1234a (Twelve-Tone Spirals)	1947	0	11	1	10	2	9	3	8	4	7	5	6
Slonimsky, Nicholas	No. 1235a (Twelve-Tone Spirals)	1947	0	11	1	10	2	9	3	8	4	7	5	6
Slonimsky, Nicholas	No. 1236a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals)	1947	0	11	9	2	4	7	5	6	8	3	1	10
Slonimsky, Nicholas	No. 1237a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals)	1947	0	11	9	7	2	4	6	5	3	1	8	10
Slonimsky, Nicholas	No. 1238a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals)	1947	0	9	7	5	3	2	4	6	8	1	10	11
Slonimsky, Nicholas	No. 1239a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals)	1947	0	11	2	9	4	7	6	5	8	3	10	1
Slonimsky, Nicholas	No. 1240a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals)	1947	0	11	9	2	4	7	5	3	6	8	1	10

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1241a Mutually Exclusive Diminished-Seventh Chords (Twelve-Tone Spirals)	1947	0	9	6	3	11	5	2	8	7	10	1	4
Slonimsky, Nicholas	No. 1242a Mutually Exclusive Diminished-Seventh Chords (Twelve-Tone Spirals)	1947	0	8	4	11	3	7	1	9	5	10	2	6
Slonimsky, Nicholas	No. 1243a Crossing Sixths (Crossing Intervals)	1947	0	1	9	4	6	7	3	10	11	2	8	5
Slonimsky, Nicholas	No. 1244a Crossing Sixths (Crossing Intervals)	1947	0	3	8	7	4	11	1	2	10	5	6	9
Slonimsky, Nicholas	No. 1245a Crossing Fifths (Crossing Intervals)	1947	0	5	7	10	2	3	9	8	4	1	11	6
Slonimsky, Nicholas	No. 1246a Crossing Fourth (Crossing Intervals)	1947	0	7	5	2	10	9	3	4	8	11	1	6
Slonimsky, Nicholas	No. 1247a Crossing Thirds (Crossing Intervals)	1947	0	3	4	11	7	8	10	5	2	1	6	9
Slonimsky, Nicholas	No. 1248a Crossing Thirds (Crossing Intervals)	1947	0	5	4	1	8	9	11	6	3	2	7	10
Slonimsky, Nicholas	No. 1249a Crossing Thirds (Crossing Intervals)	1947	0	11	3	8	6	5	9	2	1	10	4	7
Slonimsky, Nicholas	No. 1250a Crossing Seconds (Crossing Intervals)	1947	0	11	2	9	4	7	6	5	8	3	10	1
Slonimsky, Nicholas	No. 1251a Quadrifonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	1	6	9	2	5	8	11	4
Slonimsky, Nicholas	No. 1251b Quadrifonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	5	3	11	6	2	10	7	4	1	9

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1252a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	1	5	9	2	6	8	11	4
Slonimsky, Nicholas	No. 1252b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	5	3	10	6	2	11	7	4	1	9
Slonimsky, Nicholas	No. 1253a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	1	5	8	11	3	6	9	2
Slonimsky, Nicholas	No. 1253b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	3	1	9	6	4	11	7	5	2	10
Slonimsky, Nicholas	No. 1254a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	2	5	8	11	3	6	9	1
Slonimsky, Nicholas	No. 1254b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	3	1	10	6	4	11	7	5	2	9
Slonimsky, Nicholas	No. 1255a [Slonimsky: Moto Perpetuo] Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	1	6	9	2	5	8	11	3
Slonimsky, Nicholas	No. 1255b [Slonimsky: Moto Perpetuo] Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	3	2	9	6	5	1	10	7	4	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1256a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	2	5	8	11	4	6	9	1
Slonimsky, Nicholas	No. 1256b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	9	4	2	11	7	5	1	8	6	3	10
Slonimsky, Nicholas	No. 1257a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	3	7	10	1	6	9	2	5
Slonimsky, Nicholas	No. 1257b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	4	3	11	7	5	2	10	6	1	9
Slonimsky, Nicholas	No. 1258a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	2	6	9	1	5	8	11	4
Slonimsky, Nicholas	No. 1258b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	5	3	11	7	2	10	6	4	1	9
Slonimsky, Nicholas	No. 1259a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	2	6	9	1	5	7	10	3
Slonimsky, Nicholas	No. 1259b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	4	2	10	7	5	1	9	6	3	11
Slonimsky, Nicholas	No. 1260a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	2	6	9	1	5	8	11	3

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1260b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	3	2	10	6	5	1	9	7	4	11
Slonimsky, Nicholas	No. 1261a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	2	5	9	1	6	7	10	3
Slonimsky, Nicholas	No. 1261b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	4	1	10	7	5	2	9	6	3	11
Slonimsky, Nicholas	No. 1262a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	3	6	11	2	8	9	1	5
Slonimsky, Nicholas	No. 1262b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	9	5	3	11	8	4	1	7	6	2	10
Slonimsky, Nicholas	No. 1263a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	2	6	9	1	4	8	11	5
Slonimsky, Nicholas	No. 1263b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	5	3	11	7	6	2	9	4	1	10
Slonimsky, Nicholas	No. 1264a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	6	9	1	5	8	11	4	7	10	2
Slonimsky, Nicholas	No. 1264b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	9	3	2	10	6	5	1	8	7	4	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1265 Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	6	9	1	4	7	10	2	5	8	11
Slonimsky, Nicholas	No. 1265a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	6	9	1	4	7	10	2	5	8	11
Slonimsky, Nicholas	No. 1265b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	9	3	1	10	6	4	11	7	5	2	8
Slonimsky, Nicholas	No. 1266a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	6	9	2	5	8	11	4	7	10	1
Slonimsky, Nicholas	No. 1266b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	9	3	2	11	6	5	1	8	7	4	10
Slonimsky, Nicholas	No. 1267a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	1	4	8	11	5	6	9	2
Slonimsky, Nicholas	No. 1267b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	9	4	1	10	7	5	2	8	6	3	11
Slonimsky, Nicholas	No. 1268a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	1	5	8	11	2	6	9	3
Slonimsky, Nicholas	No. 1268b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	3	1	9	6	4	10	7	5	2	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1269a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	9	1	5	6	10	2	3	7	11
Slonimsky, Nicholas	No. 1269b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	4	3	11	7	6	2	10	9	5	1
Slonimsky, Nicholas	No. 1270a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	10	2	6	7	11	3	5	9	1
Slonimsky, Nicholas	No. 1270b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	4	2	10	6	3	11	7	5	1	9
Slonimsky, Nicholas	No. 1271a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	3	7	10	2	6	9	1	5
Slonimsky, Nicholas	No. 1271b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	8	4	1	9	5	2	10	6	3	11	7
Slonimsky, Nicholas	No. 1272a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	1	6	9	5	2	11	8	4
Slonimsky, Nicholas	No. 1272b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	6	1	2	5	9	8	4	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1273a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	1	5	9	6	2	11	8	4
Slonimsky, Nicholas	No. 1273b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	5	1	2	6	9	8	4	11
Slonimsky, Nicholas	No. 1274a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	1	5	9	6	2	11	8	3
Slonimsky, Nicholas	No. 1274b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	5	1	2	6	9	8	3	11
Slonimsky, Nicholas	No. 1275a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	2	5	9	6	1	11	8	3
Slonimsky, Nicholas	No. 1275b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	5	2	1	6	9	8	3	11
Slonimsky, Nicholas	No. 1276a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	1	6	9	5	2	11	8	3
Slonimsky, Nicholas	No. 1276b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	6	1	2	5	9	8	3	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1277a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	2	5	8	4	11	9	6	1
Slonimsky, Nicholas	No. 1277b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	5	2	4	8	11	9	6	1
Slonimsky, Nicholas	No. 1278a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	3	7	10	6	1	9	5	2
Slonimsky, Nicholas	No. 1278b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	7	3	6	10	1	9	5	2
Slonimsky, Nicholas	No. 1279a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	2	6	9	5	1	11	8	4
Slonimsky, Nicholas	No. 1279b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	6	2	1	5	9	8	4	11
Slonimsky, Nicholas	No. 1280a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	2	6	9	5	1	10	7	3
Slonimsky, Nicholas	No. 1280b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	6	2	5	9	1	10	7	3

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1281a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	2	6	9	5	1	11	8	3
Slonimsky, Nicholas	No. 1281b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	6	2	1	5	9	8	3	11
Slonimsky, Nicholas	No. 1282a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	2	5	9	6	1	10	7	3
Slonimsky, Nicholas	No. 1282b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	5	2	6	9	1	10	7	3
Slonimsky, Nicholas	No. 1283a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	3	6	8	2	11	9	5	1
Slonimsky, Nicholas	No. 1283b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	6	3	11	2	8	5	1	9
Slonimsky, Nicholas	No. 1284a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	2	6	9	4	1	11	8	5
Slonimsky, Nicholas	No. 1284b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	6	2	1	4	9	8	5	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1285a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	6	9	1	5	8	4	11	10	7	2
Slonimsky, Nicholas	No. 1285b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	6	9	5	1	11	4	8	7	2	10
Slonimsky, Nicholas	No. 1286a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	6	9	1	4	7	2	10	8	5	11
Slonimsky, Nicholas	No. 1286b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	6	9	4	1	10	2	7	8	5	11
Slonimsky, Nicholas	No. 1287a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	6	9	2	5	8	4	11	10	7	1
Slonimsky, Nicholas	No. 1287b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	6	9	5	2	11	4	8	7	1	10
Slonimsky, Nicholas	No. 1288a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	1	4	8	5	11	9	6	2
Slonimsky, Nicholas	No. 1288b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	3	7	10	4	1	11	5	8	6	2	9

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1289a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	1	5	8	2	11	9	6	3
Slonimsky, Nicholas	No. 1289b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	7	10	5	1	11	2	8	9	6	3
Slonimsky, Nicholas	No. 1290a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	9	1	5	6	2	10	7	3	11
Slonimsky, Nicholas	No. 1290b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	9	5	1	10	2	6	7	3	11
Slonimsky, Nicholas	No. 1291a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	10	2	6	7	3	11	9	5	1
Slonimsky, Nicholas	No. 1291b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	10	6	2	11	3	7	9	5	1
Slonimsky, Nicholas	No. 1292a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	3	7	10	6	2	1	9	5
Slonimsky, Nicholas	No. 1292b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads)	1947	0	4	8	11	7	3	2	6	10	9	5	1

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1293a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	2	4	5	7	9	6	8	10	11	1	3
Slonimsky, Nicholas	No. 1293b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	3	1	11	10	8	6	9	7	5	4	2
Slonimsky, Nicholas	No. 1294a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	9	4	7	5	2	6	3	10	1	11	8
Slonimsky, Nicholas	No. 1294b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	8	11	1	10	3	6	2	5	7	4	9
Slonimsky, Nicholas	No. 1295a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	2	5	4	3	1	6	8	11	10	9	7
Slonimsky, Nicholas	No. 1295b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	7	9	10	11	8	6	1	3	4	5	2
Slonimsky, Nicholas	No. 1296a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	7	8	3	4	11	6	1	2	9	10	5
Slonimsky, Nicholas	No. 1296b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	5	10	9	2	1	6	11	4	3	8	7
Slonimsky, Nicholas	No. 1297a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	11	9	7	2	4	6	5	3	1	8	10
Slonimsky, Nicholas	No. 1297b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	10	8	1	3	5	6	4	2	7	9	11
Slonimsky, Nicholas	No. 1298a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	11	1	10	2	9	6	5	7	4	8	3

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1298b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	3	8	4	7	5	6	9	2	10	1	11
Slonimsky, Nicholas	No. 1299a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	9	2	7	4	5	6	3	8	1	10	11
Slonimsky, Nicholas	No. 1299b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	11	10	1	8	3	6	5	4	7	2	9
Slonimsky, Nicholas	No. 1300a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	11	1	10	2	9	6	5	7	4	8	3
Slonimsky, Nicholas	No. 1300b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)	1947	0	3	8	4	7	5	6	9	2	10	1	11
Slonimsky, Nicholas	No. 1301 Invertible Dodecaphonic Progressions - With all Different Intervals	1947	0	1	4	8	3	5	11	9	2	10	7	6
Slonimsky, Nicholas	No. 1302 Invertible Dodecaphonic Progressions - With all Different Intervals	1947	0	1	4	2	9	5	11	3	8	10	7	6
Slonimsky, Nicholas	No. 1303 Invertible Dodecaphonic Progressions - With all Different Intervals	1947	0	2	3	7	10	5	11	4	1	9	8	6
Slonimsky, Nicholas	No. 1304 Invertible Dodecaphonic Progressions - With all Different Intervals. (On a Minor Triad)	1947	0	3	7	8	10	5	11	4	2	1	9	6
Slonimsky, Nicholas	No. 1305 Invertible Dodecaphonic Progressions - With all Different Intervals. (On a Major Sixth-Chord)	1947	0	3	8	10	11	7	1	5	4	2	9	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1306 Invertible Dodecaphonic Progressions - With all Different Intervals. (On a Major Triad)	1947	0	4	7	8	3	5	11	9	2	1	10	6
Slonimsky, Nicholas	No. 1307 Invertible Dodecaphonic Progressions - With all Different Intervals. (On a Minor Sixth-Chord)	1947	0	4	9	8	11	1	7	5	2	3	10	6
Slonimsky, Nicholas	No. 1308 Invertible Dodecaphonic Progressions - With all Different Intervals. (On a Minor Six-Four Chord)	1947	0	5	8	10	9	1	7	3	4	2	11	6
Slonimsky, Nicholas	No. 1309 Invertible Dodecaphonic Progressions - With all Different Intervals. (On a Major Six-Four Chord)	1947	0	5	9	8	10	1	7	4	2	3	11	6
Slonimsky, Nicholas	No. 1310 Invertible Dodecaphonic Progressions - With all Different Intervals	1947	0	5	1	4	2	3	9	8	10	7	11	6
Slonimsky, Nicholas	No. 1311 Invertible Dodecaphonic Progressions - With all Different Intervals	1947	0	7	9	10	2	5	11	8	4	3	1	6
Slonimsky, Nicholas	No. 1312 Invertible Dodecaphonic Progressions - With all Different Intervals	1947	0	7	10	2	3	5	11	9	8	4	1	6
Slonimsky, Nicholas	No. 1313 Invertible Dodecaphonic Progressions - With all Different Intervals	1947	0	7	11	2	4	3	9	10	8	5	1	6
Slonimsky, Nicholas	No. 1314 Invertible Dodecaphonic Progressions - With all Different Intervals. (White-Key Row of Six Notes)	1947	0	2	7	4	5	9	3	11	10	1	8	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 1315 Invertible Dodecaphonic Progressions - With all Different Intervals. (White-Key Row of Six Notes)	1947	0	4	5	2	7	9	3	1	8	11	10	6
Slonimsky, Nicholas	No. 1316 Invertible Dodecaphonic Progressions - With all Different Intervals. (White-Key Row of Six Notes)	1947	0	7	4	5	9	2	8	3	11	10	1	6
Slonimsky, Nicholas	No. 1317 Invertible Dodecaphonic Progressions - With all Different Intervals. (Mother Chord)	1947	0	11	7	4	2	9	3	8	10	1	5	6
Slonimsky, Nicholas	No. 1318 Invertible Dodecaphonic Progressions - With all Different Intervals. (Grandmother Chord)	1947	0	11	1	10	2	9	3	8	4	7	5	6
Slonimsky, Nicholas	No. 216 Ultrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	5	10	7	4	9	2	11	8	1	6	3
Slonimsky, Nicholas	No. 221 Ultrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	6	11	9	4	10	3	1	8	2	7	5
Slonimsky, Nicholas	No. 230 Ultrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	6	5	11	4	10	9	3	8	2	1	7
Slonimsky, Nicholas	No. 258 Infrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	11	10	9	4	3	2	1	8	7	6	5
Slonimsky, Nicholas	No. 262 Infrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	11	10	5	4	3	2	9	8	7	6	1

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 270 Intraposition of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	10	9	7	4	2	1	11	8	6	5	3
Slonimsky, Nicholas	No. 277 Intraposition of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	10	7	5	4	2	11	9	8	6	3	1
Slonimsky, Nicholas	No. 340 Infra-Inter-Ultraposition (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	11	2	9	4	3	6	1	8	7	10	5
Slonimsky, Nicholas	No. 348 Infra-Inter-Ultraposition (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	10	1	7	4	2	5	11	8	6	9	3
Slonimsky, Nicholas	No. 359 Infra-Inter-Ultraposition (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	10	3	9	4	2	7	1	8	6	11	5
Slonimsky, Nicholas	No. 370 Infra-Inter-Ultraposition (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	7	1	6	4	11	5	10	8	3	9	2
Slonimsky, Nicholas	No. 371 Infra-Inter-Ultraposition (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	7	2	5	4	11	6	9	8	3	10	1
Slonimsky, Nicholas	No. 388 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	3	9	6	4	7	1	10	8	11	5	2
Slonimsky, Nicholas	No. 389 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	9	3	6	4	1	7	10	8	5	11	2

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 390 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	3	9	6	4	7	1	10	8	11	5	2
Slonimsky, Nicholas	No. 391 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts)	1947	0	9	3	6	4	1	7	10	8	5	11	2
Slonimsky, Nicholas	No. 405 Ultrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	7	5	3	10	8	6	1	11	9	4	2
Slonimsky, Nicholas	No. 407 Ultrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	8	4	3	11	7	6	2	10	9	5	1
Slonimsky, Nicholas	No. 410 Ultrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	8	7	3	11	10	6	2	1	9	5	4
Slonimsky, Nicholas	No. 415 Ultrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	10	5	3	1	8	6	4	11	9	7	2
Slonimsky, Nicholas	No. 417 Ultrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	11	4	3	2	7	6	5	10	9	8	1
Slonimsky, Nicholas	No. 420 Ultrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	11	7	3	2	10	6	5	1	9	8	4
Slonimsky, Nicholas	No. 453 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	11	10	3	2	1	6	5	4	9	8	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 456 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	11	7	3	2	10	6	5	1	9	8	4
Slonimsky, Nicholas	No. 459 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	10	8	3	1	11	6	4	2	9	7	5
Slonimsky, Nicholas	No. 466 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	8	7	3	11	10	6	2	1	9	5	4
Slonimsky, Nicholas	No. 469 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	8	4	3	11	7	6	2	10	9	5	1
Slonimsky, Nicholas	No. 482 Infra-Interpolation (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	11	1	3	2	4	6	5	7	9	8	10
Slonimsky, Nicholas	No. 485 Infra-Interpolation (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	10	2	3	1	5	6	4	8	9	7	11
Slonimsky, Nicholas	No. 493 Inter-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	1	5	3	4	8	6	7	11	9	10	2
Slonimsky, Nicholas	No. 496 [Shostakovitch: Prelude No. 2] Inter-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	2	4	3	5	7	6	8	10	9	11	1
Slonimsky, Nicholas	No. 499 Inter-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	2	7	3	5	10	6	8	1	9	11	4

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 500 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	11	4	3	2	7	6	5	10	9	8	1
Slonimsky, Nicholas	No. 503 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	11	7	3	2	10	6	5	1	9	8	4
Slonimsky, Nicholas	No. 505 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	10	5	3	1	8	6	4	11	9	7	2
Slonimsky, Nicholas	No. 508 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	10	8	3	1	11	6	4	2	9	7	5
Slonimsky, Nicholas	No. 512 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts)	1947	0	8	4	3	11	7	6	2	10	9	5	1
Slonimsky, Nicholas	No. 570 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts)	1947	0	3	2	5	4	7	6	9	8	11	10	1
Slonimsky, Nicholas	No. 572 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts)	1947	0	5	2	7	4	9	6	11	8	1	10	3
Slonimsky, Nicholas	No. 574 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts)	1947	0	7	2	9	4	11	6	1	8	3	10	5
Slonimsky, Nicholas	No. 576 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts)	1947	0	9	2	11	4	1	6	3	8	5	10	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 578 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts)	1947	0	11	2	1	4	3	6	5	8	7	10	9
Slonimsky, Nicholas	No. 579 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts)	1947	0	11	2	1	4	3	6	5	8	7	10	9
Slonimsky, Nicholas	No. 637 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	1	3	2	4	5	7	6	8	9	11	10
Slonimsky, Nicholas	No. 638 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	11	9	10	4	3	1	2	8	7	5	6
Slonimsky, Nicholas	No. 639 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	1	2	5	4	3	6	7	8	11	10	9
Slonimsky, Nicholas	No. 640 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	11	10	7	8	9	6	5	4	1	2	3
Slonimsky, Nicholas	No. 641 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	1	2	3	7	6	5	4	8	9	10	11
Slonimsky, Nicholas	No. 642 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	1	2	3	4	5	11	10	9	8	7	6
Slonimsky, Nicholas	No. 643 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	6	7	8	9	10	11	5	4	3	2	1

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 644 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	6	7	8	9	10	11	5	4	3	2	1
Slonimsky, Nicholas	No. 645 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	1	11	10	8	9	7	6	4	5	3	2
Slonimsky, Nicholas	No. 646 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	1	11	6	8	9	7	2	4	5	3	10
Slonimsky, Nicholas	No. 647 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	2	11	5	8	10	7	1	4	6	3	9
Slonimsky, Nicholas	No. 648-654 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	1	2	3	4	5	6	7	8	9	10	11
Slonimsky, Nicholas	No. 655-657 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)	1947	0	11	10	9	8	7	6	5	4	3	2	1
Slonimsky, Nicholas	No. 685 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts)	1947	0	1	3	6	8	9	11	2	4	5	7	10
Slonimsky, Nicholas	No. 692 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts)	1947	0	2	3	5	8	10	11	1	4	6	7	9
Slonimsky, Nicholas	No. 698 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts)	1947	0	2	5	7	8	10	1	3	4	6	9	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 734 Inter-Infra-Ultrapolation (Quadritone Progression; Equal Division of Two Octaves into Three Parts)	1947	0	5	11	10	8	1	7	6	4	9	3	2
Slonimsky, Nicholas	No. 735 Inter-Infra-Ultrapolation (Quadritone Progression; Equal Division of Two Octaves into Three Parts)	1947	0	6	9	11	8	2	5	7	4	10	1	3
Slonimsky, Nicholas	No. 736 Inter-Infra-Ultrapolation (Quadritone Progression; Equal Division of Two Octaves into Three Parts)	1947	0	2	7	9	8	10	3	5	4	6	11	1
Slonimsky, Nicholas	No. 746 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts)	1947	0	1	5	9	10	2	6	7	11	3	4	8
Slonimsky, Nicholas	No. 749 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts)	1947	0	2	7	9	11	4	6	8	1	3	5	10
Slonimsky, Nicholas	No. 753 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts)	1947	0	4	8	9	1	5	6	10	2	3	7	11
Slonimsky, Nicholas	No. 754 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts)	1947	0	5	7	9	2	4	6	11	1	3	8	10
Slonimsky, Nicholas	No. 793 Infra-Ultrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts)	1947	0	11	10	9	8	7	6	5	4	3	2	1

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 794 Infra-Ultrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts)	1947	0	10	11	9	7	8	6	4	5	3	1	2
Slonimsky, Nicholas	No. 795 Infra-Ultrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts)	1947	0	8	1	9	5	10	6	2	7	3	11	4
Slonimsky, Nicholas	No. 799 Infra-Infrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts)	1947	0	2	7	9	11	4	6	8	1	3	5	10
Slonimsky, Nicholas	No. 813 Interpolation of Three Notes (Quinquetone Progression; Equal Division of Five Octaves into Six Parts)	1947	0	3	6	9	10	1	4	7	8	11	2	5
Slonimsky, Nicholas	No. 822 Ultrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts)	1947	0	11	10	9	8	7	6	5	4	3	2	1
Slonimsky, Nicholas	No. 823 Ultrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts)	1947	0	1	10	11	8	9	6	7	4	5	2	3
Slonimsky, Nicholas	No. 824 Infrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts)	1947	0	11	10	9	8	7	6	5	4	3	2	1
Slonimsky, Nicholas	No. 875 Infrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts)	1947	0	6	5	11	10	4	3	9	8	2	1	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Slonimsky, Nicholas	No. 903 Inter-Ultraposition (Quinquetone Progression; Equal Division of Five Octaves into Six Parts)	1947	0	4	8	5	9	1	10	2	6	3	7	11
Slonimsky, Nicholas	No. 909 Infra-Inter-Ultraposition (Quinquetone Progression; Equal Division of Five Octaves into Six Parts)	1947	0	9	3	6	5	2	8	11	10	7	1	4
Slonimsky, Nicholas	No. 915 Miscellaneous Patterns (Diatessaron Progression; Equal Division of Five Octaves into Twelve Parts)	1947	0	10	2	8	4	6	5	3	7	1	9	11
Slonimsky, Nicholas	No. 997 Infra-Interpolation (Diapente Progression; Equal Division of Seven Octaves into Twelve Parts)	1947	0	8	4	7	3	11	2	10	6	9	5	1
Smith, Hale	Contours for Orchestra	1961	0	5	6	4	10	11	7	2	1	3	9	8
Smith, Hale	Evocation	1965	0	1	7	2	9	5	8	3	10	11	4	6
Spinner, Leopold	Cantata, Op.11	1955-57	0	9	1	10	2	3	11	5	6	7	4	8
Spinner, Leopold	Chamber Symphony, Op.28	1975-79	0	11	10	6	4	5	2	1	3	7	8	9
Spinner, Leopold	Concert for Piano and Orchestra, Op.4	1947	0	2	1	9	11	3	4	7	5	6	10	8
Spinner, Leopold	Concerto for Orchestra, Op.12	1956-57	0	1	10	7	9	8	11	2	4	3	6	5
Spinner, Leopold	Die Nacht, Op.29	1978-79	0	4	1	2	5	6	7	10	8	9	11	3
Spinner, Leopold	Drei Lieder, Op.15	1959	0	2	3	9	6	10	8	4	7	5	1	11
Spinner, Leopold	Drei Lieder, Op.16	1960	0	9	8	5	4	3	6	7	10	1	2	11
Spinner, Leopold	Fantasy for Piano, Op.9	1953-54	0	1	4	5	2	3	8	9	6	7	10	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Spinner, Leopold	Fünf Lieder, Op.25	1973	0	9	11	2	1	5	7	6	10	8	4	3
Spinner, Leopold	Fünf Lieder, Op.8	1953	0	3	4	7	8	5	11	9	10	2	6	1
Spinner, Leopold	Ich lieb' eine Blume for Four-part mixed Choir	1936	0	11	2	4	9	7	1	3	10	8	5	6
Spinner, Leopold	Inventions for Piano, Op.13	1958	0	11	2	1	3	6	5	8	10	9	7	4
Spinner, Leopold	Lieder for Voice, Clarinet, Violin, and Cello	1936	0	7	6	3	11	9	2	1	4	8	10	5
Spinner, Leopold	Ouverture for Orchestra	1944	0	4	3	5	1	7	11	6	10	8	2	9
Spinner, Leopold	Ouverture for Orchestra, Op.5	1948-49	0	11	2	10	8	1	7	5	6	9	3	4
Spinner, Leopold	Prelude and Variations for Orchestra, Op.18	1960-62	0	9	10	7	8	4	5	6	2	3	1	11
Spinner, Leopold	Quintet, Op.14	1959-63	0	6	4	2	8	5	1	9	10	11	7	3
Spinner, Leopold	Ricercata, Op.21	1964-65	0	11	8	10	2	1	4	3	7	9	6	5
Spinner, Leopold	Schilfflieder, Op.27	1974-75	0	3	1	10	11	7	5	6	2	4	8	9
Spinner, Leopold	Sonata for Clarinet and Piano, Op.17	1961	0	3	4	1	2	5	11	8	7	10	9	6
Spinner, Leopold	Sonata for Piano, Op.3	1942-45	0	9	8	6	7	10	1	4	5	3	2	11
Spinner, Leopold	Sonata for Violin and Piano, Op.1	1936	0	7	6	1	3	8	5	10	2	9	4	11
Spinner, Leopold	Sonatina for Cello and Piano, Op.26	1972-73	0	1	11	2	4	3	9	10	8	5	7	6
Spinner, Leopold	Sonatina for Piano, Op.22	1966-69	0	3	2	1	9	10	11	8	5	4	7	6
Spinner, Leopold	Sonatina for Wind Instruments, Op.23	1971	0	9	1	5	4	2	8	10	11	7	3	6
Spinner, Leopold	String Quartet, No.2, Op.7	1952	0	3	4	7	8	11	1	10	9	6	5	2
Spinner, Leopold	String Quartet, Op.2	1941	0	1	7	6	11	10	4	5	8	9	3	2

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Spinner, Leopold	Suite for Clarinet and Piano, Op.10	1955-56	0	4	1	6	5	2	8	10	7	9	11	3
Spinner, Leopold	Trio for Clarinet, Cello and Piano	1935	0	1	7	6	5	11	10	3	4	2	9	8
Spinner, Leopold	Trio for Violin, Cello, and Piano, Op.6	1950	0	1	7	4	10	9	6	5	11	8	2	3
Spinner, Leopold	Variations for Violin and Piano, Op.19	1962	0	8	9	1	2	4	3	5	6	10	11	7
Spinner, Leopold	Zwei Lieder	1935-36	0	1	3	6	5	2	4	8	9	7	11	10
Spinner, Leopold	Zwei Lieder, Op.24	1970-71	0	11	1	4	3	7	5	6	9	8	10	2
Spinner, Leopold	Zwei kleine Stücke for Violin and Piano	1934	0	9	2	1	8	5	4	10	7	11	3	6
Steinbauer, Othmar	Violinsonate, No.1, Op.15		0	5	2	10	7	3	11	8	4	1	6	9
Stockhausen, Karlheinz	'Mantra'	1970	0	2	11	7	8	5	10	6	4	3	1	9
Stockhausen, Karlheinz	Choral	1950	0	1	10	6	8	3	5	2	4	11	9	7
Stockhausen, Karlheinz	Gruppen	1955-57	0	8	1	10	9	11	5	3	4	7	2	6
Stockhausen, Karlheinz	Klavierstück "V.5 or Pre-VI" (row of original 1954 version)	1954-55	0	8	1	11	10	7	5	9	4	6	3	2
Stockhausen, Karlheinz	Klavierstück IV row 3	1952	0	7	1	10	11	9	5	8	4	3	2	6
Stockhausen, Karlheinz	Klavierstück IV, row 1	1952	0	11	4	10	9	5	8	6	2	1	7	3
Stockhausen, Karlheinz	Klavierstück IV, row 2	1952	0	3	5	1	2	6	4	10	7	8	11	9
Stockhausen, Karlheinz	Klavierstück IX	1954-55	0	8	1	10	9	11	5	3	4	7	2	6
Stockhausen, Karlheinz	Klavierstück VII	1954-55	0	8	1	10	9	11	5	3	4	7	2	6
Stockhausen, Karlheinz	Klavierstück VIII	1954-55	0	8	1	11	10	7	5	9	4	6	3	2
Stockhausen, Karlheinz	Klavierstück X	1954-55	0	8	1	10	9	11	5	3	4	7	2	6

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Stockhausen, Karlheinz	Kreuzspiel	1951	0	10	9	11	7	2	8	1	4	6	5	3
Stockhausen, Karlheinz	Licht, Eve formula	1977-2003	0	4	3	2	5	6	10	11	9	1	7	8
Stockhausen, Karlheinz	Plus-Minus	1963,74	0	1	7	9	8	6	3	10	2	5	11	4
Stockhausen, Karlheinz	Tierkreis, Aquarius	1974-75	0	3	5	4	11	10	9	8	7	6	2	1
Stockhausen, Karlheinz	Tierkreis, Aries	1974-75	0	3	2	9	7	8	11	6	1	5	4	10
Stockhausen, Karlheinz	Tierkreis, Cancer	1974-75	0	7	11	10	9	8	3	6	4	1	5	2
Stockhausen, Karlheinz	Tierkreis, Capricorn	1974-75	0	9	2	8	7	5	6	1	3	4	10	11
Stockhausen, Karlheinz	Tierkreis, Gemini	1974-75	0	4	5	10	7	6	1	8	11	2	9	3
Stockhausen, Karlheinz	Tierkreis, Leo	1974-75	0	5	11	6	3	2	8	7	9	10	4	1
Stockhausen, Karlheinz	Tierkreis, Sagittarius	1974-75	0	6	5	2	3	4	7	8	9	10	11	1
Stockhausen, Karlheinz	Tierkreis, Scorpio	1974-75	0	4	3	11	7	8	10	9	2	5	1	6
Strauss, Richard	'Also sprach Zarathustra', Op.30	1896/8/24	0	11	6	2	3	7	10	9	4	1	5	8
Stravinsky, Igor	A Sermon, a Narrative and a Prayer	1961	0	1	9	11	10	7	8	3	4	6	5	2
Stravinsky, Igor	Abraham & Isaac	1963	0	1	3	5	6	2	4	8	7	9	11	10
Stravinsky, Igor	Agon, "Double Pas-de-Deux"	1953-57	0	11	1	2	9	8	10	7	5	6	4	3
Stravinsky, Igor	Agon, "Pas de deux", "Four trios"	1953-57	0	1	4	3	2	5	6	9	8	11	10	7
Stravinsky, Igor	Anthem "The dove descending breaks the air"	1962	0	4	2	5	7	8	10	9	11	1	6	3
Stravinsky, Igor	Canticum Sacrum, II	1955	0	11	9	6	10	8	7	5	2	4	3	1
Stravinsky, Igor	Canticum Sacrum, II & IV	1955	0	11	1	3	4	2	7	6	9	5	8	10

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Stravinsky, Igor	Double Canon "Raoul Dufy in Memoriam"	1959	0	11	3	2	1	8	6	9	10	7	5	4
Stravinsky, Igor	Elegy for J.F.K.	1964	0	6	4	2	8	9	3	1	11	10	7	5
Stravinsky, Igor	Epitaphium "für das Grabmal des Prinzen Max Egon zu Fürstenberg"	1959	0	9	2	3	11	10	5	4	1	6	7	8
Stravinsky, Igor	Fanfare for a New Theater	1964	0	11	1	3	4	2	5	7	6	8	10	9
Stravinsky, Igor	Introitus "T. S. Eliot in Memoriam"	1965	0	5	6	4	8	9	3	2	1	10	11	7
Stravinsky, Igor	Movements	1958-59	0	1	7	5	6	11	9	8	10	3	4	2
Stravinsky, Igor	Requiem Canticles, 1st series	1966	0	2	10	11	1	8	6	7	9	4	3	5
Stravinsky, Igor	Requiem Canticles, 2nd series	1966	0	7	6	4	5	9	8	10	3	1	11	2
Stravinsky, Igor	The Flood	1962	0	10	11	5	2	4	3	1	9	8	6	7
Stravinsky, Igor	The Owl and the Pussy Cat	1966	0	2	9	11	8	6	5	7	10	1	4	3
Stravinsky, Igor	Threni: id est lamentationes Jeremiae prophetae	1958	0	5	4	7	10	6	11	8	1	9	2	3
Stravinsky, Igor	Variations "Aldous Huxley in Memoriam"	1963-64	0	10	7	9	2	8	6	11	1	5	4	3
Talma, Louise	Passacaglia and Fugue	1955	0	4	2	9	11	7	8	3	1	6	5	10
Talma, Louise	Piano Sonata 2, mvt 1	1955	0	11	2	4	1	5	7	3	8	10	6	9
Talma, Louise	Piano Sonata 2, mvt 4, first row	1955	0	4	8	2	5	10	1	11	6	9	7	3
Talma, Louise	Piano Sonata 2, mvt 4, second row	1955	0	9	4	1	3	8	5	7	2	11	10	6
Talma, Louise	Seven Episodes for flute, viola and piano	1986-87	0	9	11	4	6	3	8	1	10	2	5	7
Talma, Louise	Six Etudes, Etude 1	1953-54	0	3	6	8	10	2	5	7	9	1	11	4
Talma, Louise	Six Etudes, Etude 2	1953-54	0	3	9	5	11	2	8	4	10	6	1	7
Talma, Louise	Six Etudes, Etude 3	1954	0	8	11	9	4	6	3	5	2	1	7	10

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Talma, Louise	Six Etudes, Etude 4	1953-54	0	1	5	9	4	8	7	6	11	2	10	3
Talma, Louise	Six Etudes, Etude 5	1953-54	0	4	6	11	8	3	9	1	5	7	2	10
Talma, Louise	Six Etudes, Etude 6	1953-54	0	8	6	9	4	5	2	1	3	10	7	11
Talma, Louise	Soundshots, "Whirring Pin Wheels"	1974	0	2	5	1	10	11	7	8	9	6	3	4
Talma, Louise	Three Bagatelles, Bagatelle 1	1955	0	1	3	5	10	4	9	7	2	6	11	8
Talma, Louise	Three Bagatelles, Bagatelle 2	1955	0	8	1	2	7	4	10	11	3	6	9	5
Talma, Louise	Three Bagatelles, Bagatelle 3	1955	0	3	4	1	5	8	10	7	2	11	6	9
Toufektsis, Orestis	MIKRO-ALLAXI (EpiEnteka II), für 15 Musiker	2006	0	8	3	7	2	4	10	11	1	6	9	5
Tranchell, Peter	Dodecafonía [no.6 for piano]	1950	0	1	3	4	5	7	8	10	11	2	6	9
Tranchell, Peter	Piano piece for Carl Dawson (unfinished), 1A	1950s?	0	10	9	1	4	8	7	2	5	11	3	6
Tranchell, Peter	Piano piece for Carl Dawson (unfinished), 2A	1950s?	0	11	9	5	6	7	10	8	3	2	1	4
Tranchell, Peter	Piano piece for Carl Dawson (unfinished), 3	1950s?	0	10	8	4	3	6	5	11	9	1	2	7
Tranchell, Peter	Piano piece for Carl Dawson (unfinished), 4	1950s?	0	7	6	1	3	4	2	11	9	5	10	8
Tranchell, Peter	Piano piece for Carl Dawson (unfinished), 5	1950s?	0	4	3	10	6	9	1	5	2	8	11	7
Tranchell, Peter	Piano piece for Carl Dawson (unfinished), 6	1950s?	0	8	3	6	4	9	10	5	7	1	11	2
Tranchell, Peter	Piano piece for Carl Dawson (unfinished), 7	1950s?	0	2	11	8	5	3	10	9	1	7	6	4
Tranchell, Peter	Piano piece for Carl Dawson (unfinished), 8	1950s?	0	4	3	11	6	8	2	9	10	7	1	5
Tranchell, Peter	Septet : [for] 2 violins, oboe, clarinet, horn, bassoon, cello : fifth dodecafonía	1940s?	0	2	1	10	3	4	11	6	5	9	8	7
Tranchell, Peter	Twice a Kiss sketch 1	1950/03/18	0	9	1	2	4	8	5	7	10	6	3	11

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Tranchell, Peter	Twice a Kiss sketch 2	1950/03/18	0	9	1	2	4	8	3	11	5	6	7	10
Tranchell, Peter	Twice a Kiss sketch 3	1950/03/18	0	1	2	4	8	9	7	5	3	6	10	11
Urbanner, Erich	Adagio	1966	0	3	1	11	10	9	8	7	6	4	2	5
Volkonsky, Andrei	Musica Stricta, mvt 2, row A	1956-57	0	6	8	9	11	10	1	7	2	3	5	4
Volkonsky, Andrei	Musica Stricta, mvt 2, row B	1956-57	0	3	1	4	11	6	5	10	7	2	8	9
Volkonsky, Andrei	Musica Stricta, mvt 2, row C	1956-57	0	10	11	9	4	5	7	2	1	3	6	8
Volkonsky, Andrei	Musica Stricta, mvt 2, row D	1956-57	0	4	9	2	8	10	11	1	3	7	5	6
Volkonsky, Andrei	Musica Stricta, mvt 3, row E	1956-57	0	4	9	5	10	1	2	6	7	8	11	3
Volkonsky, Andrei	Musica Stricta, mvt 3, row F	1956-57	0	1	9	3	5	6	7	11	10	8	4	2
Volkonsky, Andrei	Musica Stricta, mvt 4, row G	1956-57	0	6	5	4	3	2	1	11	9	10	8	7
Volkonsky, Andrei	Musica Stricta, mvt 4, row H	1956-57	0	6	4	9	8	2	7	1	11	5	10	3
Walker, George	Spatials	1961	0	3	9	11	2	8	7	5	4	1	10	6
Walton, William	Symphony, No.2	1957-60	0	3	7	8	2	11	6	5	9	10	4	1
Wang, Jian-Zhong	Five Pieces for Piano no. 1, "Pastorale"		0	3	5	6	1	8	9	7	10	11	2	4
Wang, Jian-Zhong	Five Pieces for Piano no. 1, "Pastorale" (variant)		0	3	5	7	4	2	11	9	6	8	10	1
Wang, Xi-Lin	A Dilapidated Tombstone		0	4	6	3	2	10	11	5	8	9	7	1
Weber, Ben	Fantasia (Variations), Op.25	1946	0	1	5	9	10	2	6	11	7	4	3	8
Weber, Ben	Five Bagatelles for Piano, Op.2, mvt ii	1939	0	1	2	9	6	7	4	8	5	11	10	3
Weber, Ben	Five Bagatelles for Piano, Op.2, mvt iii	1939	0	4	10	1	5	9	6	11	3	8	2	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Weber, Ben	Five Bagatelles for Piano, Op.2, mvt iv	1939	0	6	8	3	4	5	2	7	9	1	10	11
Weber, Ben	Five Bagatelles for Piano, Op.2, mvt v	1939	0	9	1	8	2	7	3	5	6	4	11	10
Weber, Ben	Humoreske, Op.49	1958	0	2	4	5	7	10	1	11	9	8	6	3
Weber, Ben	Intermezzo	1972	0	4	11	9	8	3	6	1	2	5	10	7
Weber, Ben	Lyric Piece, Op.40a	1953-54	0	1	5	4	10	2	8	6	3	9	7	11
Webern, Anton	2 Lieder, "Weiss Wie Lilien", Op.19, No.1	1925-26	0	3	11	10	8	2	1	6	7	4	9	5
Webern, Anton	2 Lieder, "Ziehn Die Schafe", Op.19, No.2	1925-26	0	8	1	10	11	4	3	9	7	6	2	5
Webern, Anton	3 Lieder, "Ave, Regina Coelorum", Op.18, No.3	1925	0	11	3	2	1	7	6	10	9	8	5	4
Webern, Anton	3 Lieder, "Erlösung", Op.18, No.2	1925	0	3	11	2	10	1	9	5	8	4	7	6
Webern, Anton	3 Lieder, "Schatzerl Klein", Op.18, No.1	1925	0	11	5	8	10	9	3	4	1	7	2	6
Webern, Anton	3 Volkstexte, "Armer Sunder, Du", Op.17, No.1	1924-25	0	11	6	7	4	5	8	9	10	1	2	3
Webern, Anton	3 Volkstexte, "Heiland, Unsere Missetaten...", Op.17, No.3	1925	0	9	8	7	11	10	4	5	6	3	2	1
Webern, Anton	3 Volkstexte, "Liebste Jungfrau", Op.17, No.2	1924-25	0	11	10	6	7	1	2	5	4	3	8	9
Webern, Anton	Cantata I, Op.29	1938-39	0	8	11	10	2	1	4	3	7	6	9	5
Webern, Anton	Cantata II, Op.31	1941-43	0	3	11	10	2	9	1	5	4	8	7	6
Webern, Anton	Concerto for Nine Instruments (Konzert), Op.24	1931-34	0	11	3	4	8	7	9	5	6	1	2	10
Webern, Anton	Das Augenlicht, Op.26	1935	0	2	1	4	3	7	8	5	9	6	10	11
Webern, Anton	Kinderstück	1924	0	1	9	8	7	10	11	6	5	4	3	2
Webern, Anton	Klavierstück	1925	0	1	2	11	10	4	5	6	9	8	7	3

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Webern, Anton	Op.32 (un-finished), initial sketch	1945	0	1	9	11	3	2	7	6	10	8	4	5
Webern, Anton	Op.32 (un-finished), later sketch	1945	0	1	2	11	10	9	5	4	3	6	7	8
Webern, Anton	Quartet for Violin, Clarinet, Tenor Sax, And Piano, Op.22	1928-30	0	9	8	11	10	2	3	4	5	7	1	6
Webern, Anton	String Quartet, Op.28	1937-38	0	11	2	1	5	6	3	4	8	7	10	9
Webern, Anton	String Trio, Op.20	1926-27	0	11	6	5	10	9	1	2	7	8	4	3
Webern, Anton	Symphony, Op.21	1927-28	0	3	2	1	5	4	10	11	7	8	9	6
Webern, Anton	Three Songs on Texts by Hildegard Jone, Op.25	1934	0	9	8	11	6	10	7	4	3	5	2	1
Webern, Anton	Three Songs, Op.23	1933-34	0	7	11	8	2	10	6	9	5	4	1	3
Webern, Anton	Variations for Orchestra, Op.30	1940	0	1	4	3	2	5	6	9	8	7	10	11
Webern, Anton	Variations for Piano, Op.27	1936	0	8	7	11	10	9	3	1	4	2	6	5
Weiss, Adolph	Prelude for Piano, No.11	1927	0	6	4	11	1	3	10	8	9	7	5	2
Westergaard, Peter	Mr. and Mrs. Discobolos	1966	0	2	1	4	3	5	8	6	10	7	11	9
Wilson, Olly	Piece for Four'	1966	0	8	9	4	2	6	7	11	10	3	5	1
Wolpe, Stefan	Form for Piano	1959	0	9	2	1	11	8	10	6	5	7	3	4
Wolpe, Stefan	Four Studies on Basic Rows, No.1 - Study on Tritones	1935-36	0	6	7	1	2	8	11	5	10	4	9	3
Wolpe, Stefan	Four Studies on Basic Rows, No.2 - Study on Thirds	1935-36	0	11	9	8	10	7	6	5	3	2	4	1
Wolpe, Stefan	Four Studies on Basic Rows, No.4, "Basic Row" 1	1935-36	0	1	2	3	4	5	6	7	8	9	10	11
Wolpe, Stefan	Four Studies on Basic Rows, No.4, "Basic Row" 10	1935-36	0	10	1	11	4	2	5	3	8	6	9	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Wolpe, Stefan	Four Studies on Basic Rows, No.4, "Basic Row" 11	1935-36	0	11	2	1	4	3	6	5	8	7	10	9
Wolpe, Stefan	Four Studies on Basic Rows, No.4, "Basic Row" 2	1935-36	0	2	4	6	8	10	11	1	3	5	7	9
Wolpe, Stefan	Four Studies on Basic Rows, No.4, "Basic Row" 3	1935-36	0	3	1	4	2	5	6	9	7	10	8	11
Wolpe, Stefan	Four Studies on Basic Rows, No.4, "Basic Row" 4	1935-36	0	4	8	2	6	10	3	7	11	5	9	1
Wolpe, Stefan	Four Studies on Basic Rows, No.4, "Basic Row" 5	1935-36	0	5	2	7	4	9	6	11	8	1	10	3
Wolpe, Stefan	Four Studies on Basic Rows, No.4, "Basic Row" 6	1935-36	0	6	1	7	2	8	3	9	4	10	5	11
Wolpe, Stefan	Four Studies on Basic Rows, No.4, "Basic Row" 7	1935-36	0	7	2	9	4	11	6	1	8	3	10	5
Wolpe, Stefan	Four Studies on Basic Rows, No.4, "Basic Row" 8	1935-36	0	8	4	1	9	5	2	10	6	3	11	7
Wolpe, Stefan	Four Studies on Basic Rows, No.4, "Basic Row" 9	1935-36	0	9	1	10	2	11	6	3	7	4	8	5
Wuorinen, Charles	Flute Variations II	1968	0	1	3	2	5	4	9	10	6	8	7	11
Wuorinen, Charles	Piano Concerto, No.3	1983	0	5	2	1	11	3	10	9	4	6	8	7
Wuorinen, Charles	Reliquary for Igor Stravinsky	1975	0	11	7	5	6	8	2	4	9	3	1	10
Wuorinen, Charles	Second Sonata, Source set	1976	0	2	10	3	5	7	6	4	1	11	9	8
Wuorinen, Charles	Second Sonata, Voice 2	1976	0	2	10	9	11	1	6	4	7	5	3	8
Wuorinen, Charles	Second Sonata, Voice 3	1976	0	2	4	3	5	1	9	7	11	10	8	6
Wuorinen, Charles	Sonata for Piano	1969	0	3	2	4	5	1	11	8	9	7	6	10

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Wuorinen, Charles	Third Piano Sonata	1986	0	7	5	2	10	9	3	4	8	11	1	6
Yi, Chen	Near Distance	1988	0	1	10	3	4	6	8	9	11	5	7	2
Yi, Chen	Symphony, No.2	1993	0	6	2	3	7	9	10	4	5	11	8	1
Yi, Chen	Woodwind Quintet	1987	0	11	1	7	9	8	10	4	6	5	2	3
Yun, Isang	Funf Stücke für Klavier, Stück 1, Row 1	1958	0	4	2	6	5	8	7	9	3	1	10	11
Yun, Isang	Funf Stücke für Klavier, Stück 1, Row 2	1958	0	11	10	4	2	1	3	6	5	9	7	8
Yun, Isang	Funf Stücke für Klavier, Stück 2	1958	0	9	8	4	6	7	10	1	3	5	2	11
Yun, Isang	Funf Stücke für Klavier, Stück 3, Row 1	1958	0	11	1	9	10	7	5	6	8	2	3	4
Yun, Isang	Funf Stücke für Klavier, Stück 3, Row 2	1958	0	4	2	8	5	6	7	9	3	11	10	1
Yun, Isang	Funf Stücke für Klavier, Stück 4	1958	0	1	7	8	11	3	4	9	5	2	6	10
Yun, Isang	Funf Stücke für Klavier, Stück 5	1958	0	11	6	3	2	10	9	1	5	4	8	7
Yun, Isang	Garak	1963	0	3	6	1	4	5	7	10	9	11	8	2
Yun, Isang	Gasa	1963	0	11	7	8	6	5	2	9	10	1	3	4
Yun, Isang	Piri for solo oboe	1971	0	1	7	4	5	11	10	6	8	2	3	9
Yun, Isang	Riul für Klarinette und Klavier	1968	0	5	6	9	8	4	3	7	1	2	11	10
Zappa, Frank	Brown Shoes Don't Make It	1967	0	11	3	2	9	1	7	8	4	10	5	6
Zappa, Frank	Waltz	1958/12/22	0	11	3	2	9	1	7	8	4	10	5	6
Zenk, Ludwig	Abend in Lans, Op.3, No.2	1934	0	1	6	4	5	2	7	8	3	10	11	9
Zenk, Ludwig	Adagio for Orchestra	1935	0	3	11	8	6	2	7	5	9	4	1	10
Zenk, Ludwig	An einen Springbrunnen, Op.6, No.1	1935	0	2	3	7	6	10	9	1	5	11	4	8
Zenk, Ludwig	Piano Sonata, No.2, Op.4	1935-37	0	11	6	8	7	10	5	4	9	2	1	3
Zenk, Ludwig	Piano Sonata, Op.1	1932-33	0	1	8	4	6	5	2	10	9	3	11	7

Composer	Work	Year	1	2	3	4	5	6	7	8	9	10	11	12
Zenk, Ludwig	Tränen, Op.5, No.4	1935	0	8	7	4	5	11	10	2	3	6	1	9
Zhou, Jin-Min	Piano Quintet, Scherzo		0	10	5	4	6	11	7	9	2	3	1	8
Zillig, Wilfried	Das Opfer	1937	0	11	3	4	8	7	10	9	1	2	6	5
Zillig, Wilfried	Die Windsbraut	1940	0	3	7	9	10	2	5	11	1	4	6	8
Zimmerman, Bernd Alois	Perspektiven	1955-56	0	2	10	8	4	6	3	1	5	7	11	9
Zimmermann, Bernd Alois	'Ich wandte mich um und sah alles Unrecht das geschah unter der Sonne'	1970	0	1	11	2	10	3	9	4	8	5	7	6
hauer, Josef Matthias	Zwölftonspiel für Oechester. 28. 9. 1954	1954/9/28	0	5	7	4	6	1	9	3	8	11	10	2

Musical Notation



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=6498>

Rows in the Repertoire by FourScoreAndMore

Anthology

The full list of rows above presents examples of repertoire row usages.

The following sections interpret that list somewhat, looking for the presence of certain properties. For a longer introduction to what these properties mean, please see the Row Properties chapter.

Re-used Rows

We begin with rows used more than once in this collection. This takes account of transposition (by

comparing P0 forms), but not inversion or retrograde equivalence. This list is short and largely limited to “famous” rows like the so-called “mother” chord (Berg, Ginastera, Klein) and cases of homage such as the Boulez-Messiaen and Payne-Lutyens pairs.

1. [0, 3, 11, 2, 10, 1, 7, 4, 8, 5, 9, 6]: Babbitt, Milton: Composition for Four Instruments; Schwantner, Joseph: In Aeternum (Derived Row)
2. [0, 1, 11, 2, 10, 3, 9, 8, 4, 6, 7, 5]: Babbitt, Milton: Relata I; Babbitt, Milton: Relata II
3. [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6]: Babbitt, Milton: Semi-simple variations; Stockhausen, Karlheinz: Gruppen; Stockhausen, Karlheinz: Klavierstück IX; Stockhausen, Karlheinz: Klavierstück VII; Stockhausen, Karlheinz: Klavierstück X
4. [0, 3, 11, 4, 1, 2, 8, 10, 5, 9, 7, 6]: Babbitt, Milton: String Quartet, No.2; Morris, Robert: Roundelay, row 5
5. [0, 3, 6, 9, 11, 2, 5, 8, 10, 1, 4, 7]: Bach, Johann Sebastian: Chromatische Fantasie; Panufnik, Andrzej: Sinfonia di Sfere (Symphony, No.5), Chord 2
6. [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2]: Baker, David: “Status Symbol” from “The Black Experience”; Seiber, Mátyás: Ulysses; Spinner, Leopold: String Quartet, No.2, Op.7
7. [0, 8, 4, 11, 3, 7, 1, 9, 5, 10, 2, 6]: Barber, Samuel: Piano Sonata, Op.26; Slonimsky, Nicholas: No. 1242a Mutually Exclusive Diminished-Seventh Chords (Twelve-Tone Spirals)
8. [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]: Berg, Alban: Lyric Suite, Primary Row / mvt I; Berg, Alban: Schliesse mir die Augen Beide; Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class III; Klein, Fritz: Die Maschine: Eine extonale Selbstsatire, Op.1; Klein, Fritz Heinrich: Variationen, Op.14; Slonimsky, Nicholas: No. 1317 Invertible Dodecaphonic Progressions – With all Different Intervals. (Mother Chord)
9. [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3]: Berg, Alban: Lyric Suite, mvt I; Eisler, Hanns: Der Zweck der Musik; Slonimsky, Nicholas: No. 1293a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)
10. [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]: Boulez, Pierre: Le Marteau sans Maître, cycle of Bourreaux de solitude; Lackner, Peter: INITIUM TRIPLEX. 28. Juni 2016; für drei Tasteninstrumente; Lackner, Peter: Kanon für drei Klaviere. 28. 6. 2016; Slonimsky, Nicholas: No. 648-654 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts); Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 1
11. [0, 11, 6, 5, 4, 3, 1, 10, 9, 7, 2, 8]: Boulez, Pierre: Structures Ia; Messiaen, Olivier: Mode de valeurs et d’intensités, Series 1
12. [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3]: Britten, Benjamin: The Turn of the Screw; Lackner, Peter: Kanon T2 à 6; Slonimsky, Nicholas: No. 1219a Fourths (Twelve-Tone Patterns); Slonimsky, Nicholas: No. 572 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts); Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 5

13. [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1]: Carter, Elliott: String Quartet, No.2 (sketch) 2; Slonimsky, Nicholas: No. 1269b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads); Slonimsky, Nicholas: No. 407 Ultraposition of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts); Slonimsky, Nicholas: No. 469 Infraposition of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts); Slonimsky, Nicholas: No. 512 Infra-Ultraposition (Sesquitone Progression; Equal Division of One Octave into Four Parts)
14. [0, 1, 5, 8, 10, 4, 3, 7, 9, 2, 11, 6]: Dallapiccola, Luigi: Canti di Liberazione; Dallapiccola, Luigi: Quaderno musicale di Annalibera; Dallapiccola, Luigi: Variazioni per orchestra
15. [0, 6, 11, 10, 1, 3, 5, 8, 7, 2, 4, 9]: Davies, Peter Maxwell: Five Pieces for Piano, Op.2, No.1; Davies, Peter Maxwell: Five Pieces for Piano, Op.2, No.1 (first row)
16. [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9]: Eisler, Hanns: Praeludium und Fuge über B-A-C-H for String Trio, Op.46; Slonimsky, Nicholas: No. 578 Ultraposition of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts); Slonimsky, Nicholas: No. 579 Ultraposition of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts); Wolpe, Stefan: Four Studies on Basic Rows, No.4, "Basic Row" 11
17. [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]: Fine, Vivian: Chaconne for piano; Ginastera, Alberto: Quintet, Op.29, Row Class VII S; Slonimsky, Nicholas: No. 1232a (Twelve-Tone Spirals); Slonimsky, Nicholas: No. 1233a (Twelve-Tone Spirals); Slonimsky, Nicholas: No. 1234a (Twelve-Tone Spirals); Slonimsky, Nicholas: No. 1235a (Twelve-Tone Spirals); Slonimsky, Nicholas: No. 1318 Invertible Dodecaphonic Progressions – With all Different Intervals. (Grandmother Chord)
18. [0, 9, 3, 7, 4, 10, 2, 6, 1, 8, 11, 5]: Florey, Hans: Griechisch-lateinisches Quadrat der Ordnung 4 mit Fuge in Klangnotation; Hauer, Josef Matthias: Tanz [Zwölftonspiel] im langsamen 3/4 Takt für zwei Violinen, zwei Bratschen und Klavier zu zwei Händen; Hauer, Josef Matthias: Zwölftonmusik [Zwölftonspiel] für Klavier zu vier Händen. Februar 1959 (Fragment)
19. [0, 1, 4, 6, 5, 3, 11, 10, 9, 7, 8, 2]: Florey, Hans: Kanonvariationen; Hauer, Josef Matthias: 1. canonic Example from the theoretical work 'Zwölftontechnik'
20. [0, 4, 6, 3, 8, 9, 7, 2, 1, 5, 11, 10]: Florey, Hans: Kleiner Doppelkanon; Florey, Hans: Magisches Quadrat der Ordnung 3
21. [0, 10, 1, 7, 4, 6, 5, 8, 3, 9, 2, 11]: Florey, Hans: Magischer Würfel mit 6 Spiegelpunkten; Florey, Hans: Sechs Kanonzyklen einunddesselben magischen Quadrates
22. [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6]: Gielen, Michael: Six Songs, for bass, violin, viola, clarinet, bass clarinet, and piano; Lang, Bernhard: Der Reigen; Slonimsky, Nicholas: No. 1310 Invertible Dodecaphonic Progressions – With all Different Intervals
23. [0, 11, 2, 3, 4, 1, 6, 5, 8, 9, 10, 7]: Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 2; Ginastera, Alberto: Violin Concerto, Op.30
24. [0, 11, 1, 8, 2, 7, 5, 6, 4, 9, 3, 10]: Ginastera, Alberto: Quintet, Op.29, Row Class III 2; Ginastera,

Alberto: Quintet, Op.29, Row Class VII 2

25. [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1]: Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 1; Slonimsky, Nicholas: No. 655-657 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts); Slonimsky, Nicholas: No. 793 Infra-Ultrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts); Slonimsky, Nicholas: No. 822 Ultrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts); Slonimsky, Nicholas: No. 824 Infrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts)
26. [0, 3, 6, 9, 2, 5, 8, 11, 4, 7, 10, 1]: Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 2; Slonimsky, Nicholas: No. 1266a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)
27. [0, 9, 3, 2, 11, 6, 5, 1, 8, 7, 4, 10]: Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 3; Slonimsky, Nicholas: No. 1266b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)
28. [0, 7, 1, 6, 4, 11, 5, 10, 8, 3, 9, 2]: Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 5; Slonimsky, Nicholas: No. 370 Infra-Inter-Ultrapolation (Ditone Progression; Equal Division of One Octave into Three Parts)
29. [0, 11, 4, 3, 8, 7, 1, 2, 9, 10, 5, 6]: Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 6; Slonimsky, Nicholas: No. 1231a Major Sevenths (Twelve-Tone Patterns)
30. [0, 4, 3, 10, 6, 9, 1, 5, 2, 8, 11, 7]: Gotham, Mark: Move On!; Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 5
31. [0, 6, 9, 2, 8, 10, 4, 7, 1, 11, 3, 5]: Hauer, Josef Matthias: 'Salambo', opera after Gustave Flaubert;, Op.60; Lackner, Peter: Salambo-Kanon (à 4); Bad Aussee, 2. Februar 2008; Matthias, Josef: Salambo, Op.60
32. [0, 9, 6, 11, 4, 1, 10, 5, 2, 8, 3, 7]: Hauer, Josef Matthias: Hausmusik [Zwölftonspiel] für Klavier zu vier Händen. September 1958; Hauer, Josef Matthias: Schulmusik für zwei Klaviere. 3. Oktober 1958; Hauer, Josef Matthias: Tanz [Zwölftonspiel] im langsamen 3/4 Takt für Violine, Bratsche und Klavier zu vier Händen. 6. September 1958; Hauer, Josef Matthias: Zwölftonspiel 22. Mai 1958; für zwei Violinen, Bratsche, Cello und Klavier zu zwei Händen; Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen
33. [0, 5, 7, 3, 9, 6, 11, 2, 8, 4, 1, 10]: Hauer, Josef Matthias: Nomos; Hauer, Josef Matthias: Nomos, Op.19 (bb.1-36)
34. [0, 9, 8, 5, 10, 2, 11, 6, 3, 7, 4, 1]: Hauer, Josef Matthias: Zwölftonspiel 26. August 1948; für Violine und Klavier; Hauer, Josef Matthias: Zwölftonspiel für Violine allein mit einer Zwölftonreihe von Dr. Ernst Weidinger
35. [0, 9, 6, 2, 3, 10, 8, 5, 4, 7, 11, 1]: Hauer, Josef Matthias: Zwölftonspiel 28. August 1948; für Violine und Klavier; Hauer, Josef Matthias: Zwölftonspiel 31. August 1948; für Violine (Flöte) und

- Klavier; Hauer, Josef Matthias: Zwölftonspiel 31. August 1948; für Violine und Klavier; 2. Fassung;
Hauer, Josef Matthias: Zwölftonspiel für Violine und Cembalo [Klavier]. 27. August 1948
36. [0, 4, 2, 9, 10, 6, 11, 1, 7, 3, 8, 5]: Hauer, Josef Matthias: Zwölftonspiel 5. September 1957; für Violine, Bratsche und Klavier; Hauer, Josef Matthias: Zwölftonspiel 9. September 1957; für vier Solostimmen [S, A, T, B], Violine, Bratsche und Klavier
37. [0, 10, 7, 2, 8, 6, 3, 4, 9, 11, 1, 5]: Hauer, Josef Matthias: Zwölftonspiel für Flöte, Horn, Violine, Bratsche, Cello und Klavier; Hauer, Josef Matthias: Zwölftonspiel für Violine und Klavier; Hauer, Josef Matthias: Zwölftonspiel für zwei Violinen, Bratsche und Cello ('Ins Räumliche übertragen'). 3. September 1953; Hauer, Josef Matthias: Zwölftonspiel in drei Teilen für zwei Violinen, Bratsche und Cello. 31. Juli 1953
38. [0, 6, 11, 4, 2, 9, 3, 1, 5, 7, 10, 8]: Hauer, Josef Matthias: Zwölftonspiel für Klavier. 11. Juni 1955; Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen. Mai 1955
39. [0, 5, 7, 4, 6, 1, 9, 3, 8, 11, 10, 2]: Hauer, Josef Matthias: Zwölftonspiel für Orchester. 28. 9. 1954; hauer, Josef Matthias: Zwölftonspiel für Oechester. 28. 9. 1954
40. [0, 1, 2, 3, 4, 5, 11, 10, 9, 8, 7, 6]: Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.1; Slonimsky, Nicholas: No. 642 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)
41. [0, 4, 3, 11, 10, 9, 1, 7, 8, 6, 2, 5]: Krenek, Ernst: Studies in Counterpoint; Krenek, Ernst: Studies in Counterpoint (i); Krenek, Ernst: Suite, Op.84 for solo cello
42. [0, 3, 10, 4, 9, 11, 8, 7, 5, 1, 2, 6]: Krenek, Ernst: Studies in Counterpoint (ii); Krenek, Ernst: Symeon, der Stylit
43. [0, 6, 3, 5, 9, 11, 7, 1, 4, 2, 10, 8]: Lackner, Peter: 'Der Winter'; Lackner, Peter: Kanon für Klavierquartett. 27. April 1991
44. [0, 10, 2, 6, 8, 4, 1, 9, 11, 3, 7, 5]: Lackner, Peter: 'Euphorbia obesa'. Kanon für Oboe, Englischhorn und Fagott.; Lackner, Peter: Kanon für zwei Violinen und Klavier. 1. Dezember 2004
45. [0, 3, 5, 11, 7, 10, 1, 8, 4, 9, 6, 2]: Lackner, Peter: 'Lied des Harfenmädchens' für Frauenstimme und Klavier; Lackner, Peter: 'Lied des Harfenmädchens II' für Flöte, Klarinette, Posaune, Violine, Cello und Klavier
46. [0, 4, 2, 8, 11, 7, 10, 5, 9, 1, 3, 6]: Lackner, Peter: 'Ständchen' für zwei Violinen und zwei Bratschen. 1913,2013; Lackner, Peter: Kanon für Violine, Bratsche und Klavier; Lackner, Peter: Kanon á 4
47. [0, 3, 6, 2, 9, 11, 7, 4, 1, 5, 10, 8]: Lackner, Peter: 'Wo ist der Freund' (erstes Lied aus dem Zyklus 'Wilde Erdbeeren' für Singstimme und Klavier); Lackner, Peter: Moebius-Band für Flöte, Violine, Violoncello und Klavier; Lackner, Peter: Moebius-Band für sechs Violinen
48. [0, 10, 2, 7, 9, 5, 11, 3, 1, 8, 4, 6]: Lackner, Peter: 2. Kanonzyklus; Lackner, Peter: Kanon für Flöte und Elektronik. Februar 1999
49. [0, 6, 8, 10, 1, 3, 5, 11, 9, 7, 4, 2]: Lackner, Peter: 3. Kanonzyklus; Lackner, Peter: Kanon für

Klavier

50. [0, 5, 3, 7, 11, 1, 9, 4, 6, 2, 10, 8]: Lackner, Peter: 4. Kanonzyklus; Lackner, Peter: Kanon für Flöte, Akkordeon, zwei Violinen, Bratsche und Klavier; Lackner, Peter: Kanon für Klavier. April 2000
51. [0, 8, 10, 4, 2, 6, 9, 1, 11, 5, 7, 3]: Lackner, Peter: KANON für A, O & Gsellmanns Weltmaschine. 8. Oktober 1958, 2008; Lackner, Peter: Kanon für Streichquartett. 22. September 2003
52. [0, 2, 7, 3, 5, 10, 6, 8, 1, 9, 11, 4]: Lackner, Peter: Kanon T3 à 4; Slonimsky, Nicholas: No. 499 Inter-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts)
53. [0, 2, 9, 10, 6, 5, 1, 11, 4, 3, 7, 8]: Lackner, Peter: Kanon für Cello und Klavier; Lackner, Peter: Kanon für Klavier. 5. April 1989; Lackner, Peter: Kanon für Violine und Violoncello
54. [0, 1, 10, 7, 9, 4, 5, 11, 8, 6, 2, 3]: Lackner, Peter: Kanon für Klavier zu vier Händen. Frühling 1984; Lackner, Peter: Kanon für zwei Violinen und Klavier. Frühjahr 1984
55. [0, 11, 3, 10, 6, 2, 7, 8, 4, 9, 1, 5]: Lackner, Peter: Kanon für acht Instrumente. Dezember 1991, März 2007; Lackner, Peter: Kanon für drei Bratschen
56. [0, 4, 8, 11, 3, 7, 10, 2, 6, 9, 1, 5]: Liszt, Franz: Eine Faust Symphonie; Panufnik, Andrzej: Sinfonia di Sfere (Symphony, No.5), Chord 1; Slonimsky, Nicholas: No. 1271a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)
57. [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6]: Luo, Zhong-Rong: Chang'e; Slonimsky, Nicholas: No. 1246a Crossing Fourths (Crossing Intervals); Wuorinen, Charles: Third Piano Sonata
58. [0, 2, 7, 5, 10, 8, 6, 3, 1, 11, 9, 4]: Luo, Zhong-Rong: Dusk, row 1; Luo, Zhong-Rong: Evening
59. [0, 2, 5, 7, 4, 11, 6, 8, 1, 3, 9, 10]: Luo, Zhong-Rong: Sonatina, mvt 2; Luo, Zhong-Rong: String Quartet, No.3, row 2
60. [0, 6, 5, 11, 10, 4, 3, 9, 8, 2, 1, 7]: Lutosławski, Witold: Musique Funébre (Funeral Music); Schnittke, Alfred: Piano Sonata, No.1, mvt 2, mm. 72-76; Slonimsky, Nicholas: No. 875 Infrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts)
61. [0, 6, 11, 10, 8, 7, 9, 1, 3, 2, 4, 5]: Lutyens, Elisabeth: The Valley of Hatsu'se; Payne, Antony: Miniature Variations on a Theme of E.L.
62. [0, 7, 2, 3, 6, 9, 10, 1, 4, 5, 8, 11]: Maderna, Bruno: Quartetto; Maderna, Bruno: Streichquartett (Basisreihe 1)
63. [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]: Messiaen, Olivier: Livre d'orgue; Nono, Luigi: Canti per tredici; Nono, Luigi: Cori di Didone; Nono, Luigi: Il canto sospeso; Nono, Luigi: La terra e la compagna (sketch), Series 1; Zimmermann, Bernd Alois: 'Ich wandte mich um und sah alles Unrecht das geschah unter der Sonne'
64. [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6]: Morris, Robert: Knot Lilacs; Morris, Robert: Not Lilacs; Slonimsky, Nicholas: No. 1302 Invertible Dodecaphonic Progressions – With all Different Intervals
65. [0, 6, 1, 7, 2, 8, 3, 9, 4, 10, 5, 11]: Nono, Luigi: Ha venido; Wolpe, Stefan: Four Studies on Basic Rows, No.4, "Basic Row" 6
66. [0, 1, 3, 2, 4, 5, 7, 6, 8, 9, 11, 10]: Nono, Luigi: Intolleranza, Tenor 2; Slonimsky, Nicholas: No. 637

Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)

67. [0, 1, 9, 8, 4, 5, 7, 6, 10, 11, 3, 2]: Nono, Luigi: Variazioni canoniche sulla serie dell'Op.41 di Arnold Schönberg; Schoenberg, Arnold: Ode To Napoleon Buonaparte, Op.41 (view 2)
68. [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5]: Sande, Henrik: 4032 Töne für Klavier sechshändig; Slonimsky, Nicholas: No. 1220a Fifths (Twelve-Tone Patterns); Slonimsky, Nicholas: No. 1221a Fifths (Twelve-Tone Patterns); Slonimsky, Nicholas: No. 1222a Fifths (Twelve-Tone Patterns); Slonimsky, Nicholas: No. 574 Ultraposition of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts); Wolpe, Stefan: Four Studies on Basic Rows, No.4, "Basic Row" 7
69. [0, 2, 3, 6, 7, 11, 1, 9, 4, 8, 5, 10]: Santoro, Claudio: Invenções a duas vozes (Two-Part inventions); Santoro, Claudio: Sonata 1942
70. [0, 5, 1, 4, 10, 8, 11, 9, 3, 6, 2, 7]: Schnittke, Alfred: Concerto Grosso, No.3, monogram 1; Schnittke, Alfred: Concerto Grosso, No.3
71. [0, 3, 6, 9, 10, 1, 4, 7, 8, 11, 2, 5]: Schnittke, Alfred: Sonata, No.2 for Cello and Piano, mvt 2, new row; Slonimsky, Nicholas: No. 813 Interpolation of Three Notes (Quinquetone Progression; Equal Division of Five Octaves into Six Parts)
72. [0, 11, 9, 7, 2, 4, 6, 5, 3, 1, 8, 10]: Slonimsky, Nicholas: No. 1237a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals); Slonimsky, Nicholas: No. 1297a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)
73. [0, 11, 2, 9, 4, 7, 6, 5, 8, 3, 10, 1]: Slonimsky, Nicholas: No. 1239a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals); Slonimsky, Nicholas: No. 1250a Crossing Seconds (Crossing Intervals)
74. [0, 3, 6, 9, 1, 4, 7, 10, 2, 5, 8, 11]: Slonimsky, Nicholas: No. 1265 Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads); Slonimsky, Nicholas: No. 1265a Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads)
75. [0, 4, 8, 9, 1, 5, 6, 10, 2, 3, 7, 11]: Slonimsky, Nicholas: No. 1269a Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads); Slonimsky, Nicholas: No. 753 Interpolation of Two Notes (Sesquiquadrilateral Progression; Equal Division of Three Octaves into Four Parts)
76. [0, 8, 4, 1, 9, 5, 2, 10, 6, 3, 11, 7]: Slonimsky, Nicholas: No. 1271b Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads); Wolpe, Stefan: Four Studies on Basic Rows, No.4, "Basic Row" 8
77. [0, 11, 1, 10, 2, 9, 6, 5, 7, 4, 8, 3]: Slonimsky, Nicholas: No. 1298a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns); Slonimsky, Nicholas: No. 1300a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)
78. [0, 3, 8, 4, 7, 5, 6, 9, 2, 10, 1, 11]: Slonimsky, Nicholas: No. 1298b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns); Slonimsky, Nicholas: No. 1300b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns)
79. [0, 3, 9, 6, 4, 7, 1, 10, 8, 11, 5, 2]: Slonimsky, Nicholas: No. 388 Miscellaneous Patterns

- [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts); Slonimsky, Nicholas: No. 390 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts)
80. [0, 9, 3, 6, 4, 1, 7, 10, 8, 5, 11, 2]: Slonimsky, Nicholas: No. 389 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts); Slonimsky, Nicholas: No. 391 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts)
 81. [0, 8, 7, 3, 11, 10, 6, 2, 1, 9, 5, 4]: Slonimsky, Nicholas: No. 410 Ultraposition of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts); Slonimsky, Nicholas: No. 466 Infraposition of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts)
 82. [0, 10, 5, 3, 1, 8, 6, 4, 11, 9, 7, 2]: Slonimsky, Nicholas: No. 415 Ultraposition of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts); Slonimsky, Nicholas: No. 505 Infra-Ultraposition (Sesquitone Progression; Equal Division of One Octave into Four Parts)
 83. [0, 11, 4, 3, 2, 7, 6, 5, 10, 9, 8, 1]: Slonimsky, Nicholas: No. 417 Ultraposition of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts); Slonimsky, Nicholas: No. 500 Infra-Ultraposition (Sesquitone Progression; Equal Division of One Octave into Four Parts)
 84. [0, 11, 7, 3, 2, 10, 6, 5, 1, 9, 8, 4]: Slonimsky, Nicholas: No. 420 Ultraposition of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts); Slonimsky, Nicholas: No. 456 Infraposition of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts); Slonimsky, Nicholas: No. 503 Infra-Ultraposition (Sesquitone Progression; Equal Division of One Octave into Four Parts)
 85. [0, 10, 8, 3, 1, 11, 6, 4, 2, 9, 7, 5]: Slonimsky, Nicholas: No. 459 Infraposition of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts); Slonimsky, Nicholas: No. 508 Infra-Ultraposition (Sesquitone Progression; Equal Division of One Octave into Four Parts)
 86. [0, 6, 7, 8, 9, 10, 11, 5, 4, 3, 2, 1]: Slonimsky, Nicholas: No. 643 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts); Slonimsky, Nicholas: No. 644 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts)
 87. [0, 2, 7, 9, 11, 4, 6, 8, 1, 3, 5, 10]: Slonimsky, Nicholas: No. 749 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts); Slonimsky, Nicholas: No. 799 Infra-Infraposition (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts)
 88. [0, 8, 1, 11, 10, 7, 5, 9, 4, 6, 3, 2]: Stockhausen, Karlheinz: Klavierstück "V.5 or Pre-VI" (row of original 1954 version); Stockhausen, Karlheinz: Klavierstück VIII
 89. [0, 11, 3, 2, 9, 1, 7, 8, 4, 10, 5, 6]: Zappa, Frank: Brown Shoes Don't Make It; Zappa, Frank: Waltz

All-Interval

All-interval rows go through all 11 different intervals (1, 2, 3, ... 11) between neighbouring pitches in the row.

1. Babbitt, Milton: Du, row i, [0, 9, 2, 10, 11, 1, 7, 5, 4, 8, 3, 6]
2. Babbitt, Milton: Du, row ii, [0, 5, 2, 10, 9, 7, 1, 3, 4, 8, 11, 6]
3. Babbitt, Milton: Partitions, [0, 7, 9, 10, 2, 11, 5, 8, 4, 3, 1, 6]
4. Babbitt, Milton: Semi-simple variations, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6]
5. Babbitt, Milton: Sounds and Words, [0, 9, 2, 4, 8, 3, 11, 10, 1, 7, 5, 6]
6. Babbitt, Milton: String Quartet, No.2, [0, 3, 11, 4, 1, 2, 8, 10, 5, 9, 7, 6]
7. Babbitt, Milton: The Widow's Lament in Springtime, [0, 11, 9, 2, 10, 7, 1, 4, 8, 3, 5, 6]
8. Babbitt, Milton: Three Compositions for Piano, No.1, [0, 5, 7, 4, 2, 3, 9, 1, 8, 11, 10, 6]
9. Berg, Alban: Lyric Suite, Primary Row / mvt I, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
10. Berg, Alban: Schliesse mir die Augen Beide, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
11. Carter, Elliott: A Symphony of Three Orchestras, [0, 8, 7, 10, 4, 5, 2, 9, 11, 3, 1, 6]
12. Carter, Elliott: Caténaires, [0, 8, 5, 3, 7, 9, 10, 4, 11, 2, 1, 6]
13. Carter, Elliott: Night Fantasies, [0, 10, 3, 11, 8, 7, 1, 2, 5, 9, 4, 6]
14. Carter, Elliott: String Quartet, No.3, [0, 11, 2, 9, 5, 3, 4, 8, 10, 7, 1, 6]
15. Dallapiccola, Luigi: Piccola musica notturna, [0, 9, 1, 3, 4, 11, 2, 8, 7, 5, 10, 6]
16. Fine, Vivian: Chaconne for piano, [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
17. Gielen, Michael: Six Songs, for bass, violin, viola, clarinet, bass clarinet, and piano, [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6]
18. Ginastera, Alberto: Quintet, Op.29, Row Class VII S, [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
19. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class III, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
20. Klein, Fritz: Die Maschine: Eine extonale Selbstsatire, Op.1, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
21. Klein, Fritz Heinrich: Variationen, Op.14, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
22. Krenek, Ernst: Quaestio temporis, Op.170, [0, 3, 11, 4, 2, 1, 7, 8, 10, 5, 9, 6]
23. Krenek, Ernst: Studies in Counterpoint (ii), [0, 3, 10, 4, 9, 11, 8, 7, 5, 1, 2, 6]
24. Krenek, Ernst: Symeon, der Stylit, [0, 3, 10, 4, 9, 11, 8, 7, 5, 1, 2, 6]
25. Krenek, Ernst: Symphonic Piece for string Orchestra, Op.86, [0, 3, 4, 10, 2, 9, 11, 8, 7, 5, 1, 6]
26. Krenek, Ernst: Zwölf Variationen in Drei Sätzen, Op.79, [0, 1, 3, 10, 2, 5, 11, 7, 4, 9, 8, 6]
27. Lackner, Peter: 'Flügelaltar' für Klavier, [0, 9, 11, 10, 2, 7, 1, 8, 4, 5, 3, 6]
28. Lang, Bernhard: Der Reigen, [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6]
29. Lang, Bernhard: Monadologie XIII a; 'The Saucy Maid', [0, 1, 5, 2, 4, 9, 3, 10, 8, 11, 7, 6]
30. Lang, Klaus: 'Von der Ligurischen Küste zum Trasimenischen See'; Trauermusik für Violine und

- Klavier, [0, 5, 9, 8, 10, 7, 1, 4, 2, 3, 11, 6]
31. Luo, Zhong-Rong: Chang'e, [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6]
 32. Messiaen, Olivier: Livre d'orgue, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]
 33. Morris, Robert: Knot Lilacs, [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6]
 34. Morris, Robert: Not Lilacs, [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6]
 35. Morris, Robert: Roundelay, row 5, [0, 3, 11, 4, 1, 2, 8, 10, 5, 9, 7, 6]
 36. Nono, Luigi: Canti per tredici, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]
 37. Nono, Luigi: Cori di Didone, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]
 38. Nono, Luigi: Il canto sospeso, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]
 39. Nono, Luigi: La terra e la compagna (sketch), Series 1, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]
 40. Schnittke, Alfred: String Quartet, No.1, [0, 2, 1, 10, 3, 11, 5, 9, 4, 7, 8, 6]
 41. Slonimsky, Nicholas: No. 1232a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
 42. Slonimsky, Nicholas: No. 1233a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
 43. Slonimsky, Nicholas: No. 1234a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
 44. Slonimsky, Nicholas: No. 1235a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
 45. Slonimsky, Nicholas: No. 1245a Crossing Fifths (Crossing Intervals), [0, 5, 7, 10, 2, 3, 9, 8, 4, 1, 11, 6]
 46. Slonimsky, Nicholas: No. 1246a Crossing Fourths (Crossing Intervals), [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6]
 47. Slonimsky, Nicholas: No. 1301 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 1, 4, 8, 3, 5, 11, 9, 2, 10, 7, 6]
 48. Slonimsky, Nicholas: No. 1302 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6]
 49. Slonimsky, Nicholas: No. 1303 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 2, 3, 7, 10, 5, 11, 4, 1, 9, 8, 6]
 50. Slonimsky, Nicholas: No. 1304 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Minor Triad), [0, 3, 7, 8, 10, 5, 11, 4, 2, 1, 9, 6]
 51. Slonimsky, Nicholas: No. 1305 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Major Sixth-Chord), [0, 3, 8, 10, 11, 7, 1, 5, 4, 2, 9, 6]
 52. Slonimsky, Nicholas: No. 1306 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Major Triad), [0, 4, 7, 8, 3, 5, 11, 9, 2, 1, 10, 6]
 53. Slonimsky, Nicholas: No. 1307 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Minor Sixth-Chord), [0, 4, 9, 8, 11, 1, 7, 5, 2, 3, 10, 6]
 54. Slonimsky, Nicholas: No. 1308 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Minor Six-Four Chord), [0, 5, 8, 10, 9, 1, 7, 3, 4, 2, 11, 6]
 55. Slonimsky, Nicholas: No. 1309 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Major Six-Four Chord), [0, 5, 9, 8, 10, 1, 7, 4, 2, 3, 11, 6]

56. Slonimsky, Nicholas: No. 1310 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6]
57. Slonimsky, Nicholas: No. 1311 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 9, 10, 2, 5, 11, 8, 4, 3, 1, 6]
58. Slonimsky, Nicholas: No. 1312 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 10, 2, 3, 5, 11, 9, 8, 4, 1, 6]
59. Slonimsky, Nicholas: No. 1313 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 11, 2, 4, 3, 9, 10, 8, 5, 1, 6]
60. Slonimsky, Nicholas: No. 1314 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 2, 7, 4, 5, 9, 3, 11, 10, 1, 8, 6]
61. Slonimsky, Nicholas: No. 1315 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 4, 5, 2, 7, 9, 3, 1, 8, 11, 10, 6]
62. Slonimsky, Nicholas: No. 1317 Invertible Dodecaphonic Progressions – With all Different Intervals. (Mother Chord), [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
63. Slonimsky, Nicholas: No. 1318 Invertible Dodecaphonic Progressions – With all Different Intervals. (Grandmother Chord), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
64. Stockhausen, Karlheinz: Gruppen, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6]
65. Stockhausen, Karlheinz: Klavierstück IX, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6]
66. Stockhausen, Karlheinz: Klavierstück VII, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6]
67. Stockhausen, Karlheinz: Klavierstück X, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6]
68. Wuorinen, Charles: Third Piano Sonata, [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6]
69. Zimmermann, Bernd Alois: 'Ich wandte mich um und sah alles Unrecht das geschah unter der Sonne', [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]

Self Retrograde

We turn now to classes of row symmetry, beginning with self retrograde rows for which the prime form is transposition-equivalent to its retrograde. The section after this one deals with retrograde inversion symmetry, and rotational symmetry is included as part of the following sections on derived rows (starting with "6x Same Dyad").

1. Babbitt, Milton: Composition for Four Instruments, [0, 3, 11, 2, 10, 1, 7, 4, 8, 5, 9, 6]
2. Babbitt, Milton: Composition for Four Instruments, row i, [0, 10, 9, 8, 7, 5, 11, 1, 2, 3, 4, 6]
3. Babbitt, Milton: Composition for Four Instruments, row ii, [0, 9, 11, 2, 4, 1, 7, 10, 8, 5, 3, 6]
4. Babbitt, Milton: Composition for Four Instruments, row iii, [0, 4, 3, 8, 7, 11, 5, 1, 2, 9, 10, 6]
5. Babbitt, Milton: Composition for Four Instruments, row iv, [0, 4, 1, 8, 5, 9, 3, 11, 2, 7, 10, 6]
6. Babbitt, Milton: Du, row i, [0, 9, 2, 10, 11, 1, 7, 5, 4, 8, 3, 6]

7. Babbitt, Milton: Du, row ii, [0, 5, 2, 10, 9, 7, 1, 3, 4, 8, 11, 6]
8. Babbitt, Milton: Partitions, [0, 7, 9, 10, 2, 11, 5, 8, 4, 3, 1, 6]
9. Babbitt, Milton: Semi-simple variations, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6]
10. Babbitt, Milton: The Widow's Lament in Springtime, [0, 11, 9, 2, 10, 7, 1, 4, 8, 3, 5, 6]
11. Barber, Samuel: Piano Sonata, Op.26, [0, 8, 4, 11, 3, 7, 1, 9, 5, 10, 2, 6]
12. Berg, Alban: Lyric Suite, Primary Row / mvt I, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
13. Berg, Alban: Schliesse mir die Augen Beide, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
14. Carter, Elliott: Night Fantasies, [0, 10, 3, 11, 8, 7, 1, 2, 5, 9, 4, 6]
15. Fine, Vivian: Chaconne for piano, [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
16. Gielen, Michael: Six Songs, for bass, violin, viola, clarinet, bass clarinet, and piano, [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6]
17. Ginastera, Alberto: Quintet, Op.29, Row Class VII S, [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
18. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class III, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
19. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 6, [0, 11, 4, 3, 8, 7, 1, 2, 9, 10, 5, 6]
20. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.1, [0, 1, 2, 3, 4, 5, 11, 10, 9, 8, 7, 6]
21. Jung, Joachim: , [0, 11, 3, 10, 2, 1, 7, 8, 4, 9, 5, 6]
22. Klein, Fritz: Die Maschine: Eine extonale Selbstsatire, Op.1, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
23. Klein, Fritz Heinrich: Variationen, Op.14, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
24. Krenek, Ernst: Quaestio temporis, Op.170, [0, 3, 11, 4, 2, 1, 7, 8, 10, 5, 9, 6]
25. Lackner, Peter: 'Flügelaltar' für Klavier, [0, 9, 11, 10, 2, 7, 1, 8, 4, 5, 3, 6]
26. Lackner, Peter: 2. Kanonzyklus, [0, 10, 2, 7, 9, 5, 11, 3, 1, 8, 4, 6]
27. Lackner, Peter: Kanon für Blockflötenquartett. April 2005, [0, 10, 11, 3, 1, 2, 8, 7, 9, 5, 4, 6]
28. Lackner, Peter: Kanon für Flöte solo und N. N., [0, 3, 7, 10, 2, 5, 11, 8, 4, 1, 9, 6]
29. Lackner, Peter: Kanon für Flöte und Elektronik. Februar 1999, [0, 10, 2, 7, 9, 5, 11, 3, 1, 8, 4, 6]
30. Lackner, Peter: Kanon für Violine, Viola und Akkordeon. 11. Juni 2007, [0, 11, 1, 2, 3, 10, 4, 9, 8, 7, 5, 6]
31. Lackner, Peter: Kanon für Violine solo, [0, 11, 2, 7, 10, 9, 3, 4, 1, 8, 5, 6]
32. Lackner, Peter: Kanon für zwei Singstimmen und Ensemble zur Skulpturengruppe LEM von Axel Kirchmayr und einem Text von Hannes Walzl. September 2004, [0, 2, 9, 10, 5, 7, 1, 11, 4, 3, 8, 6]
33. Lackner, Peter: Kanon für zwei Trompeten, Horn, Posaune und Tuba. 1. Mai 1993, [0, 1, 2, 10, 3, 5, 11, 9, 4, 8, 7, 6]
34. Lackner, Peter: Kanon für zwei Violinen. Frühjahr 1992, [0, 2, 4, 7, 9, 11, 5, 3, 1, 10, 8, 6]
35. Lackner, Peter: kgV (3,4) [zweistimmiger Kanon für Klavier], [0, 10, 2, 3, 5, 7, 1, 11, 9, 8, 4, 6]
36. Lang, Bernhard: Der Reigen, [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6]

37. Lang, Bernhard: Hemma (Music Theatre Hemma Klagenfurt 2015), [0, 5, 10, 2, 3, 1, 7, 9, 8, 4, 11, 6]
38. Lang, Bernhard: Monadologie XIII a; 'The Saucy Maid', [0, 1, 5, 2, 4, 9, 3, 10, 8, 11, 7, 6]
39. Lang, Klaus: 'Von der Ligurischen Küste zum Trasimenischen See'; Trauermusik für Violine und Klavier, [0, 5, 9, 8, 10, 7, 1, 4, 2, 3, 11, 6]
40. Luo, Zhong-Rong: Chang'e, [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6]
41. Messiaen, Olivier: Livre d'orgue, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]
42. Morris, Robert: Knot Lilacs, [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6]
43. Morris, Robert: Not Lilacs, [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6]
44. Nono, Luigi: Canti per tredici, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]
45. Nono, Luigi: Cori di Didone, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]
46. Nono, Luigi: Il canto sospeso, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]
47. Nono, Luigi: La terra e la compagna (sketch), Series 1, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]
48. Riegebauer, Sigrid: Toccata, [0, 3, 1, 2, 11, 10, 4, 5, 8, 7, 9, 6]
49. Schnittke, Alfred: Concerto Grosso, No.3, monogram 3, [0, 11, 2, 1, 3, 4, 10, 9, 7, 8, 5, 6]
50. Schnittke, Alfred: Sonata, No.2 for Cello and Piano, mvt 2, [0, 2, 3, 1, 4, 5, 11, 10, 7, 9, 8, 6]
51. Schnittke, Alfred: String Quartet, No.1, [0, 2, 1, 10, 3, 11, 5, 9, 4, 7, 8, 6]
52. Schwantner, Joseph: In Aeternum (Derived Row), [0, 3, 11, 2, 10, 1, 7, 4, 8, 5, 9, 6]
53. Seiber, Mátyás: String Quartet, No.2, [0, 2, 3, 1, 4, 11, 5, 10, 7, 9, 8, 6]
54. Slonimsky, Nicholas: No. 1215a Fourths (Twelve-Tone Patterns), [0, 5, 10, 3, 8, 1, 7, 2, 9, 4, 11, 6]
55. Slonimsky, Nicholas: No. 1229a Major Sevenths (Twelve-Tone Patterns), [0, 11, 10, 9, 8, 7, 1, 2, 3, 4, 5, 6]
56. Slonimsky, Nicholas: No. 1231a Major Sevenths (Twelve-Tone Patterns), [0, 11, 4, 3, 8, 7, 1, 2, 9, 10, 5, 6]
57. Slonimsky, Nicholas: No. 1232a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
58. Slonimsky, Nicholas: No. 1233a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
59. Slonimsky, Nicholas: No. 1234a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
60. Slonimsky, Nicholas: No. 1235a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
61. Slonimsky, Nicholas: No. 1242a Mutually Exclusive Diminished-Seventh Chords (Twelve-Tone Spirals), [0, 8, 4, 11, 3, 7, 1, 9, 5, 10, 2, 6]
62. Slonimsky, Nicholas: No. 1245a Crossing Fifths (Crossing Intervals), [0, 5, 7, 10, 2, 3, 9, 8, 4, 1, 11, 6]
63. Slonimsky, Nicholas: No. 1246a Crossing Fourths (Crossing Intervals), [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6]
64. Slonimsky, Nicholas: No. 1301 Invertible Dodecapronic Progressions – With all Different Intervals, [0, 1, 4, 8, 3, 5, 11, 9, 2, 10, 7, 6]
65. Slonimsky, Nicholas: No. 1302 Invertible Dodecapronic Progressions – With all Different Intervals,

- [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6]
66. Slonimsky, Nicholas: No. 1303 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 2, 3, 7, 10, 5, 11, 4, 1, 9, 8, 6]
 67. Slonimsky, Nicholas: No. 1304 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Minor Triad), [0, 3, 7, 8, 10, 5, 11, 4, 2, 1, 9, 6]
 68. Slonimsky, Nicholas: No. 1305 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Major Sixth-Chord), [0, 3, 8, 10, 11, 7, 1, 5, 4, 2, 9, 6]
 69. Slonimsky, Nicholas: No. 1306 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Major Triad), [0, 4, 7, 8, 3, 5, 11, 9, 2, 1, 10, 6]
 70. Slonimsky, Nicholas: No. 1307 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Minor Sixth-Chord), [0, 4, 9, 8, 11, 1, 7, 5, 2, 3, 10, 6]
 71. Slonimsky, Nicholas: No. 1308 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Minor Six-Four Chord), [0, 5, 8, 10, 9, 1, 7, 3, 4, 2, 11, 6]
 72. Slonimsky, Nicholas: No. 1309 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Major Six-Four Chord), [0, 5, 9, 8, 10, 1, 7, 4, 2, 3, 11, 6]
 73. Slonimsky, Nicholas: No. 1310 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6]
 74. Slonimsky, Nicholas: No. 1311 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 9, 10, 2, 5, 11, 8, 4, 3, 1, 6]
 75. Slonimsky, Nicholas: No. 1312 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 10, 2, 3, 5, 11, 9, 8, 4, 1, 6]
 76. Slonimsky, Nicholas: No. 1313 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 11, 2, 4, 3, 9, 10, 8, 5, 1, 6]
 77. Slonimsky, Nicholas: No. 1314 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 2, 7, 4, 5, 9, 3, 11, 10, 1, 8, 6]
 78. Slonimsky, Nicholas: No. 1315 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 4, 5, 2, 7, 9, 3, 1, 8, 11, 10, 6]
 79. Slonimsky, Nicholas: No. 1316 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 7, 4, 5, 9, 2, 8, 3, 11, 10, 1, 6]
 80. Slonimsky, Nicholas: No. 1317 Invertible Dodecaphonic Progressions – With all Different Intervals. (Mother Chord), [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6]
 81. Slonimsky, Nicholas: No. 1318 Invertible Dodecaphonic Progressions – With all Different Intervals. (Grandmother Chord), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6]
 82. Slonimsky, Nicholas: No. 642 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 4, 5, 11, 10, 9, 8, 7, 6]
 83. Spinner, Leopold: Ich lieb' eine Blume for Four-part mixed Choir, [0, 11, 2, 4, 9, 7, 1, 3, 10, 8, 5, 6]
 84. Spinner, Leopold: Sonata for Clarinet and Piano, Op.17, [0, 3, 4, 1, 2, 5, 11, 8, 7, 10, 9, 6]

85. Spinner, Leopold: Sonatina for Cello and Piano, Op.26, [0, 1, 11, 2, 4, 3, 9, 10, 8, 5, 7, 6]
86. Spinner, Leopold: Sonatina for Wind Instruments, Op.23, [0, 9, 1, 5, 4, 2, 8, 10, 11, 7, 3, 6]
87. Stockhausen, Karlheinz: Gruppen, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6]
88. Stockhausen, Karlheinz: Klavierstück IX, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6]
89. Stockhausen, Karlheinz: Klavierstück VII, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6]
90. Stockhausen, Karlheinz: Klavierstück X, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6]
91. Webern, Anton: Symphony, Op.21, [0, 3, 2, 1, 5, 4, 10, 11, 7, 8, 9, 6]
92. Wuorinen, Charles: Third Piano Sonata, [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6]
93. Zimmermann, Bernd Alois: 'Ich wandte mich um und sah alles Unrecht das geschah unter der Sonne', [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6]

Self Retrograde Inversion

These rows have a palindromic interval succession meaning that the prime is transposition-equivalent to its retrograde-inversion.

1. Bach, Johann Sebastian: Chromatische Fantasie, [0, 3, 6, 9, 11, 2, 5, 8, 10, 1, 4, 7]
2. Bartók, Béla: String Quartet, No.4, [0, 5, 6, 11, 4, 9, 10, 3, 8, 1, 2, 7]
3. Bennett, Richard Rodney: Five Studies for Piano, [0, 3, 5, 6, 11, 9, 4, 2, 7, 8, 10, 1]
4. Berg, Alban: Lyric Suite, mvt I, [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3]
5. Berg, Alban: Lyric Suite, mvt VI, [0, 2, 4, 7, 9, 11, 6, 8, 10, 1, 3, 5]
6. Berger, Arthur: Chamber Music for Thirteen Players, [0, 1, 11, 7, 10, 9, 6, 5, 8, 4, 2, 3]
7. Boulez, Pierre: Le Marteau sans Maître, cycle of Bourreaux de solitude, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
8. Britten, Benjamin: The Turn of the Screw, [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3]
9. Carter, Elliott: String Quartet, No.2 (sketch) 1, [0, 4, 8, 3, 7, 11, 6, 10, 2, 9, 1, 5]
10. Carter, Elliott: String Quartet, No.2 (sketch) 2, [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1]
11. Carter, Elliott: String Quartet, No.2 (sketch) 3, [0, 2, 4, 6, 8, 10, 1, 3, 5, 7, 9, 11]
12. Dallapiccola, Luigi: Cinque canti, [0, 11, 5, 8, 6, 2, 7, 3, 1, 4, 10, 9]
13. Dallapiccola, Luigi: Dialoghi, [0, 1, 10, 2, 6, 4, 5, 3, 7, 11, 8, 9]
14. Dallapiccola, Luigi: Requiescant (alternative view), [0, 2, 1, 7, 11, 8, 9, 6, 10, 4, 3, 5]
15. Dallapiccola, Luigi: Ulisse [opera], [0, 2, 1, 3, 9, 8, 11, 10, 4, 6, 5, 7]
16. Denisov, Edison: Concerto for Guitar and Orchestra, Row 1, [0, 6, 10, 4, 8, 2, 3, 9, 1, 7, 11, 5]
17. Denisov, Edison: Octet for Winds, mvt 2, row B, [0, 6, 11, 5, 4, 10, 9, 3, 2, 8, 1, 7]
18. Eisler, Hanns: Der Zweck der Musik, [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3]
19. Eisler, Hanns: Praeludium und Fuge über B-A-C-H for String Trio, Op.46, [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9]

20. Fano, Michel: Sonata for Two Pianos, [0, 6, 10, 7, 9, 8, 3, 2, 4, 1, 5, 11]
21. Finney, Ross Lee: Sonata Quasi una Fantasia, [0, 1, 3, 2, 4, 5, 6, 7, 9, 8, 10, 11]
22. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 4, [0, 9, 10, 11, 6, 5, 8, 7, 2, 3, 4, 1]
23. Ginastera, Alberto: Quintet, Op.29, Row Class III 1, [0, 11, 1, 8, 2, 7, 10, 3, 9, 4, 6, 5]
24. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class III S, [0, 6, 11, 5, 8, 2, 7, 1, 4, 10, 3, 9]
25. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 1, [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1]
26. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 2, [0, 3, 6, 9, 2, 5, 8, 11, 4, 7, 10, 1]
27. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 4, [0, 2, 1, 5, 3, 4, 7, 8, 6, 10, 9, 11]
28. Hartmann, Karl Amadeus: Symphony, No.4, [0, 1, 3, 2, 11, 4, 5, 10, 7, 6, 8, 9]
29. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 3, [0, 1, 4, 6, 8, 10, 5, 7, 9, 11, 2, 3]
30. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 6, [0, 2, 4, 6, 7, 10, 5, 8, 9, 11, 1, 3]
31. Krenek, Ernst: Symphonic Elegy for String Orchestra, Op.105, [0, 1, 9, 11, 10, 2, 3, 7, 6, 8, 4, 5]
32. Lackner, Peter: 'Euphorbia obesa'. Kanon für Oboe, Englischhorn und Fagott., [0, 10, 2, 6, 8, 4, 1, 9, 11, 3, 7, 5]
33. Lackner, Peter: INITIUM TRIPLEX. 28. Juni 2016; für drei Tasteninstrumente, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
34. Lackner, Peter: KANON für A, O & Gsellmanns Weltmaschine. 8. Oktober 1958, 2008, [0, 8, 10, 4, 2, 6, 9, 1, 11, 5, 7, 3]
35. Lackner, Peter: Kanon T2 à 6, [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3]
36. Lackner, Peter: Kanon für Klavier. 15. Juni 1992, [0, 10, 3, 8, 6, 5, 2, 1, 11, 4, 9, 7]
37. Lackner, Peter: Kanon für Schwegel, diatonisches Hackbrett und Violine, [0, 8, 4, 10, 6, 2, 5, 1, 9, 3, 11, 7]
38. Lackner, Peter: Kanon für Streichquartett. 22. September 2003, [0, 8, 10, 4, 2, 6, 9, 1, 11, 5, 7, 3]
39. Lackner, Peter: Kanon für drei Klaviere. 28. 6. 2016, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
40. Lackner, Peter: Kanon für zwei Gitarren. September 2001, [0, 5, 3, 9, 11, 6, 7, 2, 4, 10, 8, 1]
41. Lackner, Peter: Kanon für zwei Violinen und Klavier. 1. Dezember 2004, [0, 10, 2, 6, 8, 4, 1, 9, 11, 3, 7, 5]
42. Lackner, Peter: TACET (drittes Lied aus dem Zyklus 'Wilde Erdbeeren'), [0, 2, 9, 5, 8, 11, 4, 7, 10, 6, 1, 3]
43. Leibowitz, René: Trois pièces pour piano, Op.19, [0, 4, 3, 1, 2, 5, 6, 9, 10, 8, 7, 11]
44. Ligeti, György: Le Grand Macabre, [0, 6, 5, 11, 10, 4, 9, 3, 2, 8, 7, 1]
45. Liszt, Franz: Eine Faust Symphonie, [0, 4, 8, 11, 3, 7, 10, 2, 6, 9, 1, 5]
46. Luo, Zhong-Rong: String Quartet, No.2, [0, 3, 5, 10, 6, 8, 11, 1, 9, 2, 4, 7]

47. Lutosławski, Witold: *Musique Funébre* (Funeral Music), [0, 6, 5, 11, 10, 4, 3, 9, 8, 2, 1, 7]
48. Maderna, Bruno: *Improvvisazione N. 1*, [0, 11, 4, 8, 3, 2, 7, 6, 1, 5, 10, 9]
49. Nono, Luigi: *Ha venido*, [0, 6, 1, 7, 2, 8, 3, 9, 4, 10, 5, 11]
50. Nono, Luigi: *Intolleranza*, Alto, [0, 6, 7, 1, 2, 8, 9, 3, 4, 10, 11, 5]
51. Nono, Luigi: *Intolleranza*, Baritone, [0, 2, 7, 9, 4, 6, 11, 1, 8, 10, 3, 5]
52. Nono, Luigi: *Intolleranza*, Tenor 1, [0, 6, 11, 5, 10, 4, 9, 3, 8, 2, 7, 1]
53. Nono, Luigi: *Sarà dolce tacere*, [0, 10, 5, 3, 8, 6, 1, 11, 4, 2, 9, 7]
54. Panufnik, Andrzej: *Sinfonia di Sfere* (Symphony, No.5), Chord 1, [0, 4, 8, 11, 3, 7, 10, 2, 6, 9, 1, 5]
55. Panufnik, Andrzej: *Sinfonia di Sfere* (Symphony, No.5), Chord 2, [0, 3, 6, 9, 11, 2, 5, 8, 10, 1, 4, 7]
56. Sande, Henrik: *4032 Töne für Klavier sechshändig*, [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5]
57. Schnittke, Alfred: *Concerto, No.2 for Violin and Chamber Orchestra*, [0, 11, 1, 2, 10, 3, 4, 9, 5, 6, 8, 7]
58. Schnittke, Alfred: *Concerto Grosso, No.3, (mvt 3, 4), row 6*, [0, 11, 2, 1, 9, 10, 7, 8, 4, 3, 6, 5]
59. Schnittke, Alfred: *Concerto Grosso, No.3, monogram 1*, [0, 5, 1, 4, 10, 8, 11, 9, 3, 6, 2, 7]
60. Schnittke, Alfred: *Concerto Grosso, No.3*, [0, 5, 1, 4, 10, 8, 11, 9, 3, 6, 2, 7]
61. Schnittke, Alfred: *Piano Sonata, No.1, mvt 2, mm. 72-76*, [0, 6, 5, 11, 10, 4, 3, 9, 8, 2, 1, 7]
62. Schnittke, Alfred: *Sonata, No.1 for Violin and Piano, mvt 1*, [0, 3, 6, 10, 2, 11, 8, 5, 9, 1, 4, 7]
63. Schnittke, Alfred: *Sonata, No.2 for Cello and Piano, mvt 2, new row*, [0, 3, 6, 9, 10, 1, 4, 7, 8, 11, 2, 5]
64. Schnittke, Alfred: *String Quartet, No.4, mvt 4, m.31*, [0, 11, 9, 10, 8, 7, 6, 5, 3, 4, 2, 1]
65. Schnittke, Alfred: *Viola Concerto*, [0, 11, 5, 2, 1, 6, 3, 8, 7, 4, 10, 9]
66. Schoenberg, Arnold: *Ode To Napoleon Buonaparte, Op.41 (view 1)*, [0, 11, 3, 4, 8, 7, 2, 1, 5, 6, 10, 9]
67. Schoenberg, Arnold: *Serenade, mvt 5, "Tanzscene", Op.24*, [0, 1, 3, 6, 7, 9, 8, 10, 11, 2, 4, 5]
68. Schwantner, Joseph: *...and the mountains rising nowhere*, [0, 11, 8, 7, 4, 3, 2, 1, 10, 9, 6, 5]
69. Schwantner, Joseph: *Elixir (Consortium VIII), m.22*, [0, 1, 4, 5, 8, 9, 6, 7, 10, 11, 2, 3]
70. Schwantner, Joseph: *Modus Caelestis (A)*, [0, 6, 7, 1, 11, 5, 4, 10, 8, 2, 3, 9]
71. Schwantner, Joseph: *Modus Caelestis (m. 39)*, [0, 6, 11, 10, 5, 9, 4, 8, 3, 2, 7, 1]
72. Slonimsky, Nicholas: *No. 1214a Thirds (Twelve-Tone Patterns)*, [0, 4, 8, 11, 3, 7, 6, 10, 2, 5, 9, 1]
73. Slonimsky, Nicholas: *No. 1216a Fourths (Twelve-Tone Patterns)*, [0, 5, 10, 3, 7, 2, 9, 4, 8, 1, 6, 11]
74. Slonimsky, Nicholas: *No. 1217a Fourths (Twelve-Tone Patterns)*, [0, 5, 10, 3, 11, 6, 1, 8, 4, 9, 2, 7]
75. Slonimsky, Nicholas: *No. 1218a Fourths (Twelve-Tone Patterns)*, [0, 5, 10, 3, 8, 1, 6, 11, 4, 9, 2, 7]
76. Slonimsky, Nicholas: *No. 1219a Fourths (Twelve-Tone Patterns)*, [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3]
77. Slonimsky, Nicholas: *No. 1220a Fifths (Twelve-Tone Patterns)*, [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5]
78. Slonimsky, Nicholas: *No. 1221a Fifths (Twelve-Tone Patterns)*, [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5]
79. Slonimsky, Nicholas: *No. 1222a Fifths (Twelve-Tone Patterns)*, [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5]
80. Slonimsky, Nicholas: *No. 1224a Sixths (Twelve-Tone Patterns)*, [0, 9, 6, 3, 7, 10, 1, 4, 8, 5, 2, 11]

81. Slonimsky, Nicholas: No. 1254a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 5, 8, 11, 3, 6, 9, 1]
82. Slonimsky, Nicholas: No. 1255a [Slonimsky: Moto Perpetuo] Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 6, 9, 2, 5, 8, 11, 3]
83. Slonimsky, Nicholas: No. 1258b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 5, 3, 11, 7, 2, 10, 6, 4, 1, 9]
84. Slonimsky, Nicholas: No. 1260a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 6, 9, 1, 5, 8, 11, 3]
85. Slonimsky, Nicholas: No. 1265 Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 4, 7, 10, 2, 5, 8, 11]
86. Slonimsky, Nicholas: No. 1265a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 4, 7, 10, 2, 5, 8, 11]
87. Slonimsky, Nicholas: No. 1266a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 2, 5, 8, 11, 4, 7, 10, 1]
88. Slonimsky, Nicholas: No. 1269a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 9, 1, 5, 6, 10, 2, 3, 7, 11]
89. Slonimsky, Nicholas: No. 1269b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1]
90. Slonimsky, Nicholas: No. 1270a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 10, 2, 6, 7, 11, 3, 5, 9, 1]
91. Slonimsky, Nicholas: No. 1270b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 2, 10, 6, 3, 11, 7, 5, 1, 9]
92. Slonimsky, Nicholas: No. 1271a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 3, 7, 10, 2, 6, 9, 1, 5]
93. Slonimsky, Nicholas: No. 1271b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 1, 9, 5, 2, 10, 6, 3, 11, 7]
94. Slonimsky, Nicholas: No. 1293a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3]
95. Slonimsky, Nicholas: No. 1296a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 7, 8, 3, 4, 11, 6, 1, 2, 9, 10, 5]
96. Slonimsky, Nicholas: No. 230 Ultraposition of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 6, 5, 11, 4, 10, 9, 3, 8, 2, 1, 7]
97. Slonimsky, Nicholas: No. 258 Infraposition of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 11, 10, 9, 4, 3, 2, 1, 8, 7, 6, 5]
98. Slonimsky, Nicholas: No. 270 Infraposition of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 10, 9, 7, 4, 2, 1, 11, 8, 6, 5, 3]
99. Slonimsky, Nicholas: No. 277 Infraposition of Three Notes (Ditone Progression; Equal Division of

- One Octave into Three Parts), [0, 10, 7, 5, 4, 2, 11, 9, 8, 6, 3, 1]
100. Slonimsky, Nicholas: No. 407 Ultrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1]
 101. Slonimsky, Nicholas: No. 453 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 10, 3, 2, 1, 6, 5, 4, 9, 8, 7]
 102. Slonimsky, Nicholas: No. 459 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 8, 3, 1, 11, 6, 4, 2, 9, 7, 5]
 103. Slonimsky, Nicholas: No. 469 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1]
 104. Slonimsky, Nicholas: No. 496 [Shostakovitch: Prelude No, 2] Inter-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 2, 4, 3, 5, 7, 6, 8, 10, 9, 11, 1]
 105. Slonimsky, Nicholas: No. 508 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 8, 3, 1, 11, 6, 4, 2, 9, 7, 5]
 106. Slonimsky, Nicholas: No. 512 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1]
 107. Slonimsky, Nicholas: No. 570 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 3, 2, 5, 4, 7, 6, 9, 8, 11, 10, 1]
 108. Slonimsky, Nicholas: No. 572 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3]
 109. Slonimsky, Nicholas: No. 574 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5]
 110. Slonimsky, Nicholas: No. 576 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 9, 2, 11, 4, 1, 6, 3, 8, 5, 10, 7]
 111. Slonimsky, Nicholas: No. 578 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9]
 112. Slonimsky, Nicholas: No. 579 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9]
 113. Slonimsky, Nicholas: No. 641 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 7, 6, 5, 4, 8, 9, 10, 11]
 114. Slonimsky, Nicholas: No. 648-654 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
 115. Slonimsky, Nicholas: No. 655-657 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1]
 116. Slonimsky, Nicholas: No. 692 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 3, 5, 8, 10, 11, 1, 4, 6, 7, 9]
 117. Slonimsky, Nicholas: No. 698 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 5, 7, 8, 10, 1, 3, 4, 6, 9, 11]

118. Slonimsky, Nicholas: No. 736 Inter-Infra-Ultrapolation (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 7, 9, 8, 10, 3, 5, 4, 6, 11, 1]
119. Slonimsky, Nicholas: No. 753 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 4, 8, 9, 1, 5, 6, 10, 2, 3, 7, 11]
120. Slonimsky, Nicholas: No. 793 Infra-Ultrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1]
121. Slonimsky, Nicholas: No. 813 Interpolation of Three Notes (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 3, 6, 9, 10, 1, 4, 7, 8, 11, 2, 5]
122. Slonimsky, Nicholas: No. 822 Ultrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1]
123. Slonimsky, Nicholas: No. 823 Ultrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 1, 10, 11, 8, 9, 6, 7, 4, 5, 2, 3]
124. Slonimsky, Nicholas: No. 824 Infrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1]
125. Slonimsky, Nicholas: No. 875 Infrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 6, 5, 11, 10, 4, 3, 9, 8, 2, 1, 7]
126. Slonimsky, Nicholas: No. 903 Inter-Ultrapolation (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 4, 8, 5, 9, 1, 10, 2, 6, 3, 7, 11]
127. Slonimsky, Nicholas: No. 997 Infra-Interpolation (Diapente Progression; Equal Division of Seven Octaves into Twelve Parts), [0, 8, 4, 7, 3, 11, 2, 10, 6, 9, 5, 1]
128. Spinner, Leopold: Fantasy for Piano, Op.9 , [0, 1, 4, 5, 2, 3, 8, 9, 6, 7, 10, 11]
129. Spinner, Leopold: Ricercata, Op.21, [0, 11, 8, 10, 2, 1, 4, 3, 7, 9, 6, 5]
130. Spinner, Leopold: Sonata for Piano, Op.3, [0, 9, 8, 6, 7, 10, 1, 4, 5, 3, 2, 11]
131. Spinner, Leopold: Trio for Violin, Cello, and Piano, Op.6, [0, 1, 7, 4, 10, 9, 6, 5, 11, 8, 2, 3]
132. Spinner, Leopold: Variations for Violin and Piano, Op.19, [0, 8, 9, 1, 2, 4, 3, 5, 6, 10, 11, 7]
133. Urbanner, Erich: Adagio, [0, 3, 1, 11, 10, 9, 8, 7, 6, 4, 2, 5]
134. Wang, Jian-Zhong: Five Pieces for Piano no. 1, “Pastorale” (variant), [0, 3, 5, 7, 4, 2, 11, 9, 6, 8, 10, 1]
135. Webern, Anton: Cantata I, Op.29, [0, 8, 11, 10, 2, 1, 4, 3, 7, 6, 9, 5]
136. Webern, Anton: String Quartet, Op.28, [0, 11, 2, 1, 5, 6, 3, 4, 8, 7, 10, 9]
137. Webern, Anton: Variations for Orchestra, Op.30, [0, 1, 4, 3, 2, 5, 6, 9, 8, 7, 10, 11]
138. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 1, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
139. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 10, [0, 10, 1, 11, 4, 2, 5, 3, 8, 6, 9, 7]
140. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 11, [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9]
141. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 2, [0, 2, 4, 6, 8, 10, 11, 1, 3, 5, 7, 9]

142. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 3, [0, 3, 1, 4, 2, 5, 6, 9, 7, 10, 8, 11]
143. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 4, [0, 4, 8, 2, 6, 10, 3, 7, 11, 5, 9, 1]
144. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 5, [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3]
145. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 6, [0, 6, 1, 7, 2, 8, 3, 9, 4, 10, 5, 11]
146. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 7, [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5]
147. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 8, [0, 8, 4, 1, 9, 5, 2, 10, 6, 3, 11, 7]
148. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 9, [0, 9, 1, 10, 2, 11, 6, 3, 7, 4, 8, 5]
149. Zillig, Wilfried: Das Opfer, [0, 11, 3, 4, 8, 7, 10, 9, 1, 2, 6, 5]

6x Same Dyad (interval)

These next four sections set out cases where the discrete sub-segments of a row all form the same pitch class set. The pitch class set in question is given after the row in prime form and rows which are also self-rotational are identified (with the self-rotational interval pattern). This first section presents cases of 6x the same dyad (pitches 1-2, 3-4, 5-6, 7-8, 9-10, and 11-12).

1. Babbitt, Milton: Composition for Four Instruments, [0, 3, 11, 2, 10, 1, 7, 4, 8, 5, 9, 6], pc set (0, 3)
2. Babbitt, Milton: Composition for Four Instruments, row ii, [0, 9, 11, 2, 4, 1, 7, 10, 8, 5, 3, 6], pc set (0, 3)
3. Bach, Johann Sebastian: Chromatische Fantasie, [0, 3, 6, 9, 11, 2, 5, 8, 10, 1, 4, 7], pc set (0, 3)
4. Baker, David: “Status Symbol” from “The Black Experience”, [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], pc set (0, 3)
5. Bartók, Béla: String Quartet, No.4, [0, 5, 6, 11, 4, 9, 10, 3, 8, 1, 2, 7], pc set (0, 5)
6. Boulez, Pierre: Le Marteau sans Maître, cycle of Bourreaux de solitude, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11], pc set (0, 1), self-rotational interval pattern 1-1-
7. Britten, Benjamin: The Turn of the Screw, [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3], pc set (0, 5), self-rotational interval pattern 5-9-
8. Carter, Elliott: String Quartet, No.2 (sketch) 3, [0, 2, 4, 6, 8, 10, 1, 3, 5, 7, 9, 11], pc set (0, 2)
9. Denisov, Edison: Concerto for Guitar and Orchestra, Row 1, [0, 6, 10, 4, 8, 2, 3, 9, 1, 7, 11, 5], pc set (0, 6)
10. Denisov, Edison: Octet for Winds, mvt 2, row B, [0, 6, 11, 5, 4, 10, 9, 3, 2, 8, 1, 7], pc set (0, 6)
11. Eisler, Hanns: Praeludium und Fuge über B-A-C-H for String Trio, Op.46, [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9], pc set (0, 1), self-rotational interval pattern 11-3-
12. Finney, Ross Lee: Sonata Quasi una Fantasia, [0, 1, 3, 2, 4, 5, 6, 7, 9, 8, 10, 11], pc set (0, 1)
13. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 8, [0, 1, 7, 6, 8, 9, 3, 2, 4, 5, 11, 10], pc set (0, 1)
14. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class III S, [0, 6, 11, 5, 8, 2, 7, 1,

- 4, 10, 3, 9], pc set (0, 6)
15. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 1, [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1], pc set (0, 1), self-rotational interval pattern 11-11-
 16. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 2, [0, 3, 6, 9, 2, 5, 8, 11, 4, 7, 10, 1], pc set (0, 3)
 17. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 5, [0, 7, 1, 6, 4, 11, 5, 10, 8, 3, 9, 2], pc set (0, 5)
 18. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 6, [0, 11, 4, 3, 8, 7, 1, 2, 9, 10, 5, 6], pc set (0, 1)
 19. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.14, [0, 2, 5, 7, 8, 10, 11, 9, 6, 4, 3, 1], pc set (0, 2)
 20. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.19, [0, 1, 4, 5, 8, 9, 11, 10, 7, 6, 3, 2], pc set (0, 1)
 21. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.29, [0, 1, 6, 7, 8, 9, 11, 10, 5, 4, 3, 2], pc set (0, 1)
 22. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.31, [0, 1, 2, 3, 6, 7, 11, 10, 9, 8, 5, 4], pc set (0, 1)
 23. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.6, [0, 2, 4, 6, 8, 10, 9, 7, 5, 3, 1, 11], pc set (0, 2)
 24. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.1, [0, 1, 2, 3, 4, 5, 11, 10, 9, 8, 7, 6], pc set (0, 1)
 25. Hendler, Maximilian: aus den fünf Liedern nach Texten von Elisabeth Pöschl : 'Sonnenaufgang' für Singstimme und Klavier, Op.44-1, [0, 11, 2, 1, 5, 6, 4, 3, 8, 7, 9, 10], pc set (0, 1)
 26. Kalodiki, Georgia: Six Sketches for piano, [0, 7, 6, 1, 2, 9, 8, 3, 4, 11, 5, 10], pc set (0, 5)
 27. Lackner, Peter: INITIUM TRIPLEX. 28. Juni 2016; für drei Tasteninstrumente, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11], pc set (0, 1), self-rotational interval pattern 1-1-
 28. Lackner, Peter: Kanon T2 à 6, [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3], pc set (0, 5), self-rotational interval pattern 5-9-
 29. Lackner, Peter: Kanon T4 á 3, [0, 5, 7, 2, 4, 9, 11, 6, 8, 1, 3, 10], pc set (0, 5)
 30. Lackner, Peter: Kanon für Flöte solo und N. N., [0, 3, 7, 10, 2, 5, 11, 8, 4, 1, 9, 6], pc set (0, 3)
 31. Lackner, Peter: Kanon für drei Klaviere. 28. 6. 2016, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11], pc set (0, 1), self-rotational interval pattern 1-1-
 32. Lackner, Peter: Moebiusband I für zwei Melodieinstrumente, [0, 6, 8, 2, 7, 1, 11, 5, 3, 9, 4, 10], pc set (0, 6)
 33. Lackner, Peter: Trauermusik für Fagott, Kontrafagott und Pauke, [0, 6, 2, 8, 10, 4, 11, 5, 9, 3, 1, 7], pc set (0, 6)
 34. Ligeti, György: Le Grand Macabre, [0, 6, 5, 11, 10, 4, 9, 3, 2, 8, 7, 1], pc set (0, 6)

35. Lutosławski, Witold: *Musique Funébre* (Funeral Music), [0, 6, 5, 11, 10, 4, 3, 9, 8, 2, 1, 7], pc set (0, 6), self-rotational interval pattern 6-11-
36. Mamlok, Ursula: *Haiku Settings*, No.5, [0, 11, 8, 7, 4, 3, 5, 6, 9, 10, 1, 2], pc set (0, 1)
37. Nono, Luigi: *Ha venido*, [0, 6, 1, 7, 2, 8, 3, 9, 4, 10, 5, 11], pc set (0, 6), self-rotational interval pattern 6-7-
38. Nono, Luigi: *Intolleranza*, Alto, [0, 6, 7, 1, 2, 8, 9, 3, 4, 10, 11, 5], pc set (0, 6), self-rotational interval pattern 6-1-
39. Nono, Luigi: *Intolleranza*, Baritone, [0, 2, 7, 9, 4, 6, 11, 1, 8, 10, 3, 5], pc set (0, 2)
40. Nono, Luigi: *Intolleranza*, Soprano 1, [0, 3, 4, 7, 8, 5, 6, 9, 10, 1, 2, 11], pc set (0, 3)
41. Nono, Luigi: *Intolleranza*, Tenor 1, [0, 6, 11, 5, 10, 4, 9, 3, 8, 2, 7, 1], pc set (0, 6), self-rotational interval pattern 6-5-
42. Nono, Luigi: *Intolleranza*, Tenor 2, [0, 1, 3, 2, 4, 5, 7, 6, 8, 9, 11, 10], pc set (0, 1)
43. Nono, Luigi: *La terra e la compagna* (sketch), Series 2, [0, 6, 1, 7, 11, 5, 2, 8, 10, 4, 3, 9], pc set (0, 6)
44. Nono, Luigi: *La terra e la compagna* (sketch), Series 3, [0, 9, 6, 3, 1, 4, 7, 10, 11, 8, 5, 2], pc set (0, 3)
45. Nono, Luigi: *Sarà dolce tacere*, [0, 10, 5, 3, 8, 6, 1, 11, 4, 2, 9, 7], pc set (0, 2)
46. Nono, Luigi: *Variazioni canoniche sulla serie dell'Op.41 di Arnold Schönberg*, [0, 1, 9, 8, 4, 5, 7, 6, 10, 11, 3, 2], pc set (0, 1)
47. Panufnik, Andrzej: *Sinfonia di Sfere* (Symphony, No.5), Chord 2, [0, 3, 6, 9, 11, 2, 5, 8, 10, 1, 4, 7], pc set (0, 3)
48. Pärt, Arvo: *Diagrams*, [0, 11, 2, 1, 3, 4, 9, 10, 7, 8, 6, 5], pc set (0, 1)
49. Reynolds, Roger: *Ambages*, [0, 1, 4, 5, 7, 6, 8, 9, 10, 11, 2, 3], pc set (0, 1)
50. Rochberg, George: *String Quartet*, No.2 with soprano solo, [0, 11, 6, 5, 1, 2, 8, 7, 3, 4, 9, 10], pc set (0, 1)
51. Sande, Henrik: *4032 Töne für Klavier sechshändig*, [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], pc set (0, 5), self-rotational interval pattern 7-7-
52. Schnittke, Alfred: *Concerto Grosso*, No.1, mvt 2, [0, 11, 2, 1, 8, 7, 10, 9, 6, 5, 4, 3], pc set (0, 1)
53. Schnittke, Alfred: *Concerto Grosso*, No.3, (mvt 3, 4), row 6, [0, 11, 2, 1, 9, 10, 7, 8, 4, 3, 6, 5], pc set (0, 1)
54. Schnittke, Alfred: *Concerto Grosso*, No.3, monogram 3, [0, 11, 2, 1, 3, 4, 10, 9, 7, 8, 5, 6], pc set (0, 1)
55. Schnittke, Alfred: *Piano Sonata*, No.1, mvt 2, mm. 72-76, [0, 6, 5, 11, 10, 4, 3, 9, 8, 2, 1, 7], pc set (0, 6), self-rotational interval pattern 6-11-
56. Schnittke, Alfred: *Sonata*, No.1 for Violin and Piano, mvt 2, [0, 3, 7, 10, 2, 11, 6, 9, 1, 4, 8, 5], pc set (0, 3)
57. Schnittke, Alfred: *Sonata*, No.2 for Cello and Piano, mvt 2, new row, [0, 3, 6, 9, 10, 1, 4, 7, 8, 11, 2,

- 5], pc set (0, 3)
58. Schnittke, Alfred: String Quartet, No.4, mvt 2, m.40, [0, 5, 10, 3, 2, 7, 8, 1, 6, 11, 4, 9], pc set (0, 5)
 59. Schnittke, Alfred: String Quartet, No.4, mvt 4, m.31, [0, 11, 9, 10, 8, 7, 6, 5, 3, 4, 2, 1], pc set (0, 1)
 60. Schnittke, Alfred: Symphony, No.7, mvt 3, row y, [0, 1, 11, 10, 8, 9, 7, 6, 5, 4, 3, 2], pc set (0, 1)
 61. Schoenberg, Arnold: Ode To Napoleon Buonaparte, Op.41 (view 1), [0, 11, 3, 4, 8, 7, 2, 1, 5, 6, 10, 9], pc set (0, 1)
 62. Schoenberg, Arnold: Ode To Napoleon Buonaparte, Op.41 (view 2), [0, 1, 9, 8, 4, 5, 7, 6, 10, 11, 3, 2], pc set (0, 1)
 63. Schwantner, Joseph: ...and the mountains rising nowhere, [0, 11, 8, 7, 4, 3, 2, 1, 10, 9, 6, 5], pc set (0, 1)
 64. Schwantner, Joseph: Elixir (Consortium VIII), m.22, [0, 1, 4, 5, 8, 9, 6, 7, 10, 11, 2, 3], pc set (0, 1)
 65. Schwantner, Joseph: In Aeternum (Derived Row), [0, 3, 11, 2, 10, 1, 7, 4, 8, 5, 9, 6], pc set (0, 3)
 66. Schwantner, Joseph: Modus Caelestis (A), [0, 6, 7, 1, 11, 5, 4, 10, 8, 2, 3, 9], pc set (0, 6)
 67. Seiber, Mátyás: Concert Piece for Violin and Piano, [0, 1, 7, 6, 11, 10, 4, 5, 9, 8, 2, 3], pc set (0, 1)
 68. Seiber, Mátyás: Ulysses, [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], pc set (0, 3)
 69. Slonimsky, Nicholas: No. 1215a Fourths (Twelve-Tone Patterns), [0, 5, 10, 3, 8, 1, 7, 2, 9, 4, 11, 6], pc set (0, 5)
 70. Slonimsky, Nicholas: No. 1216a Foutths (Twelve-Tone Patterns), [0, 5, 10, 3, 7, 2, 9, 4, 8, 1, 6, 11], pc set (0, 5)
 71. Slonimsky, Nicholas: No. 1217a Fourths (Twelve-Tone Patterns), [0, 5, 10, 3, 11, 6, 1, 8, 4, 9, 2, 7], pc set (0, 5)
 72. Slonimsky, Nicholas: No. 1218a Fourths (Twelve-Tone Patterns), [0, 5, 10, 3, 8, 1, 6, 11, 4, 9, 2, 7], pc set (0, 5), self-rotational interval pattern 5-5-
 73. Slonimsky, Nicholas: No. 1219a Fourths (Twelve-Tone Patterns), [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3], pc set (0, 5), self-rotational interval pattern 5-9-
 74. Slonimsky, Nicholas: No. 1220a Fifths (Twelve-Tone Patterns), [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], pc set (0, 5), self-rotational interval pattern 7-7-
 75. Slonimsky, Nicholas: No. 1221a Fifths (Twelve-Tone Patterns), [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], pc set (0, 5), self-rotational interval pattern 7-7-
 76. Slonimsky, Nicholas: No. 1222aFifths (Twelve-Tone Patterns), [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], pc set (0, 5), self-rotational interval pattern 7-7-
 77. Slonimsky, Nicholas: No. 1224a Sixths (Twelve-Tone Patterns), [0, 9, 6, 3, 7, 10, 1, 4, 8, 5, 2, 11], pc set (0, 3)
 78. Slonimsky, Nicholas: No. 1227a Minor Sevenths (Twelve-Tone Patterns), [0, 10, 4, 2, 8, 6, 1, 11, 9, 7, 5, 3], pc set (0, 2)
 79. Slonimsky, Nicholas: No. 1228a Minor Sevenths (Twelve-Tone Patterns), [0, 10, 2, 4, 8, 6, 11, 1, 5, 3, 7, 9], pc set (0, 2)

80. Slonimsky, Nicholas: No. 1229a Major Sevenths (Twelve-Tone Patterns), [0, 11, 10, 9, 8, 7, 1, 2, 3, 4, 5, 6], pc set (0, 1)
81. Slonimsky, Nicholas: No. 1230a Major Sevenths (Twelve-Tone Patterns), [0, 11, 3, 4, 8, 7, 1, 2, 6, 5, 9, 10], pc set (0, 1)
82. Slonimsky, Nicholas: No. 1231a Major Sevenths (Twelve-Tone Patterns), [0, 11, 4, 3, 8, 7, 1, 2, 9, 10, 5, 6], pc set (0, 1)
83. Slonimsky, Nicholas: No. 1265 Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 4, 7, 10, 2, 5, 8, 11], pc set (0, 3)
84. Slonimsky, Nicholas: No. 1265a Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 4, 7, 10, 2, 5, 8, 11], pc set (0, 3)
85. Slonimsky, Nicholas: No. 1266a Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 2, 5, 8, 11, 4, 7, 10, 1], pc set (0, 3)
86. Slonimsky, Nicholas: No. 1294a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 9, 4, 7, 5, 2, 6, 3, 10, 1, 11, 8], pc set (0, 3)
87. Slonimsky, Nicholas: No. 1296a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 7, 8, 3, 4, 11, 6, 1, 2, 9, 10, 5], pc set (0, 5)
88. Slonimsky, Nicholas: No. 230 Ultraposition of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 6, 5, 11, 4, 10, 9, 3, 8, 2, 1, 7], pc set (0, 6)
89. Slonimsky, Nicholas: No. 258 Intraposition of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 11, 10, 9, 4, 3, 2, 1, 8, 7, 6, 5], pc set (0, 1)
90. Slonimsky, Nicholas: No. 270 Intraposition of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 10, 9, 7, 4, 2, 1, 11, 8, 6, 5, 3], pc set (0, 2)
91. Slonimsky, Nicholas: No. 277 Intraposition of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 10, 7, 5, 4, 2, 11, 9, 8, 6, 3, 1], pc set (0, 2)
92. Slonimsky, Nicholas: No. 370 Infra-Inter-Ultraposition (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 7, 1, 6, 4, 11, 5, 10, 8, 3, 9, 2], pc set (0, 5)
93. Slonimsky, Nicholas: No. 388 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 3, 9, 6, 4, 7, 1, 10, 8, 11, 5, 2], pc set (0, 3)
94. Slonimsky, Nicholas: No. 389 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 9, 3, 6, 4, 1, 7, 10, 8, 5, 11, 2], pc set (0, 3)
95. Slonimsky, Nicholas: No. 390 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 3, 9, 6, 4, 7, 1, 10, 8, 11, 5, 2], pc set (0, 3)
96. Slonimsky, Nicholas: No. 391 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 9, 3, 6, 4, 1, 7, 10, 8, 5, 11, 2], pc

set (0, 3)

97. Slonimsky, Nicholas: No. 570 Ultrappolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 3, 2, 5, 4, 7, 6, 9, 8, 11, 10, 1], pc set (0, 3), self-rotational interval pattern 3-11-
98. Slonimsky, Nicholas: No. 572 Ultrappolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3], pc set (0, 5), self-rotational interval pattern 5-9-
99. Slonimsky, Nicholas: No. 574 Ultrappolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], pc set (0, 5), self-rotational interval pattern 7-7-
100. Slonimsky, Nicholas: No. 576 Ultrappolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 9, 2, 11, 4, 1, 6, 3, 8, 5, 10, 7], pc set (0, 3), self-rotational interval pattern 9-5-
101. Slonimsky, Nicholas: No. 578 Ultrappolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9], pc set (0, 1), self-rotational interval pattern 11-3-
102. Slonimsky, Nicholas: No. 579 Ultrappolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9], pc set (0, 1), self-rotational interval pattern 11-3-
103. Slonimsky, Nicholas: No. 637 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 3, 2, 4, 5, 7, 6, 8, 9, 11, 10], pc set (0, 1)
104. Slonimsky, Nicholas: No. 638 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 11, 9, 10, 4, 3, 1, 2, 8, 7, 5, 6], pc set (0, 1)
105. Slonimsky, Nicholas: No. 641 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 7, 6, 5, 4, 8, 9, 10, 11], pc set (0, 1)
106. Slonimsky, Nicholas: No. 642 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 4, 5, 11, 10, 9, 8, 7, 6], pc set (0, 1)
107. Slonimsky, Nicholas: No. 645 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 11, 10, 8, 9, 7, 6, 4, 5, 3, 2], pc set (0, 1)
108. Slonimsky, Nicholas: No. 648-654 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11], pc set (0, 1), self-rotational interval pattern 1-1-
109. Slonimsky, Nicholas: No. 655-657 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1], pc set (0, 1), self-rotational interval pattern 11-11-
110. Slonimsky, Nicholas: No. 692 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 3, 5, 8, 10, 11, 1, 4, 6, 7, 9], pc set (0, 2)

111. Slonimsky, Nicholas: No. 698 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 5, 7, 8, 10, 1, 3, 4, 6, 9, 11], pc set (0, 2)
112. Slonimsky, Nicholas: No. 736 Inter-Infra-Ultrapolation (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 7, 9, 8, 10, 3, 5, 4, 6, 11, 1], pc set (0, 2)
113. Slonimsky, Nicholas: No. 793 Infra-Ultrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1], pc set (0, 1), self-rotational interval pattern 11-11-
114. Slonimsky, Nicholas: No. 813 Interpolation of Three Notes (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 3, 6, 9, 10, 1, 4, 7, 8, 11, 2, 5], pc set (0, 3)
115. Slonimsky, Nicholas: No. 822 Ultrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1], pc set (0, 1), self-rotational interval pattern 11-11-
116. Slonimsky, Nicholas: No. 823 Ultrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 1, 10, 11, 8, 9, 6, 7, 4, 5, 2, 3], pc set (0, 1), self-rotational interval pattern 1-9-
117. Slonimsky, Nicholas: No. 824 Infrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1], pc set (0, 1), self-rotational interval pattern 11-11-
118. Slonimsky, Nicholas: No. 875 Infrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 6, 5, 11, 10, 4, 3, 9, 8, 2, 1, 7], pc set (0, 6), self-rotational interval pattern 6-11-
119. Slonimsky, Nicholas: No. 909 Infra-Inter-Ultrapolation (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 9, 3, 6, 5, 2, 8, 11, 10, 7, 1, 4], pc set (0, 3)
120. Spinner, Leopold: Fantasy for Piano, Op.9 , [0, 1, 4, 5, 2, 3, 8, 9, 6, 7, 10, 11], pc set (0, 1)
121. Spinner, Leopold: Sonata for Clarinet and Piano, Op.17, [0, 3, 4, 1, 2, 5, 11, 8, 7, 10, 9, 6], pc set (0, 3)
122. Spinner, Leopold: Sonata for Violin and Piano, Op.1, [0, 7, 6, 1, 3, 8, 5, 10, 2, 9, 4, 11], pc set (0, 5)
123. Spinner, Leopold: String Quartet, No.2, Op.7, [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], pc set (0, 3)
124. Spinner, Leopold: String Quartet, Op.2, [0, 1, 7, 6, 11, 10, 4, 5, 8, 9, 3, 2], pc set (0, 1)
125. Talma, Louise: Three Bagatelles, Bagatelle 3, [0, 3, 4, 1, 5, 8, 10, 7, 2, 11, 6, 9], pc set (0, 3)
126. Webern, Anton: String Quartet, Op.28, [0, 11, 2, 1, 5, 6, 3, 4, 8, 7, 10, 9], pc set (0, 1)
127. Webern, Anton: String Trio, Op.20, [0, 11, 6, 5, 10, 9, 1, 2, 7, 8, 4, 3], pc set (0, 1)
128. Wolpe, Stefan: Four Studies on Basic Rows, No.1 – Study on Tritones, [0, 6, 7, 1, 2, 8, 11, 5, 10, 4, 9, 3], pc set (0, 6)
129. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 1, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11], pc set (0, 1), self-rotational interval pattern 1-1-
130. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 10, [0, 10, 1, 11, 4, 2, 5, 3, 8, 6, 9,

7], pc set (0, 2)

131. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 11, [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9], pc set (0, 1), self-rotational interval pattern 11-3-
132. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 2, [0, 2, 4, 6, 8, 10, 11, 1, 3, 5, 7, 9], pc set (0, 2)
133. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 3, [0, 3, 1, 4, 2, 5, 6, 9, 7, 10, 8, 11], pc set (0, 3)
134. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 5, [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3], pc set (0, 5), self-rotational interval pattern 5-9-
135. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 6, [0, 6, 1, 7, 2, 8, 3, 9, 4, 10, 5, 11], pc set (0, 6), self-rotational interval pattern 6-7-
136. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 7, [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], pc set (0, 5), self-rotational interval pattern 7-7-
137. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 9, [0, 9, 1, 10, 2, 11, 6, 3, 7, 4, 8, 5], pc set (0, 3)
138. Zillig, Wilfried: Das Opfer, [0, 11, 3, 4, 8, 7, 10, 9, 1, 2, 6, 5], pc set (0, 1)
139. Zimmerman, Bernd Alois: Perspektiven, [0, 2, 10, 8, 4, 6, 3, 1, 5, 7, 11, 9], pc set (0, 2)

4x Same Trichord

Now for cases of 4x the same trichord (pitches 1-3, 4-6, 7-9 and 10-12).

1. Apostel, Hans Erich: Fischerhaus-Serenade, Op.45, [0, 4, 8, 3, 11, 7, 1, 9, 5, 2, 10, 6], pc set (0, 4, 8)
2. Babbitt, Milton: Composition for Four Instruments, [0, 3, 11, 2, 10, 1, 7, 4, 8, 5, 9, 6], pc set (0, 1, 4)
3. Babbitt, Milton: Composition for Four Instruments, row i, [0, 10, 9, 8, 7, 5, 11, 1, 2, 3, 4, 6], pc set (0, 1, 3)
4. Babbitt, Milton: Composition for Four Instruments, row ii, [0, 9, 11, 2, 4, 1, 7, 10, 8, 5, 3, 6], pc set (0, 1, 3)
5. Babbitt, Milton: Composition for Four Instruments, row iii, [0, 4, 3, 8, 7, 11, 5, 1, 2, 9, 10, 6], pc set (0, 1, 4)
6. Babbitt, Milton: Composition for Four Instruments, row iv, [0, 4, 1, 8, 5, 9, 3, 11, 2, 7, 10, 6], pc set (0, 1, 4)
7. Baker, David: “Status Symbol” from “The Black Experience”, [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], pc set (0, 1, 4)
8. Barber, Samuel: Piano Sonata, Op.26, [0, 8, 4, 11, 3, 7, 1, 9, 5, 10, 2, 6], pc set (0, 4, 8)

9. Bennett, Richard Rodney: Five Studies for Piano, [0, 3, 5, 6, 11, 9, 4, 2, 7, 8, 10, 1], pc set (0, 2, 5)
10. Berg, Alban: Lulu, whole-tone row, [0, 2, 4, 6, 10, 8, 11, 7, 9, 1, 3, 5], pc set (0, 2, 4)
11. Berg, Alban: Lyric Suite, mvt I, [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3], pc set (0, 2, 4)
12. Berg, Alban: Lyric Suite, mvt VI, [0, 2, 4, 7, 9, 11, 6, 8, 10, 1, 3, 5], pc set (0, 2, 4)
13. Berio, Luciano: Cinque Variazioni, [0, 2, 4, 1, 3, 5, 8, 10, 6, 7, 9, 11], pc set (0, 2, 4)
14. Berio, Luciano: Sequenza I, [0, 11, 10, 9, 8, 7, 4, 6, 5, 3, 1, 2], pc set (0, 1, 2)
15. Carter, Elliott: String Quartet, No.2 (sketch) 1, [0, 4, 8, 3, 7, 11, 6, 10, 2, 9, 1, 5], pc set (0, 4, 8), self-rotational interval pattern 4-4-7-
16. Carter, Elliott: String Quartet, No.2 (sketch) 2, [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1], pc set (0, 4, 8), self-rotational interval pattern 8-8-11-
17. Carter, Elliott: String Quartet, No.2 (sketch) 3, [0, 2, 4, 6, 8, 10, 1, 3, 5, 7, 9, 11], pc set (0, 2, 4)
18. Cordero, Roque: Sonata breve, [0, 1, 4, 11, 10, 7, 5, 8, 9, 6, 3, 2], pc set (0, 1, 4)
19. Crosse, Gordon: Elegy for Small Orchestra, Op.1, [0, 11, 3, 1, 9, 10, 5, 6, 2, 4, 8, 7], pc set (0, 1, 4)
20. Denisov, Edison: Concerto for Guitar and Orchestra, Row 1, [0, 6, 10, 4, 8, 2, 3, 9, 1, 7, 11, 5], pc set (0, 2, 6)
21. Denisov, Edison: Five Etudes for Solo Bassoon, row B, [0, 11, 6, 5, 4, 10, 9, 3, 2, 7, 1, 8], pc set (0, 1, 6)
22. Denisov, Edison: Five Etudes for Solo Bassoon, row C, [0, 6, 11, 5, 4, 10, 9, 3, 2, 7, 1, 8], pc set (0, 1, 6)
23. Denisov, Edison: Five Etudes for Solo Bassoon, row E, [0, 1, 7, 6, 5, 11, 10, 4, 3, 8, 2, 9], pc set (0, 1, 6)
24. Denisov, Edison: Five Etudes for Solo Bassoon, row G, [0, 11, 5, 10, 4, 3, 9, 8, 2, 1, 6, 7], pc set (0, 1, 6)
25. Denisov, Edison: Five Etudes for Solo Bassoon, row J, [0, 6, 5, 11, 4, 10, 9, 3, 2, 7, 1, 8], pc set (0, 1, 6)
26. Denisov, Edison: Octet for Winds, mvt 2, row B, [0, 6, 11, 5, 4, 10, 9, 3, 2, 8, 1, 7], pc set (0, 1, 6)
27. Dessau, Paul: Les Voix, [0, 11, 6, 8, 9, 3, 4, 10, 5, 7, 2, 1], pc set (0, 1, 6)
28. Eisler, Hanns: Der Zweck der Musik, [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3], pc set (0, 2, 4)
29. Eisler, Hanns: Gegen den Krieg, Op.55, [0, 3, 2, 5, 4, 7, 6, 8, 9, 10, 1, 11], pc set (0, 1, 3)
30. Finney, Ross Lee: Fantasy in Two Movements for solo violin, [0, 1, 3, 5, 4, 2, 11, 10, 8, 6, 7, 9], pc set (0, 1, 3)
31. Finney, Ross Lee: Sonata Quasi una Fantasia, [0, 1, 3, 2, 4, 5, 6, 7, 9, 8, 10, 11], pc set (0, 1, 3)
32. Ginastera, Alberto: Cantata para América Mágica, Op.27, [0, 7, 6, 5, 10, 11, 8, 1, 2, 9, 4, 3], pc set (0, 1, 6)
33. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 1, [0, 1, 6, 7, 8, 2, 10, 11, 5, 4, 9, 3], pc set (0, 1, 6)
34. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 2, [0, 11, 2, 3, 4, 1, 6, 5, 8, 9, 10, 7], pc set (0,

- 1, 3)
35. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 5, [0, 1, 7, 6, 5, 11, 2, 8, 9, 10, 4, 3], pc set (0, 1, 6)
 36. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 4, [0, 2, 1, 5, 3, 4, 7, 8, 6, 10, 9, 11], pc set (0, 1, 2)
 37. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 6, [0, 11, 4, 3, 8, 7, 1, 2, 9, 10, 5, 6], pc set (0, 1, 5)
 38. Ginastera, Alberto: Violin Concerto, Op.30, [0, 11, 2, 3, 4, 1, 6, 5, 8, 9, 10, 7], pc set (0, 1, 3)
 39. Gotham, Mark: Move On!, [0, 4, 3, 10, 6, 9, 1, 5, 2, 8, 11, 7], pc set (0, 1, 4)
 40. Harrison, Lou: Untitled Piano Piece, [0, 10, 4, 3, 9, 7, 2, 8, 6, 1, 11, 5], pc set (0, 2, 6)
 41. Hauer, Josef Matthias: Nomos, Op.19 (bb.362-365), [0, 7, 5, 3, 10, 8, 4, 2, 9, 6, 11, 1], pc set (0, 2, 7)
 42. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.15, [0, 1, 3, 6, 7, 9, 11, 10, 8, 5, 4, 2], pc set (0, 1, 3)
 43. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.18, [0, 3, 4, 6, 9, 10, 11, 8, 7, 5, 2, 1], pc set (0, 1, 4)
 44. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.19, [0, 1, 4, 5, 8, 9, 11, 10, 7, 6, 3, 2], pc set (0, 1, 4)
 45. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.30, [0, 1, 2, 6, 7, 8, 11, 10, 9, 5, 4, 3], pc set (0, 1, 2)
 46. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.6, [0, 2, 4, 6, 8, 10, 9, 7, 5, 3, 1, 11], pc set (0, 2, 4)
 47. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.1, [0, 1, 2, 3, 4, 5, 11, 10, 9, 8, 7, 6], pc set (0, 1, 2)
 48. Huber, Klaus: Zwei Sätze, [0, 3, 1, 10, 11, 8, 6, 9, 7, 2, 4, 5], pc set (0, 1, 3)
 49. Ives, Charles: On the Antipodes, [0, 3, 11, 8, 4, 7, 10, 9, 6, 2, 5, 1], pc set (0, 1, 4)
 50. Jung, Joachim: , [0, 11, 3, 10, 2, 1, 7, 8, 4, 9, 5, 6], pc set (0, 1, 4)
 51. Krenek, Ernst: Symphonic Elegy for String Orchestra, Op.105, [0, 1, 9, 11, 10, 2, 3, 7, 6, 8, 4, 5], pc set (0, 1, 4)
 52. Lackner, Peter: 'An alle Außerirdischen'. Kanon für drei Singstimmen, Kontrabaß und Klavier, [0, 4, 9, 7, 11, 2, 5, 1, 8, 10, 6, 3], pc set (0, 3, 7)
 53. Lackner, Peter: 'Euphorbia obesa'. Kanon für Oboe, Englischhorn und Fagott., [0, 10, 2, 6, 8, 4, 1, 9, 11, 3, 7, 5], pc set (0, 2, 4)
 54. Lackner, Peter: 2. Kanonzyklus, [0, 10, 2, 7, 9, 5, 11, 3, 1, 8, 4, 6], pc set (0, 2, 4)
 55. Lackner, Peter: Das Buch der Wandlungen I für Frauenstimmen und,oder Klavier, [0, 8, 3, 5, 1, 10, 7, 11, 4, 2, 6, 9], pc set (0, 3, 7)
 56. Lackner, Peter: KANON für A, O & Gsellmanns Weltmaschine. 8. Oktober 1958,2008, [0, 8, 10, 4,

- 2, 6, 9, 1, 11, 5, 7, 3], pc set (0, 2, 4)
57. Lackner, Peter: Kanon T3 à 4, [0, 2, 7, 3, 5, 10, 6, 8, 1, 9, 11, 4], pc set (0, 2, 7), self-rotational interval pattern 2-5-8-
 58. Lackner, Peter: Kanon T6 á 2, [0, 10, 8, 3, 1, 5, 6, 4, 2, 9, 7, 11], pc set (0, 2, 4)
 59. Lackner, Peter: Kanon für Blockflötenquartett. April 2005, [0, 10, 11, 3, 1, 2, 8, 7, 9, 5, 4, 6], pc set (0, 1, 2)
 60. Lackner, Peter: Kanon für Flöte solo und N. N., [0, 3, 7, 10, 2, 5, 11, 8, 4, 1, 9, 6], pc set (0, 3, 7)
 61. Lackner, Peter: Kanon für Flöte und Elektronik. Februar 1999, [0, 10, 2, 7, 9, 5, 11, 3, 1, 8, 4, 6], pc set (0, 2, 4)
 62. Lackner, Peter: Kanon für Klavierquartett, [0, 8, 6, 11, 3, 9, 1, 5, 7, 2, 10, 4], pc set (0, 2, 6)
 63. Lackner, Peter: Kanon für Klavierquartett. 27. Juni 1991, [0, 2, 6, 9, 11, 3, 7, 5, 1, 10, 8, 4], pc set (0, 2, 6)
 64. Lackner, Peter: Kanon für Klaviertrio, [0, 2, 4, 9, 5, 7, 3, 1, 11, 6, 10, 8], pc set (0, 2, 4)
 65. Lackner, Peter: Kanon für Orgel, zweimanualiges Cembalo oder Klavier, [0, 7, 2, 11, 4, 9, 6, 8, 1, 5, 3, 10], pc set (0, 2, 7)
 66. Lackner, Peter: Kanon für Orgel. 21. November 1994, 4. Februar 1995, [0, 8, 5, 1, 4, 9, 2, 11, 7, 3, 10, 6], pc set (0, 3, 7)
 67. Lackner, Peter: Kanon für Schwegel, diatonisches Hackbrett und Violine, [0, 8, 4, 10, 6, 2, 5, 1, 9, 3, 11, 7], pc set (0, 4, 8)
 68. Lackner, Peter: Kanon für Schwegel und zwei Geigen, [0, 6, 4, 2, 10, 8, 9, 3, 5, 7, 11, 1], pc set (0, 2, 6)
 69. Lackner, Peter: Kanon für Streichquartett. 22. September 2003, [0, 8, 10, 4, 2, 6, 9, 1, 11, 5, 7, 3], pc set (0, 2, 4)
 70. Lackner, Peter: Kanon für Violine solo, [0, 11, 2, 7, 10, 9, 3, 4, 1, 8, 5, 6], pc set (0, 1, 3)
 71. Lackner, Peter: Kanon für drei Violinen I, II August 1998, [0, 2, 10, 4, 8, 6, 1, 9, 11, 5, 3, 7], pc set (0, 2, 4)
 72. Lackner, Peter: Kanon für zwei Gitarren. September 2001, [0, 5, 3, 9, 11, 6, 7, 2, 4, 10, 8, 1], pc set (0, 2, 5)
 73. Lackner, Peter: Kanon für zwei Singstimmen und Ensemble zur Skulpturengruppe LEM von Axel Kirchmayr und einem Text von Hannes Walzl. September 2004, [0, 2, 9, 10, 5, 7, 1, 11, 4, 3, 8, 6], pc set (0, 2, 5)
 74. Lackner, Peter: Kanon für zwei Violinen, [0, 7, 4, 5, 9, 2, 3, 8, 11, 10, 6, 1], pc set (0, 3, 7)
 75. Lackner, Peter: Kanon für zwei Violinen. Frühjahr 1992, [0, 2, 4, 7, 9, 11, 5, 3, 1, 10, 8, 6], pc set (0, 2, 4)
 76. Lackner, Peter: Kanon für zwei Violinen und Klavier. 1. Dezember 2004, [0, 10, 2, 6, 8, 4, 1, 9, 11, 3, 7, 5], pc set (0, 2, 4)
 77. Lackner, Peter: Trauermusik für Fagott, Kontrafagott und Pauke, [0, 6, 2, 8, 10, 4, 11, 5, 9, 3, 1, 7],

pc set (0, 2, 6)

78. Lackner, Peter: kgV (3,4) [zweistimmiger Kanon für Klavier], [0, 10, 2, 3, 5, 7, 1, 11, 9, 8, 4, 6], pc set (0, 2, 4)
79. Lang, Bernhard: 'Der Golem' nach Gustav Meyrinck, [0, 4, 7, 8, 11, 3, 5, 2, 9, 1, 10, 6], pc set (0, 3, 7)
80. Leibowitz, René: Trois pièces pour piano, Op.19, [0, 4, 3, 1, 2, 5, 6, 9, 10, 8, 7, 11], pc set (0, 1, 4)
81. Ligeti, György: Le Grand Macabre, [0, 6, 5, 11, 10, 4, 9, 3, 2, 8, 7, 1], pc set (0, 1, 6)
82. Liszt, Franz: Eine Faust Symphonie, [0, 4, 8, 11, 3, 7, 10, 2, 6, 9, 1, 5], pc set (0, 4, 8), self-rotational interval pattern 4-4-3-
83. Luo, Zhong-Rong: Three Piano Pieces, "Arabeque", row 2, [0, 2, 7, 9, 11, 4, 6, 8, 1, 3, 10, 5], pc set (0, 2, 7)
84. Lutyens, Elisabeth: Motet (Excerpta Tractati Logico-Philosophici), Op.27, [0, 11, 3, 7, 8, 4, 2, 6, 5, 1, 9, 10], pc set (0, 1, 4)
85. Mamlok, Ursula: Haiku Settings, No.5, [0, 11, 8, 7, 4, 3, 5, 6, 9, 10, 1, 2], pc set (0, 1, 4)
86. Moevs, Robert: Musica da Camera, [0, 1, 11, 3, 4, 2, 9, 10, 8, 7, 5, 6], pc set (0, 1, 2)
87. Morris, Robert: Sung Song, [0, 3, 7, 6, 9, 2, 10, 5, 1, 8, 4, 11], pc set (0, 3, 7)
88. Nono, Luigi: Incontri, [0, 2, 3, 8, 9, 6, 4, 5, 7, 11, 1, 10], pc set (0, 1, 3)
89. Nono, Luigi: Variazioni canoniche sulla serie dell'Op.41 di Arnold Schönberg, [0, 1, 9, 8, 4, 5, 7, 6, 10, 11, 3, 2], pc set (0, 1, 4)
90. Panufnik, Andrzej: Sinfonia di Sfere (Symphony, No.5), Chord 1, [0, 4, 8, 11, 3, 7, 10, 2, 6, 9, 1, 5], pc set (0, 4, 8), self-rotational interval pattern 4-4-3-
91. Pärt, Arvo: Diagrams, [0, 11, 2, 1, 3, 4, 9, 10, 7, 8, 6, 5], pc set (0, 1, 3)
92. Rochberg, George: Sonata-Fantasia, [0, 11, 10, 4, 5, 6, 9, 8, 7, 1, 2, 3], pc set (0, 1, 2)
93. Sande, Henrik: 'Volkslied' für zwei Singstimmen und Klavier. 24. 12. 2015, [0, 2, 4, 5, 7, 9, 10, 8, 6, 3, 1, 11], pc set (0, 2, 4)
94. Schnittke, Alfred: Concerto Grosso, No.3, monogram 3, [0, 11, 2, 1, 3, 4, 10, 9, 7, 8, 5, 6], pc set (0, 1, 3)
95. Schnittke, Alfred: String Quartet, No.4, mvt 4, m.31, [0, 11, 9, 10, 8, 7, 6, 5, 3, 4, 2, 1], pc set (0, 1, 3)
96. Schnittke, Alfred: Symphony, No.7, mvt 3, row y, [0, 1, 11, 10, 8, 9, 7, 6, 5, 4, 3, 2], pc set (0, 1, 2)
97. Schoenberg, Arnold: Die Jakobsleiter, [0, 1, 4, 3, 7, 6, 11, 2, 10, 9, 5, 8], pc set (0, 1, 4)
98. Schoenberg, Arnold: Modern Psalms, The First Psalm, Op.50c, [0, 11, 8, 4, 7, 3, 1, 5, 2, 6, 9, 10], pc set (0, 1, 4)
99. Schoenberg, Arnold: Ode To Napoleon Buonaparte, Op.41 (view 1), [0, 11, 3, 4, 8, 7, 2, 1, 5, 6, 10, 9], pc set (0, 1, 4)
100. Schoenberg, Arnold: Ode To Napoleon Buonaparte, Op.41 (view 2), [0, 1, 9, 8, 4, 5, 7, 6, 10, 11, 3, 2], pc set (0, 1, 4)

101. Schoenberg, Arnold: Serenade, mvt 5, “Tanzscene”, Op.24, [0, 1, 3, 6, 7, 9, 8, 10, 11, 2, 4, 5], pc set (0, 1, 3)
102. Schoenberg, Arnold: Suite, Op.29, [0, 4, 3, 7, 11, 8, 9, 6, 5, 1, 2, 10], pc set (0, 1, 4)
103. Schoenberg, Arnold: Three Songs, No.3, “Madchenlied”, Op.48, [0, 6, 8, 10, 2, 4, 9, 5, 3, 11, 7, 1], pc set (0, 2, 6)
104. Schwantner, Joseph: ...and the mountains rising nowhere, [0, 11, 8, 7, 4, 3, 2, 1, 10, 9, 6, 5], pc set (0, 1, 4)
105. Schwantner, Joseph: Elixir (Consortium VIII), m.22, [0, 1, 4, 5, 8, 9, 6, 7, 10, 11, 2, 3], pc set (0, 1, 4)
106. Schwantner, Joseph: In Aeternum (Derived Row), [0, 3, 11, 2, 10, 1, 7, 4, 8, 5, 9, 6], pc set (0, 1, 4)
107. Schwantner, Joseph: In Aeternum (Principal Row), [0, 4, 11, 6, 10, 5, 1, 9, 2, 7, 3, 8], pc set (0, 1, 5)
108. Seiber, Mátyás: Ulysses, [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], pc set (0, 1, 4)
109. Slonimsky, Nicholas: No. 1214a Thirds (Twelve-Tone Patterns), [0, 4, 8, 11, 3, 7, 6, 10, 2, 5, 9, 1], pc set (0, 4, 8)
110. Slonimsky, Nicholas: No. 1215a Fourths (Twelve-Tone Patterns), [0, 5, 10, 3, 8, 1, 7, 2, 9, 4, 11, 6], pc set (0, 2, 7)
111. Slonimsky, Nicholas: No. 1223a Sixths (Twelve-Tone Patterns), [0, 8, 4, 1, 5, 9, 6, 2, 10, 7, 11, 3], pc set (0, 4, 8)
112. Slonimsky, Nicholas: No. 1225a Sixths (Twelve-Tone Patterns), [0, 8, 4, 7, 11, 3, 6, 2, 10, 1, 5, 9], pc set (0, 4, 8)
113. Slonimsky, Nicholas: No. 1226a Minor Sevenths (Twelve-Tone Patterns), [0, 10, 8, 2, 4, 6, 1, 11, 9, 3, 5, 7], pc set (0, 2, 4)
114. Slonimsky, Nicholas: No. 1229a Major Sevenths (Twelve-Tone Patterns), [0, 11, 10, 9, 8, 7, 1, 2, 3, 4, 5, 6], pc set (0, 1, 2)
115. Slonimsky, Nicholas: No. 1231a Major Sevenths (Twelve-Tone Patterns), [0, 11, 4, 3, 8, 7, 1, 2, 9, 10, 5, 6], pc set (0, 1, 5)
116. Slonimsky, Nicholas: No. 1242a Mutually Exclusive Diminished-Seventh Chords (Twelve-Tone Spirals), [0, 8, 4, 11, 3, 7, 1, 9, 5, 10, 2, 6], pc set (0, 4, 8)
117. Slonimsky, Nicholas: No. 1251a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 6, 9, 2, 5, 8, 11, 4], pc set (0, 3, 7)
118. Slonimsky, Nicholas: No. 1251b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 5, 3, 11, 6, 2, 10, 7, 4, 1, 9], pc set (0, 3, 7)
119. Slonimsky, Nicholas: No. 1252a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 5, 9, 2, 6, 8, 11, 4], pc set (0, 3, 7)
120. Slonimsky, Nicholas: No. 1252b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 5, 3, 10, 6, 2, 11, 7, 4, 1, 9], pc set (0, 3, 7)

121. Slonimsky, Nicholas: No. 1253a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 5, 8, 11, 3, 6, 9, 2], pc set (0, 3, 7)
122. Slonimsky, Nicholas: No. 1253b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 3, 1, 9, 6, 4, 11, 7, 5, 2, 10], pc set (0, 3, 7)
123. Slonimsky, Nicholas: No. 1254a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 5, 8, 11, 3, 6, 9, 1], pc set (0, 3, 7)
124. Slonimsky, Nicholas: No. 1254b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 3, 1, 10, 6, 4, 11, 7, 5, 2, 9], pc set (0, 3, 7)
125. Slonimsky, Nicholas: No. 1255a [Slonimsky: Moto Perpetuo] Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 6, 9, 2, 5, 8, 11, 3], pc set (0, 3, 7)
126. Slonimsky, Nicholas: No. 1255b [Slonimsky: Moto Perpetuo] Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 3, 2, 9, 6, 5, 1, 10, 7, 4, 11], pc set (0, 3, 7)
127. Slonimsky, Nicholas: No. 1256a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 5, 8, 11, 4, 6, 9, 1], pc set (0, 3, 7)
128. Slonimsky, Nicholas: No. 1256b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 9, 4, 2, 11, 7, 5, 1, 8, 6, 3, 10], pc set (0, 3, 7)
129. Slonimsky, Nicholas: No. 1269a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 9, 1, 5, 6, 10, 2, 3, 7, 11], pc set (0, 4, 8), self-rotational interval pattern 4-4-1-
130. Slonimsky, Nicholas: No. 1269b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1], pc set (0, 4, 8), self-rotational interval pattern 8-8-11-
131. Slonimsky, Nicholas: No. 1270a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 10, 2, 6, 7, 11, 3, 5, 9, 1], pc set (0, 4, 8)
132. Slonimsky, Nicholas: No. 1270b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 2, 10, 6, 3, 11, 7, 5, 1, 9], pc set (0, 4, 8)
133. Slonimsky, Nicholas: No. 1271a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 3, 7, 10, 2, 6, 9, 1, 5], pc set (0, 4, 8), self-rotational interval pattern 4-4-3-
134. Slonimsky, Nicholas: No. 1271b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 1, 9, 5, 2, 10, 6, 3, 11, 7], pc set (0, 4, 8), self-rotational interval pattern 8-8-9-
135. Slonimsky, Nicholas: No. 1272a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 6, 9, 5, 2, 11, 8, 4], pc set (0, 3, 7)
136. Slonimsky, Nicholas: No. 1272b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into

- Four Mutually Exclusive Triads), [0, 3, 7, 10, 6, 1, 2, 5, 9, 8, 4, 11], pc set (0, 3, 7)
137. Slonimsky, Nicholas: No. 1273a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 5, 9, 6, 2, 11, 8, 4], pc set (0, 3, 7)
 138. Slonimsky, Nicholas: No. 1273b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 5, 1, 2, 6, 9, 8, 4, 11], pc set (0, 3, 7)
 139. Slonimsky, Nicholas: No. 1274a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 5, 9, 6, 2, 11, 8, 3], pc set (0, 3, 7)
 140. Slonimsky, Nicholas: No. 1274b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 5, 1, 2, 6, 9, 8, 3, 11], pc set (0, 3, 7)
 141. Slonimsky, Nicholas: No. 1275a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 5, 9, 6, 1, 11, 8, 3], pc set (0, 3, 7)
 142. Slonimsky, Nicholas: No. 1275b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 5, 2, 1, 6, 9, 8, 3, 11], pc set (0, 3, 7)
 143. Slonimsky, Nicholas: No. 1276a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 6, 9, 5, 2, 11, 8, 3], pc set (0, 3, 7)
 144. Slonimsky, Nicholas: No. 1276b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 6, 1, 2, 5, 9, 8, 3, 11], pc set (0, 3, 7)
 145. Slonimsky, Nicholas: No. 1277a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 5, 8, 4, 11, 9, 6, 1], pc set (0, 3, 7)
 146. Slonimsky, Nicholas: No. 1277b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 5, 2, 4, 8, 11, 9, 6, 1], pc set (0, 3, 7)
 147. Slonimsky, Nicholas: No. 1290a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 9, 1, 5, 6, 2, 10, 7, 3, 11], pc set (0, 4, 8)
 148. Slonimsky, Nicholas: No. 1290b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 9, 5, 1, 10, 2, 6, 7, 3, 11], pc set (0, 4, 8)
 149. Slonimsky, Nicholas: No. 1291a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 10, 2, 6, 7, 3, 11, 9, 5, 1], pc set (0, 4, 8)
 150. Slonimsky, Nicholas: No. 1291b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 10, 6, 2, 11, 3, 7, 9, 5, 1], pc set (0, 4, 8)
 151. Slonimsky, Nicholas: No. 1292a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 3, 7, 10, 6, 2, 1, 9, 5], pc set (0, 4, 8)
 152. Slonimsky, Nicholas: No. 1292b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 7, 3, 2, 6, 10, 9, 5, 1], pc set (0, 4, 8)
 153. Slonimsky, Nicholas: No. 1293a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3], pc set (0, 2, 4)
 154. Slonimsky, Nicholas: No. 1293b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 3, 1, 11, 10, 8, 6, 9, 7, 5, 4, 2], pc set (0, 1, 3)

155. Slonimsky, Nicholas: No. 1296a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 7, 8, 3, 4, 11, 6, 1, 2, 9, 10, 5], pc set (0, 1, 5)
156. Slonimsky, Nicholas: No. 1297b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 10, 8, 1, 3, 5, 6, 4, 2, 7, 9, 11], pc set (0, 2, 4)
157. Slonimsky, Nicholas: No. 1316 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 7, 4, 5, 9, 2, 8, 3, 11, 10, 1, 6], pc set (0, 3, 7)
158. Slonimsky, Nicholas: No. 230 Ultrappolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 6, 5, 11, 4, 10, 9, 3, 8, 2, 1, 7], pc set (0, 1, 6)
159. Slonimsky, Nicholas: No. 405 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 7, 5, 3, 10, 8, 6, 1, 11, 9, 4, 2], pc set (0, 2, 7), self-rotational interval pattern 7-10-10-
160. Slonimsky, Nicholas: No. 407 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1], pc set (0, 4, 8), self-rotational interval pattern 8-8-11-
161. Slonimsky, Nicholas: No. 410 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 7, 3, 11, 10, 6, 2, 1, 9, 5, 4], pc set (0, 1, 5), self-rotational interval pattern 8-11-8-
162. Slonimsky, Nicholas: No. 415 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 5, 3, 1, 8, 6, 4, 11, 9, 7, 2], pc set (0, 2, 7), self-rotational interval pattern 10-7-10-
163. Slonimsky, Nicholas: No. 417 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 4, 3, 2, 7, 6, 5, 10, 9, 8, 1], pc set (0, 1, 5), self-rotational interval pattern 11-5-11-
164. Slonimsky, Nicholas: No. 420 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 7, 3, 2, 10, 6, 5, 1, 9, 8, 4], pc set (0, 1, 5), self-rotational interval pattern 11-8-8-
165. Slonimsky, Nicholas: No. 453 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 10, 3, 2, 1, 6, 5, 4, 9, 8, 7], pc set (0, 1, 2), self-rotational interval pattern 11-11-5-
166. Slonimsky, Nicholas: No. 456 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 7, 3, 2, 10, 6, 5, 1, 9, 8, 4], pc set (0, 1, 5), self-rotational interval pattern 11-8-8-
167. Slonimsky, Nicholas: No. 459 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 8, 3, 1, 11, 6, 4, 2, 9, 7, 5], pc set (0, 2, 4), self-rotational interval pattern 10-10-7-
168. Slonimsky, Nicholas: No. 466 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 7, 3, 11, 10, 6, 2, 1, 9, 5, 4], pc set (0, 1, 5), self-rotational

interval pattern 8-11-8-

169. Slonimsky, Nicholas: No. 469 Infrapolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1], pc set (0, 4, 8), self-rotational interval pattern 8-8-11-
170. Slonimsky, Nicholas: No. 482 Infra-Interpolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 1, 3, 2, 4, 6, 5, 7, 9, 8, 10], pc set (0, 1, 2), self-rotational interval pattern 11-2-2-
171. Slonimsky, Nicholas: No. 485 Infra-Interpolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 2, 3, 1, 5, 6, 4, 8, 9, 7, 11], pc set (0, 2, 4), self-rotational interval pattern 10-4-1-
172. Slonimsky, Nicholas: No. 493 Inter-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 1, 5, 3, 4, 8, 6, 7, 11, 9, 10, 2], pc set (0, 1, 5), self-rotational interval pattern 1-4-10-
173. Slonimsky, Nicholas: No. 496 [Shostakovitch: Prelude No, 2] Inter-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 2, 4, 3, 5, 7, 6, 8, 10, 9, 11, 1], pc set (0, 2, 4), self-rotational interval pattern 2-2-11-
174. Slonimsky, Nicholas: No. 499 Inter-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 2, 7, 3, 5, 10, 6, 8, 1, 9, 11, 4], pc set (0, 2, 7), self-rotational interval pattern 2-5-8-
175. Slonimsky, Nicholas: No. 500 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 4, 3, 2, 7, 6, 5, 10, 9, 8, 1], pc set (0, 1, 5), self-rotational interval pattern 11-5-11-
176. Slonimsky, Nicholas: No. 503 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 7, 3, 2, 10, 6, 5, 1, 9, 8, 4], pc set (0, 1, 5), self-rotational interval pattern 11-8-8-
177. Slonimsky, Nicholas: No. 505 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 5, 3, 1, 8, 6, 4, 11, 9, 7, 2], pc set (0, 2, 7), self-rotational interval pattern 10-7-10-
178. Slonimsky, Nicholas: No. 508 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 8, 3, 1, 11, 6, 4, 2, 9, 7, 5], pc set (0, 2, 4), self-rotational interval pattern 10-10-7-
179. Slonimsky, Nicholas: No. 512 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1], pc set (0, 4, 8), self-rotational interval pattern 8-8-11-
180. Slonimsky, Nicholas: No. 639 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 5, 4, 3, 6, 7, 8, 11, 10, 9], pc set (0, 1, 2)
181. Slonimsky, Nicholas: No. 640 Permutations (Semitone Progression; Equal Division of One Octave

- into Twelve Parts), [0, 11, 10, 7, 8, 9, 6, 5, 4, 1, 2, 3], pc set (0, 1, 2)
182. Slonimsky, Nicholas: No. 642 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 4, 5, 11, 10, 9, 8, 7, 6], pc set (0, 1, 2)
 183. Slonimsky, Nicholas: No. 746 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 1, 5, 9, 10, 2, 6, 7, 11, 3, 4, 8], pc set (0, 1, 5), self-rotational interval pattern 1-4-4-
 184. Slonimsky, Nicholas: No. 749 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 2, 7, 9, 11, 4, 6, 8, 1, 3, 5, 10], pc set (0, 2, 7), self-rotational interval pattern 2-5-2-
 185. Slonimsky, Nicholas: No. 753 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 4, 8, 9, 1, 5, 6, 10, 2, 3, 7, 11], pc set (0, 4, 8), self-rotational interval pattern 4-4-1-
 186. Slonimsky, Nicholas: No. 754 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 5, 7, 9, 2, 4, 6, 11, 1, 3, 8, 10], pc set (0, 2, 7), self-rotational interval pattern 5-2-2-
 187. Slonimsky, Nicholas: No. 794 Infra-Ultrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 10, 11, 9, 7, 8, 6, 4, 5, 3, 1, 2], pc set (0, 1, 2), self-rotational interval pattern 10-1-10-
 188. Slonimsky, Nicholas: No. 795 Infra-Ultrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 8, 1, 9, 5, 10, 6, 2, 7, 3, 11, 4], pc set (0, 1, 5), self-rotational interval pattern 8-5-8-
 189. Slonimsky, Nicholas: No. 799 Infra-Infrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 2, 7, 9, 11, 4, 6, 8, 1, 3, 5, 10], pc set (0, 2, 7), self-rotational interval pattern 2-5-2-
 190. Slonimsky, Nicholas: No. 903 Inter-Ultrapolation (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 4, 8, 5, 9, 1, 10, 2, 6, 3, 7, 11], pc set (0, 4, 8), self-rotational interval pattern 4-4-9-
 191. Slonimsky, Nicholas: No. 915 Miscellaneous Patterns (Diatessaron Progression; Equal Division of Five Octaves into Twelve Parts), [0, 10, 2, 8, 4, 6, 5, 3, 7, 1, 9, 11], pc set (0, 2, 4)
 192. Slonimsky, Nicholas: No. 997 Infra-Interpolation (Diapente Progression; Equal Division of Seven Octaves into Twelve Parts), [0, 8, 4, 7, 3, 11, 2, 10, 6, 9, 5, 1], pc set (0, 4, 8), self-rotational interval pattern 8-8-3-
 193. Smith, Hale: Contours for Orchestra, [0, 5, 6, 4, 10, 11, 7, 2, 1, 3, 9, 8], pc set (0, 1, 6)
 194. Spinner, Leopold: Chamber Symphony, Op.28, [0, 11, 10, 6, 4, 5, 2, 1, 3, 7, 8, 9], pc set (0, 1, 2)
 195. Spinner, Leopold: Ricercata, Op.21, [0, 11, 8, 10, 2, 1, 4, 3, 7, 9, 6, 5], pc set (0, 1, 4)
 196. Spinner, Leopold: Sonata for Clarinet and Piano, Op.17, [0, 3, 4, 1, 2, 5, 11, 8, 7, 10, 9, 6], pc set (0, 1, 4)

197. Spinner, Leopold: Sonata for Piano, Op.3, [0, 9, 8, 6, 7, 10, 1, 4, 5, 3, 2, 11], pc set (0, 1, 4)
198. Spinner, Leopold: Sonatina for Cello and Piano, Op.26, [0, 1, 11, 2, 4, 3, 9, 10, 8, 5, 7, 6], pc set (0, 1, 2)
199. Spinner, Leopold: String Quartet, No.2, Op.7, [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], pc set (0, 1, 4)
200. Spinner, Leopold: Trio for Clarinet, Cello and Piano, [0, 1, 7, 6, 5, 11, 10, 3, 4, 2, 9, 8], pc set (0, 1, 6)
201. Spinner, Leopold: Trio for Violin, Cello, and Piano, Op.6, [0, 1, 7, 4, 10, 9, 6, 5, 11, 8, 2, 3], pc set (0, 1, 6)
202. Stravinsky, Igor: Fanfare for a New Theater, [0, 11, 1, 3, 4, 2, 5, 7, 6, 8, 10, 9], pc set (0, 1, 2)
203. Talma, Louise: Six Etudes, Etude 4, [0, 1, 5, 9, 4, 8, 7, 6, 11, 2, 10, 3], pc set (0, 1, 5)
204. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 5, [0, 4, 3, 10, 6, 9, 1, 5, 2, 8, 11, 7], pc set (0, 1, 4)
205. Wang, Jian-Zhong: Five Pieces for Piano no. 1, "Pastorale" (variant), [0, 3, 5, 7, 4, 2, 11, 9, 6, 8, 10, 1], pc set (0, 2, 5)
206. Weber, Ben: Fantasia (Variations), Op.25, [0, 1, 5, 9, 10, 2, 6, 11, 7, 4, 3, 8], pc set (0, 1, 5)
207. Webern, Anton: Op.32 (un-finished), initial sketch, [0, 1, 9, 11, 3, 2, 7, 6, 10, 8, 4, 5], pc set (0, 1, 4)
208. Webern, Anton: Op.32 (un-finished), later sketch, [0, 1, 2, 11, 10, 9, 5, 4, 3, 6, 7, 8], pc set (0, 1, 2)
209. Webern, Anton: Cantata I, Op.29, [0, 8, 11, 10, 2, 1, 4, 3, 7, 6, 9, 5], pc set (0, 1, 4)
210. Webern, Anton: Concerto for Nine Instruments (Konzert), Op.24, [0, 11, 3, 4, 8, 7, 9, 5, 6, 1, 2, 10], pc set (0, 1, 4)
211. Wolpe, Stefan: Four Studies on Basic Rows, No.1 – Study on Tritones, [0, 6, 7, 1, 2, 8, 11, 5, 10, 4, 9, 3], pc set (0, 1, 6)
212. Wolpe, Stefan: Four Studies on Basic Rows, No.2 – Study on Thirds, [0, 11, 9, 8, 10, 7, 6, 5, 3, 2, 4, 1], pc set (0, 1, 3)
213. Wolpe, Stefan: Four Studies on Basic Rows, No.4, "Basic Row" 2, [0, 2, 4, 6, 8, 10, 11, 1, 3, 5, 7, 9], pc set (0, 2, 4)
214. Wolpe, Stefan: Four Studies on Basic Rows, No.4, "Basic Row" 3, [0, 3, 1, 4, 2, 5, 6, 9, 7, 10, 8, 11], pc set (0, 1, 3)
215. Wolpe, Stefan: Four Studies on Basic Rows, No.4, "Basic Row" 4, [0, 4, 8, 2, 6, 10, 3, 7, 11, 5, 9, 1], pc set (0, 4, 8)
216. Wolpe, Stefan: Four Studies on Basic Rows, No.4, "Basic Row" 8, [0, 8, 4, 1, 9, 5, 2, 10, 6, 3, 11, 7], pc set (0, 4, 8), self-rotational interval pattern 8-8-9-
217. Wolpe, Stefan: Four Studies on Basic Rows, No.4, "Basic Row" 9, [0, 9, 1, 10, 2, 11, 6, 3, 7, 4, 8, 5], pc set (0, 1, 4)
218. Wuorinen, Charles: Second Sonata, Voice 3, [0, 2, 4, 3, 5, 1, 9, 7, 11, 10, 8, 6], pc set (0, 2, 4)
219. Zhou, Jin-Min: Piano Quintet, Scherzo, [0, 10, 5, 4, 6, 11, 7, 9, 2, 3, 1, 8], pc set (0, 2, 7)

220. Zillig, Wilfried: *Das Opfer*, [0, 11, 3, 4, 8, 7, 10, 9, 1, 2, 6, 5], pc set (0, 1, 4)
 221. Zimmerman, Bernd Alois: *Perspektiven*, [0, 2, 10, 8, 4, 6, 3, 1, 5, 7, 11, 9], pc set (0, 2, 4)

3x Same Tetrachord

Next up we have cases of 3x the same tetrachord (pitches 1-4, 5-8, and 8-12).

1. Argento, Dominick: *A Water Bird Talk*, Bird Row, [0, 7, 2, 1, 10, 9, 3, 8, 5, 4, 11, 6], pc set (0, 1, 2, 7)
2. Babbitt, Milton: *Woodwind Quartet*, [0, 3, 1, 2, 11, 10, 8, 9, 5, 7, 6, 4], pc set (0, 1, 2, 3)
3. Bach, Johann Sebastian: *Chromatische Fantasie*, [0, 3, 6, 9, 11, 2, 5, 8, 10, 1, 4, 7], pc set (0, 3, 6, 9), self-rotational interval pattern 3-3-3-2-
4. Bartók, Béla: *String Quartet, No.4*, [0, 5, 6, 11, 4, 9, 10, 3, 8, 1, 2, 7], pc set (0, 1, 6, 7), self-rotational interval pattern 5-1-5-5-
5. Berg, Alban: *Lulu*, Schigolch, [0, 2, 3, 1, 4, 5, 6, 7, 8, 9, 11, 10], pc set (0, 1, 2, 3)
6. Dallapiccola, Luigi: *Ulisse* [opera], [0, 2, 1, 3, 9, 8, 11, 10, 4, 6, 5, 7], pc set (0, 1, 2, 3)
7. David, Johann Nepomuk: *Sonata for violin, Op.58, No.1*, [0, 2, 3, 9, 11, 10, 5, 8, 1, 6, 4, 7], pc set (0, 1, 3, 6)
8. Denisov, Edison: *Five Etudes for Solo Bassoon*, row A, [0, 6, 1, 7, 8, 3, 2, 9, 10, 5, 11, 4], pc set (0, 1, 6, 7)
9. Denisov, Edison: *Five Etudes for Solo Bassoon*, row B, [0, 11, 6, 5, 4, 10, 9, 3, 2, 7, 1, 8], pc set (0, 1, 6, 7)
10. Denisov, Edison: *Five Etudes for Solo Bassoon*, row C, [0, 6, 11, 5, 4, 10, 9, 3, 2, 7, 1, 8], pc set (0, 1, 6, 7)
11. Denisov, Edison: *Five Etudes for Solo Bassoon*, row D, [0, 6, 1, 7, 8, 3, 2, 9, 10, 11, 5, 4], pc set (0, 1, 6, 7)
12. Denisov, Edison: *Five Etudes for Solo Bassoon*, row E, [0, 1, 7, 6, 5, 11, 10, 4, 3, 8, 2, 9], pc set (0, 1, 6, 7)
13. Denisov, Edison: *Five Etudes for Solo Bassoon*, row F, [0, 6, 1, 7, 3, 2, 8, 9, 10, 5, 11, 4], pc set (0, 1, 6, 7)
14. Denisov, Edison: *Five Etudes for Solo Bassoon*, row J, [0, 6, 5, 11, 4, 10, 9, 3, 2, 7, 1, 8], pc set (0, 1, 6, 7)
15. Denisov, Edison: *Octet for Winds*, mvt 2, row B, [0, 6, 11, 5, 4, 10, 9, 3, 2, 8, 1, 7], pc set (0, 1, 6, 7)
16. Finney, Ross Lee: *Sonata Quasi una Fantasia*, [0, 1, 3, 2, 4, 5, 6, 7, 9, 8, 10, 11], pc set (0, 1, 2, 3)
17. Ginastera, Alberto: *Don Rodrigo*, Op.31, Row Class 3, [0, 5, 6, 11, 2, 1, 8, 7, 10, 4, 9, 3], pc set (0, 1, 6, 7)

18. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 4, [0, 9, 10, 11, 6, 5, 8, 7, 2, 3, 4, 1], pc set (0, 1, 2, 3)
19. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 8, [0, 1, 7, 6, 8, 9, 3, 2, 4, 5, 11, 10], pc set (0, 1, 6, 7), self-rotational interval pattern 1-6-11-2-
20. Ginastera, Alberto: Sonata for Cello and Piano, Op.49, [0, 3, 2, 1, 10, 11, 8, 9, 5, 4, 7, 6], pc set (0, 1, 2, 3)
21. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class III S, [0, 6, 11, 5, 8, 2, 7, 1, 4, 10, 3, 9], pc set (0, 1, 6, 7), self-rotational interval pattern 6-5-6-3-
22. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 2, [0, 3, 6, 9, 2, 5, 8, 11, 4, 7, 10, 1], pc set (0, 3, 6, 9), self-rotational interval pattern 3-3-3-5-
23. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 5, [0, 7, 1, 6, 4, 11, 5, 10, 8, 3, 9, 2], pc set (0, 1, 6, 7), self-rotational interval pattern 7-6-5-10-
24. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen; mit einer Zwölftonreihe von Dr. Fritz Racek, [0, 2, 9, 11, 4, 3, 6, 1, 10, 8, 5, 7], pc set (0, 2, 3, 5)
25. Hendler, Maximilian: aus den fünf Liedern nach Texten von Elisabeth Pöschl : 'Sonnenaufgang' für Singstimme und Klavier, Op.44-1, [0, 11, 2, 1, 5, 6, 4, 3, 8, 7, 9, 10], pc set (0, 1, 2, 3)
26. Huber, Klaus: Zwei Sätze, [0, 3, 1, 10, 11, 8, 6, 9, 7, 2, 4, 5], pc set (0, 2, 3, 5)
27. Jelinek, Hanns: Zwölftonwerk, Op.15, [0, 10, 5, 7, 3, 6, 1, 8, 11, 9, 2, 4], pc set (0, 2, 5, 7)
28. Kalodiki, Georgia: Six Sketches for piano, [0, 7, 6, 1, 2, 9, 8, 3, 4, 11, 5, 10], pc set (0, 1, 6, 7)
29. Lackner, Peter: Kanon T4 á 3, [0, 5, 7, 2, 4, 9, 11, 6, 8, 1, 3, 10], pc set (0, 2, 5, 7), self-rotational interval pattern 5-2-7-2-
30. Lang, Bernhard: HIOB Musiktheater für Orchester, Chor und Solisten, [0, 9, 11, 10, 5, 8, 6, 7, 2, 3, 1, 4], pc set (0, 1, 2, 3)
31. Li, Bao-Shu: Träumerei of Jiuzhai Gou, [0, 5, 7, 2, 4, 11, 9, 6, 3, 1, 8, 10], pc set (0, 2, 5, 7)
32. Ligeti, György: Le Grand Macabre, [0, 6, 5, 11, 10, 4, 9, 3, 2, 8, 7, 1], pc set (0, 1, 6, 7)
33. Luo, Zhong-Rong: String Quartet, No.2, [0, 3, 5, 10, 6, 8, 11, 1, 9, 2, 4, 7], pc set (0, 2, 5, 7)
34. Morris, Robert: Beautiful Beast, [0, 1, 3, 6, 5, 10, 7, 4, 9, 8, 11, 2], pc set (0, 1, 3, 6)
35. Morris, Robert: On the Go, [0, 9, 2, 3, 5, 8, 10, 11, 1, 4, 7, 6], pc set (0, 1, 3, 6)
36. Nono, Luigi: Intolleranza, Baritone, [0, 2, 7, 9, 4, 6, 11, 1, 8, 10, 3, 5], pc set (0, 2, 5, 7), self-rotational interval pattern 2-5-2-7-
37. Nono, Luigi: Intolleranza, Tenor 2, [0, 1, 3, 2, 4, 5, 7, 6, 8, 9, 11, 10], pc set (0, 1, 2, 3), self-rotational interval pattern 1-2-11-2-
38. Nono, Luigi: La terra e la compagna (sketch), Series 3, [0, 9, 6, 3, 1, 4, 7, 10, 11, 8, 5, 2], pc set (0, 3, 6, 9)
39. Nono, Luigi: Sarà dolce tacere, [0, 10, 5, 3, 8, 6, 1, 11, 4, 2, 9, 7], pc set (0, 2, 5, 7), self-rotational interval pattern 10-7-10-5-
40. Panufnik, Andrzej: Sinfonia di Sfere (Symphony, No.5), Chord 2, [0, 3, 6, 9, 11, 2, 5, 8, 10, 1, 4, 7],

pc set (0, 3, 6, 9), self-rotational interval pattern 3-3-3-2-

41. Pärt, Arvo: Symphony, No.2, [0, 3, 1, 2, 4, 7, 5, 6, 8, 11, 9, 10], pc set (0, 1, 2, 3), self-rotational interval pattern 3-10-1-2-
42. Rochberg, George: String Quartet, No.2 with soprano solo, [0, 11, 6, 5, 1, 2, 8, 7, 3, 4, 9, 10], pc set (0, 1, 6, 7)
43. Schnittke, Alfred: Concerto Grosso, No.1, mvt 2, [0, 11, 2, 1, 8, 7, 10, 9, 6, 5, 4, 3], pc set (0, 1, 2, 3)
44. Schnittke, Alfred: Concerto Grosso, No.3, (mvt 3, 4), row 6, [0, 11, 2, 1, 9, 10, 7, 8, 4, 3, 6, 5], pc set (0, 1, 2, 3)
45. Schnittke, Alfred: Sonata, No.2 for Cello and Piano, mvt 2, new row, [0, 3, 6, 9, 10, 1, 4, 7, 8, 11, 2, 5], pc set (0, 3, 6, 9), self-rotational interval pattern 3-3-3-1-
46. Schnittke, Alfred: String Quartet, No.4, mvt 4, m.31, [0, 11, 9, 10, 8, 7, 6, 5, 3, 4, 2, 1], pc set (0, 1, 2, 3)
47. Schnittke, Alfred: Symphony, No.7, mvt 3, row y, [0, 1, 11, 10, 8, 9, 7, 6, 5, 4, 3, 2], pc set (0, 1, 2, 3)
48. Schnittke, Alfred: Violin Sonata 2, [0, 10, 11, 9, 6, 8, 7, 5, 4, 1, 2, 3], pc set (0, 1, 2, 3)
49. Schwantner, Joseph: Modus Caelestis (A), [0, 6, 7, 1, 11, 5, 4, 10, 8, 2, 3, 9], pc set (0, 1, 6, 7)
50. Seiber, Mátyás: Concert Piece for Violin and Piano, [0, 1, 7, 6, 11, 10, 4, 5, 9, 8, 2, 3], pc set (0, 1, 6, 7)
51. Seiber, Mátyás: Sonata for Violin and Piano, [0, 1, 11, 10, 7, 6, 8, 9, 4, 3, 5, 2], pc set (0, 1, 2, 3)
52. Slonimsky, Nicholas: No. 1216a Fouths (Twelve-Tone Patterns), [0, 5, 10, 3, 7, 2, 9, 4, 8, 1, 6, 11], pc set (0, 2, 5, 7)
53. Slonimsky, Nicholas: No. 1217a Fourths (Twelve-Tone Patterns), [0, 5, 10, 3, 11, 6, 1, 8, 4, 9, 2, 7], pc set (0, 2, 5, 7)
54. Slonimsky, Nicholas: No. 1224a Sixths (Twelve-Tone Patterns), [0, 9, 6, 3, 7, 10, 1, 4, 8, 5, 2, 11], pc set (0, 3, 6, 9)
55. Slonimsky, Nicholas: No. 1241a Mutually Exclusive Diminished-Seventh Chords (Twelve-Tone Spirals), [0, 9, 6, 3, 11, 5, 2, 8, 7, 10, 1, 4], pc set (0, 3, 6, 9)
56. Slonimsky, Nicholas: No. 1265 Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 4, 7, 10, 2, 5, 8, 11], pc set (0, 3, 6, 9), self-rotational interval pattern 3-3-3-4-
57. Slonimsky, Nicholas: No. 1265a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 4, 7, 10, 2, 5, 8, 11], pc set (0, 3, 6, 9), self-rotational interval pattern 3-3-3-4-
58. Slonimsky, Nicholas: No. 1266a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 2, 5, 8, 11, 4, 7, 10, 1], pc set (0, 3, 6, 9), self-rotational interval pattern 3-3-3-5-

59. Slonimsky, Nicholas: No. 216 Ultrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 5, 10, 7, 4, 9, 2, 11, 8, 1, 6, 3], pc set (0, 2, 5, 7), self-rotational interval pattern 5-5-9-9-
60. Slonimsky, Nicholas: No. 221 Ultrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 6, 11, 9, 4, 10, 3, 1, 8, 2, 7, 5], pc set (0, 1, 3, 6), self-rotational interval pattern 6-5-10-7-
61. Slonimsky, Nicholas: No. 230 Ultrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 6, 5, 11, 4, 10, 9, 3, 8, 2, 1, 7], pc set (0, 1, 6, 7), self-rotational interval pattern 6-11-6-5-
62. Slonimsky, Nicholas: No. 258 Infrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 11, 10, 9, 4, 3, 2, 1, 8, 7, 6, 5], pc set (0, 1, 2, 3), self-rotational interval pattern 11-11-11-7-
63. Slonimsky, Nicholas: No. 262 Infrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 11, 10, 5, 4, 3, 2, 9, 8, 7, 6, 1], pc set (0, 1, 2, 7), self-rotational interval pattern 11-11-7-11-
64. Slonimsky, Nicholas: No. 270 Infrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 10, 9, 7, 4, 2, 1, 11, 8, 6, 5, 3], pc set (0, 2, 3, 5), self-rotational interval pattern 10-11-10-9-
65. Slonimsky, Nicholas: No. 277 Infrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 10, 7, 5, 4, 2, 11, 9, 8, 6, 3, 1], pc set (0, 2, 5, 7), self-rotational interval pattern 10-9-10-11-
66. Slonimsky, Nicholas: No. 340 Infra-Inter-Ultrapolation (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 11, 2, 9, 4, 3, 6, 1, 8, 7, 10, 5], pc set (0, 2, 3, 5), self-rotational interval pattern 11-3-7-7-
67. Slonimsky, Nicholas: No. 348 Infra-Inter-Ultrapolation (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 10, 1, 7, 4, 2, 5, 11, 8, 6, 9, 3], pc set (0, 1, 3, 6), self-rotational interval pattern 10-3-6-9-
68. Slonimsky, Nicholas: No. 359 Infra-Inter-Ultrapolation (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 10, 3, 9, 4, 2, 7, 1, 8, 6, 11, 5], pc set (0, 1, 3, 6), self-rotational interval pattern 10-5-6-7-
69. Slonimsky, Nicholas: No. 370 Infra-Inter-Ultrapolation (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 7, 1, 6, 4, 11, 5, 10, 8, 3, 9, 2], pc set (0, 1, 6, 7), self-rotational interval pattern 7-6-5-10-
70. Slonimsky, Nicholas: No. 371 Infra-Inter-Ultrapolation (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 7, 2, 5, 4, 11, 6, 9, 8, 3, 10, 1], pc set (0, 2, 5, 7), self-rotational interval pattern 7-7-3-11-
71. Slonimsky, Nicholas: No. 388 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone

- Progression; Equal Division of One Octave into Three Parts), [0, 3, 9, 6, 4, 7, 1, 10, 8, 11, 5, 2], pc set (0, 3, 6, 9), self-rotational interval pattern 3-6-9-10-
72. Slonimsky, Nicholas: No. 389 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 9, 3, 6, 4, 1, 7, 10, 8, 5, 11, 2], pc set (0, 3, 6, 9), self-rotational interval pattern 9-6-3-10-
 73. Slonimsky, Nicholas: No. 390 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 3, 9, 6, 4, 7, 1, 10, 8, 11, 5, 2], pc set (0, 3, 6, 9), self-rotational interval pattern 3-6-9-10-
 74. Slonimsky, Nicholas: No. 391 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 9, 3, 6, 4, 1, 7, 10, 8, 5, 11, 2], pc set (0, 3, 6, 9), self-rotational interval pattern 9-6-3-10-
 75. Slonimsky, Nicholas: No. 637 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 3, 2, 4, 5, 7, 6, 8, 9, 11, 10], pc set (0, 1, 2, 3), self-rotational interval pattern 1-2-11-2-
 76. Slonimsky, Nicholas: No. 638 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 11, 9, 10, 4, 3, 1, 2, 8, 7, 5, 6], pc set (0, 1, 2, 3), self-rotational interval pattern 11-10-1-6-
 77. Slonimsky, Nicholas: No. 641 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 7, 6, 5, 4, 8, 9, 10, 11], pc set (0, 1, 2, 3)
 78. Slonimsky, Nicholas: No. 645 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 11, 10, 8, 9, 7, 6, 4, 5, 3, 2], pc set (0, 1, 2, 3), self-rotational interval pattern 1-10-11-10-
 79. Slonimsky, Nicholas: No. 646 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 11, 6, 8, 9, 7, 2, 4, 5, 3, 10], pc set (0, 1, 2, 7), self-rotational interval pattern 1-10-7-2-
 80. Slonimsky, Nicholas: No. 647 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 2, 11, 5, 8, 10, 7, 1, 4, 6, 3, 9], pc set (0, 1, 3, 6), self-rotational interval pattern 2-9-6-3-
 81. Slonimsky, Nicholas: No. 685 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 1, 3, 6, 8, 9, 11, 2, 4, 5, 7, 10], pc set (0, 1, 3, 6), self-rotational interval pattern 1-2-3-2-
 82. Slonimsky, Nicholas: No. 692 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 3, 5, 8, 10, 11, 1, 4, 6, 7, 9], pc set (0, 2, 3, 5), self-rotational interval pattern 2-1-2-3-
 83. Slonimsky, Nicholas: No. 698 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 5, 7, 8, 10, 1, 3, 4, 6, 9, 11], pc set (0, 2, 5, 7), self-rotational interval pattern 2-3-2-1-

84. Slonimsky, Nicholas: No. 734 Inter-Infra-Ultrapolation (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 5, 11, 10, 8, 1, 7, 6, 4, 9, 3, 2], pc set (0, 1, 2, 7), self-rotational interval pattern 5-6-11-10-
85. Slonimsky, Nicholas: No. 735 Inter-Infra-Ultrapolation (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 6, 9, 11, 8, 2, 5, 7, 4, 10, 1, 3], pc set (0, 1, 3, 6), self-rotational interval pattern 6-3-2-9-
86. Slonimsky, Nicholas: No. 736 Inter-Infra-Ultrapolation (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 7, 9, 8, 10, 3, 5, 4, 6, 11, 1], pc set (0, 2, 5, 7), self-rotational interval pattern 2-5-2-11-
87. Slonimsky, Nicholas: No. 813 Interpolation of Three Notes (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 3, 6, 9, 10, 1, 4, 7, 8, 11, 2, 5], pc set (0, 3, 6, 9), self-rotational interval pattern 3-3-3-1-
88. Slonimsky, Nicholas: No. 909 Infra-Inter-Ultrapolation (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 9, 3, 6, 5, 2, 8, 11, 10, 7, 1, 4], pc set (0, 3, 6, 9), self-rotational interval pattern 9-6-3-11-
89. Spinner, Leopold: Sonatina for Piano, Op.22, [0, 3, 2, 1, 9, 10, 11, 8, 5, 4, 7, 6], pc set (0, 1, 2, 3)
90. Spinner, Leopold: String Quartet, Op.2, [0, 1, 7, 6, 11, 10, 4, 5, 8, 9, 3, 2], pc set (0, 1, 6, 7)
91. Stravinsky, Igor: Agon, “Double Pas-de-Deux”, [0, 11, 1, 2, 9, 8, 10, 7, 5, 6, 4, 3], pc set (0, 1, 2, 3)
92. Webern, Anton: String Quartet, Op.28, [0, 11, 2, 1, 5, 6, 3, 4, 8, 7, 10, 9], pc set (0, 1, 2, 3)
93. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 10, [0, 10, 1, 11, 4, 2, 5, 3, 8, 6, 9, 7], pc set (0, 1, 2, 3), self-rotational interval pattern 10-3-10-5-
94. Yun, Isang: Garak, [0, 3, 6, 1, 4, 5, 7, 10, 9, 11, 8, 2], pc set (0, 1, 3, 6)

2x Same Hexachord

Finally, we have the relatively common condition of 2x the same hexachord (pitches 1-6 and 7-12).

1. Apostel, Hans Erich: Fischerhaus-Serenade, Op.45, [0, 4, 8, 3, 11, 7, 1, 9, 5, 2, 10, 6], pc set (0, 1, 4, 5, 8, 9)
2. Argento, Dominick: A Water Bird Talk, Lecturer Row, [0, 9, 5, 10, 2, 6, 3, 11, 8, 4, 1, 7], pc set (0, 1, 3, 5, 8, 9)
3. Argento, Dominick: From the Diary of Virginia Woolf, [0, 7, 6, 2, 11, 5, 3, 1, 8, 9, 4, 10], pc set (0, 1, 2, 5, 7, 8)
4. Atterberg, Kurt: Symphony 9 [Bbm], Op.54, ‘Sinfonia visionaria’, [0, 1, 5, 6, 7, 4, 8, 11, 10, 9, 2, 3], pc set (0, 1, 2, 3, 6, 7)
5. Babbitt, Milton: All Set, [0, 4, 5, 11, 6, 10, 7, 3, 1, 2, 9, 8], pc set (0, 1, 2, 6, 7, 8)
6. Babbitt, Milton: Arie da Capo, [0, 7, 8, 6, 2, 1, 10, 5, 11, 9, 4, 3], pc set (0, 1, 2, 6, 7, 8)

7. Babbitt, Milton: Composition for Four Instruments, [0, 3, 11, 2, 10, 1, 7, 4, 8, 5, 9, 6], pc set (0, 1, 2, 3, 4, 5)
8. Babbitt, Milton: Composition for Four Instruments, row i, [0, 10, 9, 8, 7, 5, 11, 1, 2, 3, 4, 6], pc set (0, 2, 3, 4, 5, 7)
9. Babbitt, Milton: Composition for Four Instruments, row ii, [0, 9, 11, 2, 4, 1, 7, 10, 8, 5, 3, 6], pc set (0, 2, 3, 4, 5, 7)
10. Babbitt, Milton: Composition for Four Instruments, row iii, [0, 4, 3, 8, 7, 11, 5, 1, 2, 9, 10, 6], pc set (0, 1, 4, 5, 8, 9)
11. Babbitt, Milton: Composition for Four Instruments, row iv, [0, 4, 1, 8, 5, 9, 3, 11, 2, 7, 10, 6], pc set (0, 1, 4, 5, 8, 9)
12. Babbitt, Milton: Composition for Synthesizer, [0, 9, 1, 8, 4, 5, 7, 2, 3, 6, 10, 11], pc set (0, 1, 4, 5, 8, 9)
13. Babbitt, Milton: Composition for Tenor and Six Instruments, [0, 11, 7, 5, 6, 1, 4, 3, 10, 8, 2, 9], pc set (0, 1, 2, 6, 7, 8)
14. Babbitt, Milton: Composition for Twelve Instruments, [0, 1, 4, 9, 5, 8, 3, 10, 2, 11, 6, 7], pc set (0, 1, 4, 5, 8, 9)
15. Babbitt, Milton: Composition for Viola and Piano, [0, 3, 4, 8, 11, 7, 9, 2, 1, 5, 10, 6], pc set (0, 1, 4, 5, 8, 9)
16. Babbitt, Milton: Du, row i, [0, 9, 2, 10, 11, 1, 7, 5, 4, 8, 3, 6], pc set (0, 1, 2, 3, 4, 5)
17. Babbitt, Milton: Du, row ii, [0, 5, 2, 10, 9, 7, 1, 3, 4, 8, 11, 6], pc set (0, 2, 4, 5, 7, 9)
18. Babbitt, Milton: Groupwise, [0, 5, 4, 6, 10, 11, 2, 9, 3, 1, 8, 7], pc set (0, 1, 2, 6, 7, 8)
19. Babbitt, Milton: My Complements to Roger, [0, 3, 7, 8, 11, 4, 2, 6, 1, 9, 10, 5], pc set (0, 1, 4, 5, 8, 9)
20. Babbitt, Milton: My Ends Are My Beginnings, [0, 11, 4, 8, 7, 3, 5, 6, 9, 2, 10, 1], pc set (0, 1, 4, 5, 8, 9)
21. Babbitt, Milton: Paraphrases, [0, 11, 3, 10, 8, 1, 7, 5, 4, 6, 2, 9], pc set (0, 2, 3, 4, 5, 7)
22. Babbitt, Milton: Partitions, [0, 7, 9, 10, 2, 11, 5, 8, 4, 3, 1, 6], pc set (0, 2, 3, 4, 5, 7)
23. Babbitt, Milton: Relata I, [0, 1, 11, 2, 10, 3, 9, 8, 4, 6, 7, 5], pc set (0, 1, 2, 3, 4, 5)
24. Babbitt, Milton: Relata II, [0, 1, 11, 2, 10, 3, 9, 8, 4, 6, 7, 5], pc set (0, 1, 2, 3, 4, 5)
25. Babbitt, Milton: Semi-simple variations, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6], pc set (0, 1, 2, 3, 4, 5)
26. Babbitt, Milton: String Quartet, No.2, [0, 3, 11, 4, 1, 2, 8, 10, 5, 9, 7, 6], pc set (0, 1, 2, 3, 4, 5)
27. Babbitt, Milton: String Quartet, No.3, [0, 11, 6, 7, 5, 1, 10, 2, 9, 3, 4, 8], pc set (0, 1, 2, 6, 7, 8)
28. Babbitt, Milton: String Quartet, No.4, [0, 2, 9, 7, 11, 10, 1, 8, 4, 3, 5, 6], pc set (0, 2, 3, 4, 5, 7)
29. Babbitt, Milton: Tableaux, [0, 11, 4, 6, 10, 5, 2, 1, 7, 9, 8, 3], pc set (0, 1, 2, 6, 7, 8)
30. Babbitt, Milton: The Crowded Air, [0, 8, 5, 7, 10, 6, 11, 1, 9, 3, 2, 4], pc set (0, 1, 2, 3, 5, 7)
31. Babbitt, Milton: The Widow's Lament in Springtime, [0, 11, 9, 2, 10, 7, 1, 4, 8, 3, 5, 6], pc set (0, 2, 3, 4, 5, 7)

32. Babbitt, Milton: Three Compositions for Piano, No.1, [0, 5, 7, 4, 2, 3, 9, 1, 8, 11, 10, 6], pc set (0, 2, 3, 4, 5, 7)
33. Babbitt, Milton: Two Sonnets of Gerard Manley Hopkins, [0, 2, 3, 4, 7, 5, 11, 6, 10, 9, 8, 1], pc set (0, 2, 3, 4, 5, 7)
34. Babbitt, Milton: Vision and Prayer, [0, 11, 8, 3, 7, 4, 10, 9, 2, 6, 1, 5], pc set (0, 1, 4, 5, 8, 9)
35. Babbitt, Milton: Woodwind Quartet, [0, 3, 1, 2, 11, 10, 8, 9, 5, 7, 6, 4], pc set (0, 1, 2, 3, 4, 5)
36. Baker, David: "Status Symbol" from "The Black Experience", [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], pc set (0, 1, 4, 5, 8, 9)
37. Barber, Samuel: Piano Sonata, Op.26, [0, 8, 4, 11, 3, 7, 1, 9, 5, 10, 2, 6], pc set (0, 1, 4, 5, 8, 9)
38. Bartók, Béla: Violin Concerto, No.2, mvt 1, [0, 2, 8, 1, 9, 4, 10, 6, 3, 7, 11, 5], pc set (0, 1, 4, 5, 6, 8)
39. Bartók, Béla: Violin Concerto, No.2, mvt 3, [0, 8, 2, 9, 1, 4, 10, 7, 6, 3, 11, 5], pc set (0, 1, 4, 5, 6, 8)
40. Beecroft, Norma: Improvvvisazioni Concertanti, No.1, [0, 1, 11, 9, 3, 2, 7, 6, 10, 8, 4, 5], pc set (0, 1, 2, 3, 4, 6)
41. Bennett, Richard Rodney: Five Studies for Piano, [0, 3, 5, 6, 11, 9, 4, 2, 7, 8, 10, 1], pc set (0, 1, 3, 6, 7, 9)
42. Berg, Alban: Altenberg Lieder, [0, 1, 11, 10, 2, 9, 3, 8, 7, 6, 5, 4], pc set (0, 1, 2, 3, 4, 5)
43. Berg, Alban: Lulu, Lulu (title character) row, [0, 2, 3, 5, 7, 9, 1, 10, 11, 4, 6, 8], pc set (0, 2, 3, 5, 7, 9)
44. Berg, Alban: Lulu, Primary / Main / Basic Row, [0, 4, 5, 2, 7, 9, 6, 8, 11, 10, 3, 1], pc set (0, 2, 4, 5, 7, 9)
45. Berg, Alban: Lulu, Schigolch, [0, 2, 3, 1, 4, 5, 6, 7, 8, 9, 11, 10], pc set (0, 1, 2, 3, 4, 5)
46. Berg, Alban: Lulu, Schoolboy row, [0, 2, 6, 10, 4, 7, 8, 3, 5, 9, 11, 1], pc set (0, 1, 3, 5, 7, 9)
47. Berg, Alban: Lulu, permutation of main row, [0, 4, 2, 7, 9, 6, 8, 11, 3, 1, 5, 10], pc set (0, 2, 3, 5, 7, 9)
48. Berg, Alban: Lulu, whole-tone row, [0, 2, 4, 6, 10, 8, 11, 7, 9, 1, 3, 5], pc set (0, 2, 4, 6, 8, 10)
49. Berg, Alban: Lyric Suite, Primary Row / mvt I, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], pc set (0, 2, 4, 5, 7, 9)
50. Berg, Alban: Lyric Suite, mvt I, [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 2-2-1-2-2-9-
51. Berg, Alban: Lyric Suite, mvt III, [0, 11, 7, 1, 2, 9, 3, 8, 10, 4, 5, 6], pc set (0, 1, 2, 3, 5, 7)
52. Berg, Alban: Lyric Suite, mvt VI, [0, 2, 4, 7, 9, 11, 6, 8, 10, 1, 3, 5], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 2-2-3-2-2-7-
53. Berg, Alban: Schliesse mir die Augen Beide, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], pc set (0, 2, 4, 5, 7, 9)
54. Berger, Arthur: Chamber Music for Thirteen Players, [0, 1, 11, 7, 10, 9, 6, 5, 8, 4, 2, 3], pc set (0, 1,

- 2, 3, 4, 6)
55. Berio, Luciano: Chamber Music, [0, 9, 3, 5, 7, 10, 2, 11, 4, 6, 8, 1], pc set (0, 2, 3, 5, 7, 9)
 56. Berio, Luciano: Cinque Variazioni, [0, 2, 4, 1, 3, 5, 8, 10, 6, 7, 9, 11], pc set (0, 1, 2, 3, 4, 5)
 57. Berio, Luciano: Sequenza I, [0, 11, 10, 9, 8, 7, 4, 6, 5, 3, 1, 2], pc set (0, 1, 2, 3, 4, 5)
 58. Bischof, Rainer: 'Und so sink ich leise in mich selbst hinein'. Österreichischer Liederzyklus für Mezzosopran und Violine, Op.17, [0, 6, 5, 11, 4, 9, 3, 2, 8, 7, 1, 10], pc set (0, 1, 2, 5, 7, 8)
 59. Boulez, Pierre: 2nd Piano Sonata, mvt II, Section 1, [0, 2, 1, 11, 3, 9, 8, 10, 7, 6, 5, 4], pc set (0, 1, 2, 3, 4, 6)
 60. Boulez, Pierre: Le Soleil des eaux, series I, [0, 6, 10, 2, 5, 1, 7, 11, 3, 4, 8, 9], pc set (0, 1, 4, 5, 6, 8)
 61. Boulez, Pierre: Le Soleil des eaux, series II, [0, 6, 10, 2, 5, 1, 4, 7, 11, 8, 3, 9], pc set (0, 1, 4, 5, 6, 8)
 62. Boulez, Pierre: Le Soleil des eaux, series III, [0, 11, 7, 2, 6, 5, 4, 8, 10, 1, 3, 9], pc set (0, 1, 2, 5, 7, 8)
 63. Boulez, Pierre: Notations, [0, 2, 7, 6, 1, 8, 4, 9, 5, 11, 10, 3], pc set (0, 1, 2, 6, 7, 8)
 64. Boulez, Pierre: Pli selon pli, [0, 1, 8, 6, 7, 9, 4, 5, 11, 3, 2, 10], pc set (0, 1, 2, 3, 6, 7)
 65. Boulez, Pierre: Structures Ia, [0, 11, 6, 5, 4, 3, 1, 10, 9, 7, 2, 8], pc set (0, 1, 2, 3, 6, 7)
 66. Cage, John: Sonata for Clarinet, [0, 1, 10, 11, 9, 7, 6, 5, 4, 8, 3, 2], pc set (0, 1, 2, 3, 4, 6)
 67. Cage, John: Sonata for Clarinet, mvt 2, [0, 11, 9, 10, 8, 6, 5, 4, 3, 7, 2, 1], pc set (0, 1, 2, 3, 4, 6)
 68. Cage, John: Two pieces for Piano, [0, 11, 8, 3, 4, 2, 9, 7, 1, 5, 10, 6], pc set (0, 1, 2, 4, 5, 8)
 69. Carlos, Juan: Canciones y Baladas, Balada II, [0, 4, 10, 6, 3, 8, 7, 2, 5, 9, 1, 11], pc set (0, 1, 3, 5, 7, 9)
 70. Carter, Elliott: Night Fantasies, [0, 10, 3, 11, 8, 7, 1, 2, 5, 9, 4, 6], pc set (0, 1, 3, 4, 5, 8)
 71. Carter, Elliott: String Quartet, No.2 (sketch) 3, [0, 2, 4, 6, 8, 10, 1, 3, 5, 7, 9, 11], pc set (0, 2, 4, 6, 8, 10), self-rotational interval pattern 2-2-2-2-3-
 72. Coltrane, John: Miles Mode, [0, 3, 5, 2, 7, 9, 10, 8, 1, 11, 6, 4], pc set (0, 2, 3, 5, 7, 9)
 73. Copland, Aaron: Inscape, ("Y form" or "Row 1"), [0, 4, 3, 11, 2, 7, 6, 8, 10, 9, 5, 1], pc set (0, 1, 3, 4, 5, 8)
 74. Cordero, Roque: Concerto for Violin, mvt 2A, [0, 11, 6, 4, 7, 8, 5, 9, 3, 10, 1, 2], pc set (0, 1, 4, 5, 6, 8)
 75. Cordero, Roque: Soliloquios, [0, 1, 5, 11, 3, 2, 9, 8, 4, 10, 6, 7], pc set (0, 1, 2, 3, 4, 6)
 76. Cordero, Roque: Violin Concerto mvt 1-3, [0, 11, 6, 4, 8, 7, 5, 1, 3, 2, 10, 9], pc set (0, 1, 4, 5, 6, 8)
 77. Crosse, Gordon: Elegy for Small Orchestra, Op.1, [0, 11, 3, 1, 9, 10, 5, 6, 2, 4, 8, 7], pc set (0, 1, 2, 3, 4, 6)
 78. Dallapiccola, Luigi: 'Intermezzo' from the 'Ciaccona' (of 'Ciaccona, intermezzo e adagio'), [0, 5, 6, 3, 8, 9, 7, 11, 10, 2, 1, 4], pc set (0, 1, 3, 4, 6, 9)
 79. Dallapiccola, Luigi: Canti di Liberationi, No.2, [0, 5, 8, 3, 1, 9, 10, 4, 2, 11, 7, 6], pc set (0, 1, 3, 5, 8, 9)

80. Dallapiccola, Luigi: *Canti di Liberazione*, [0, 1, 5, 8, 10, 4, 3, 7, 9, 2, 11, 6], pc set (0, 1, 3, 5, 8, 9)
81. Dallapiccola, Luigi: *Cinque canti*, [0, 11, 5, 8, 6, 2, 7, 3, 1, 4, 10, 9], pc set (0, 1, 3, 6, 7, 9)
82. Dallapiccola, Luigi: *Commiato*, [0, 6, 5, 3, 9, 11, 10, 8, 7, 1, 2, 4], pc set (0, 1, 3, 6, 7, 9)
83. Dallapiccola, Luigi: *Dialoghi*, [0, 1, 10, 2, 6, 4, 5, 3, 7, 11, 8, 9], pc set (0, 2, 3, 4, 6, 8)
84. Dallapiccola, Luigi: *Il Prigioniero*, “Hope”, [0, 1, 2, 3, 11, 5, 4, 10, 6, 7, 9, 8], pc set (0, 1, 2, 3, 4, 6)
85. Dallapiccola, Luigi: *Il prigioniero*, “Prayer”, [0, 3, 6, 11, 9, 2, 1, 7, 8, 4, 5, 10], pc set (0, 1, 3, 4, 6, 9)
86. Dallapiccola, Luigi: *Liriche greche c: Sex Carmina Alcaei*, [0, 3, 5, 6, 2, 9, 8, 7, 4, 1, 10, 11], pc set (0, 1, 3, 4, 6, 9)
87. Dallapiccola, Luigi: *Quaderno musicale di Annalibera*, [0, 1, 5, 8, 10, 4, 3, 7, 9, 2, 11, 6], pc set (0, 1, 3, 5, 8, 9)
88. Dallapiccola, Luigi: *Quattro liriche di Antonio Machado*, i, iv, [0, 3, 5, 6, 8, 9, 11, 10, 7, 4, 2, 1], pc set (0, 1, 3, 4, 6, 9)
89. Dallapiccola, Luigi: *Requiescant*, [0, 2, 1, 3, 4, 6, 7, 9, 8, 10, 5, 11], pc set (0, 1, 2, 3, 4, 6)
90. Dallapiccola, Luigi: *Requiescant (alternative view)*, [0, 2, 1, 7, 11, 8, 9, 6, 10, 4, 3, 5], pc set (0, 1, 2, 3, 6, 7)
91. Dallapiccola, Luigi: *Tempus*, ‘Exhortatio’, [0, 11, 9, 3, 5, 6, 4, 7, 8, 2, 1, 10], pc set (0, 1, 3, 6, 7, 9)
92. Dallapiccola, Luigi: *Tempus*, ‘Ploratus’, [0, 1, 7, 6, 10, 4, 3, 2, 5, 11, 9, 8], pc set (0, 1, 3, 6, 7, 9)
93. Dallapiccola, Luigi: *Ulisse [opera]*, [0, 2, 1, 3, 9, 8, 11, 10, 4, 6, 5, 7], pc set (0, 1, 2, 3, 6, 7)
94. Dallapiccola, Luigi: *Variazioni per orchestra*, [0, 1, 5, 8, 10, 4, 3, 7, 9, 2, 11, 6], pc set (0, 1, 3, 5, 8, 9)
95. Davies, Peter Maxwell: *Five Pieces for Piano*, Op.2, No.2, [0, 7, 11, 1, 3, 5, 8, 6, 4, 9, 10, 2], pc set (0, 1, 2, 4, 6, 8)
96. Davies, Peter Maxwell: *Sonata for Trumpet and Piano*, Op.1, [0, 7, 6, 2, 11, 10, 8, 9, 1, 5, 3, 4], pc set (0, 1, 4, 5, 6, 8)
97. Denisov, Edison: *Concerto for Guitar and Orchestra*, Row 1, [0, 6, 10, 4, 8, 2, 3, 9, 1, 7, 11, 5], pc set (0, 2, 4, 6, 8, 10), self-rotational interval pattern 6-4-6-4-6-1-
98. Denisov, Edison: *Five Etudes for Solo Bassoon*, row A, [0, 6, 1, 7, 8, 3, 2, 9, 10, 5, 11, 4], pc set (0, 1, 2, 5, 7, 8)
99. Denisov, Edison: *Five Etudes for Solo Bassoon*, row B, [0, 11, 6, 5, 4, 10, 9, 3, 2, 7, 1, 8], pc set (0, 1, 2, 6, 7, 8)
100. Denisov, Edison: *Five Etudes for Solo Bassoon*, row C, [0, 6, 11, 5, 4, 10, 9, 3, 2, 7, 1, 8], pc set (0, 1, 2, 6, 7, 8)
101. Denisov, Edison: *Five Etudes for Solo Bassoon*, row D, [0, 6, 1, 7, 8, 3, 2, 9, 10, 11, 5, 4], pc set (0, 1, 2, 5, 7, 8)
102. Denisov, Edison: *Five Etudes for Solo Bassoon*, row E, [0, 1, 7, 6, 5, 11, 10, 4, 3, 8, 2, 9], pc set (0, 1, 2, 6, 7, 8)

103. Denisov, Edison: Five Etudes for Solo Bassoon, row F, [0, 6, 1, 7, 3, 2, 8, 9, 10, 5, 11, 4], pc set (0, 1, 2, 3, 6, 7)
104. Denisov, Edison: Five Etudes for Solo Bassoon, row I, [0, 6, 1, 7, 2, 8, 3, 10, 5, 11, 9, 4], pc set (0, 1, 2, 6, 7, 8)
105. Denisov, Edison: Five Etudes for Solo Bassoon, row J, [0, 6, 5, 11, 4, 10, 9, 3, 2, 7, 1, 8], pc set (0, 1, 2, 6, 7, 8)
106. Denisov, Edison: Octet for Winds, mvt 2, row A, [0, 1, 3, 2, 4, 5, 8, 7, 6, 11, 9, 10], pc set (0, 1, 2, 3, 4, 5)
107. Denisov, Edison: Octet for Winds, mvt 2, row B, [0, 6, 11, 5, 4, 10, 9, 3, 2, 8, 1, 7], pc set (0, 1, 2, 6, 7, 8)
108. Dessau, Paul: >Guernica< for piano, [0, 7, 6, 2, 10, 11, 5, 9, 1, 3, 4, 8], pc set (0, 1, 4, 5, 6, 8)
109. Dessau, Paul: Les Voix, [0, 11, 6, 8, 9, 3, 4, 10, 5, 7, 2, 1], pc set (0, 1, 3, 4, 6, 9)
110. Eder, Helmut: Concerto for violin and orchestra, Op.32, [0, 9, 6, 2, 11, 3, 8, 1, 7, 5, 10, 4], pc set (0, 1, 3, 4, 6, 9)
111. Eisler, Hanns: Der Zweck der Musik, [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 2-2-1-2-2-9-
112. Eisler, Hanns: Deutsche Symphonie, mvt 5, [0, 1, 3, 5, 8, 9, 6, 11, 10, 4, 2, 7], pc set (0, 1, 3, 5, 8, 9)
113. Eisler, Hanns: Deutsche Symphonie, mvt 8, [0, 3, 1, 11, 2, 10, 8, 9, 6, 7, 5, 4], pc set (0, 1, 2, 3, 4, 5)
114. Eisler, Hanns: Deutsche Symphonie, mvt 9, [0, 4, 1, 10, 8, 6, 3, 11, 9, 2, 5, 7], pc set (0, 1, 3, 5, 7, 9)
115. Eisler, Hanns: Deutsche Symphonie, mvts 1, 10, [0, 10, 6, 1, 11, 7, 5, 8, 9, 3, 4, 2], pc set (0, 1, 2, 3, 6, 7)
116. Eisler, Hanns: Five Pieces for Orchestra, mvt 3, [0, 3, 2, 1, 5, 4, 6, 9, 8, 11, 10, 7], pc set (0, 1, 2, 3, 4, 5)
117. Eisler, Hanns: Five Pieces for Orchestra, mvt 4, [0, 10, 9, 8, 6, 7, 3, 4, 5, 11, 1, 2], pc set (0, 1, 2, 3, 4, 6)
118. Eisler, Hanns: Five Pieces for Orchestra, mvt 5, [0, 2, 6, 4, 10, 9, 11, 1, 7, 5, 8, 3], pc set (0, 1, 3, 5, 7, 9)
119. Eisler, Hanns: Gegen den Krieg, Op.55, [0, 3, 2, 5, 4, 7, 6, 8, 9, 10, 1, 11], pc set (0, 2, 3, 4, 5, 7)
120. Eisler, Hanns: Man lebt von einem Tage zu dem andern ("Kantate im Exil"), [0, 10, 11, 3, 1, 8, 7, 4, 2, 6, 9, 5], pc set (0, 2, 3, 4, 5, 7)
121. Eisler, Hanns: Palmström, Op.5, No.5, [0, 10, 11, 9, 8, 1, 7, 6, 5, 3, 4, 2], pc set (0, 1, 2, 3, 4, 5)
122. Eisler, Hanns: Sonata for Piano, No.2 ("in Form von Variationen"), Op.6, row variant 1, [0, 4, 6, 3, 2, 1, 9, 10, 7, 8, 5, 11], pc set (0, 1, 2, 3, 4, 6)
123. Eisler, Hanns: Sonata for Piano, No.2 ("in Form von Variationen"), Op.6, row variant 2, [0, 4, 3, 2,

- 6, 1, 9, 10, 7, 8, 5, 11], pc set (0, 1, 2, 3, 4, 6)
124. Eisler, Hanns: Sonata for Piano, No.2 (“in Form von Variationen”), Op.6, row variant 5, [0, 3, 2, 4, 6, 1, 9, 10, 7, 8, 5, 11], pc set (0, 1, 2, 3, 4, 6)
125. Eisler, Hanns: String Quartet, [0, 9, 3, 2, 11, 1, 4, 5, 10, 7, 8, 6], pc set (0, 1, 2, 3, 4, 6)
126. Eisler, Hanns: Suite for Orchestra, No.1, mvt 4, [0, 4, 2, 3, 1, 11, 7, 10, 9, 8, 6, 5], pc set (0, 1, 2, 3, 4, 5)
127. Eisler, Hanns: Variations for Piano, [0, 3, 10, 6, 5, 8, 1, 11, 2, 4, 7, 9], pc set (0, 2, 3, 5, 7, 9)
128. Eisler, Hanns: Zwei Elegien, No.2 (An die Überlebenden), [0, 1, 4, 3, 2, 6, 8, 11, 10, 9, 5, 7], pc set (0, 1, 2, 3, 4, 6)
129. Evans, Bill: Twelve Tone Tune, [0, 10, 2, 3, 1, 11, 4, 6, 9, 8, 5, 7], pc set (0, 1, 2, 3, 4, 5)
130. Evans, Bill: Twelve Tone Tune Two, [0, 9, 11, 1, 10, 3, 2, 6, 4, 5, 8, 7], pc set (0, 1, 2, 3, 4, 6)
131. Fano, Michel: Sonata for Two Pianos, [0, 6, 10, 7, 9, 8, 3, 2, 4, 1, 5, 11], pc set (0, 1, 2, 3, 4, 6)
132. Fine, Vivian: Chaconne for piano, [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], pc set (0, 1, 2, 3, 4, 5)
133. Fine, Vivian: Four Songs, No.2, “Comfort To A Youth That Had Lost His Love”, [0, 1, 2, 6, 9, 10, 11, 3, 5, 4, 7, 8], pc set (0, 1, 2, 4, 5, 8)
134. Finney, Ross Lee: Concerto for Alto Sax, [0, 1, 3, 4, 6, 9, 11, 10, 8, 7, 5, 2], pc set (0, 1, 3, 4, 6, 9)
135. Finney, Ross Lee: Fantasy in Two Movements for solo violin, [0, 1, 3, 5, 4, 2, 11, 10, 8, 6, 7, 9], pc set (0, 1, 2, 3, 4, 5)
136. Finney, Ross Lee: Sonata Quasi una Fantasia, [0, 1, 3, 2, 4, 5, 6, 7, 9, 8, 10, 11], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 1-2-11-2-1-1-
137. Florey, Hans: Die Aussicht, [0, 9, 11, 8, 2, 10, 5, 6, 7, 4, 3, 1], pc set (0, 1, 2, 3, 4, 6)
138. Florey, Hans: Hexaeder für Klavier, [0, 9, 4, 8, 5, 10, 11, 3, 2, 6, 1, 7], pc set (0, 1, 4, 5, 6, 8)
139. Florey, Hans: Hälfte des Lebens, [0, 3, 4, 1, 7, 11, 6, 9, 10, 8, 2, 5], pc set (0, 1, 2, 4, 5, 8)
140. Florey, Hans: I Ging, [0, 7, 2, 10, 11, 6, 5, 1, 9, 8, 4, 3], pc set (0, 1, 4, 5, 6, 8)
141. Florey, Hans: Magischer Würfel mit 6 Spiegelpunkten, [0, 10, 1, 7, 4, 6, 5, 8, 3, 9, 2, 11], pc set (0, 1, 3, 6, 7, 9)
142. Florey, Hans: Sechs Kanonzyklen einunddesselben magischen Quadrates, [0, 10, 1, 7, 4, 6, 5, 8, 3, 9, 2, 11], pc set (0, 1, 3, 6, 7, 9)
143. Florey, Hans: Triptychon, [0, 8, 9, 3, 7, 2, 1, 10, 5, 6, 11, 4], pc set (0, 1, 2, 5, 7, 8)
144. Florey, Hans: Zwölftonspiel für Streichquartett. 3. Dezember 1965, [0, 10, 2, 5, 3, 4, 1, 8, 9, 6, 7, 11], pc set (0, 1, 2, 3, 5, 7)
145. Gerhard, Roberto: Capriccio for Solo Flute, [0, 11, 9, 3, 1, 10, 8, 6, 4, 7, 2, 5], pc set (0, 1, 2, 3, 4, 6)
146. Gerhard, Roberto: Chaconne for Unaccompanied Violin, [0, 11, 4, 2, 1, 3, 9, 10, 8, 6, 5, 7], pc set (0, 1, 2, 3, 4, 5)
147. Gerhard, Roberto: Hymnody, [0, 10, 11, 8, 2, 9, 4, 5, 1, 6, 7, 3], pc set (0, 1, 2, 3, 4, 6)
148. Gerhard, Roberto: Libra, [0, 6, 1, 7, 2, 8, 4, 9, 5, 10, 11, 3], pc set (0, 1, 2, 6, 7, 8)

149. Gerhard, Roberto: String Quartet, [0, 7, 8, 2, 6, 10, 9, 11, 4, 5, 1, 3], pc set (0, 1, 2, 4, 6, 8)
150. Gerhard, Roberto: String Quartet, No.2, [0, 1, 5, 2, 8, 7, 10, 9, 6, 11, 4, 3], pc set (0, 1, 2, 5, 7, 8)
151. Gerhard, Roberto: The Plague, [0, 1, 9, 11, 8, 10, 4, 5, 6, 2, 3, 7], pc set (0, 1, 2, 3, 4, 5)
152. Gerhard, Roberto: Three Impromptus, [0, 8, 1, 10, 4, 6, 7, 5, 3, 2, 9, 11], pc set (0, 1, 3, 5, 7, 9)
153. Gielen, Michael: Six Songs, for bass, violin, viola, clarinet, bass clarinet, and piano, [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6], pc set (0, 1, 2, 3, 4, 5)
154. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 1, [0, 1, 6, 7, 8, 2, 10, 11, 5, 4, 9, 3], pc set (0, 1, 2, 6, 7, 8)
155. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 2, [0, 11, 2, 3, 4, 1, 6, 5, 8, 9, 10, 7], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 11-3-1-1-9-5-
156. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 3, [0, 5, 6, 11, 2, 1, 8, 7, 10, 4, 9, 3], pc set (0, 1, 2, 3, 6, 7)
157. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 4, [0, 9, 10, 11, 6, 5, 8, 7, 2, 3, 4, 1], pc set (0, 1, 2, 3, 6, 7)
158. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 5, [0, 1, 7, 6, 5, 11, 2, 8, 9, 10, 4, 3], pc set (0, 1, 2, 6, 7, 8)
159. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 7, [0, 1, 8, 2, 7, 6, 5, 11, 9, 10, 4, 3], pc set (0, 1, 2, 6, 7, 8)
160. Ginastera, Alberto: Quintet, Op.29, Row Class III 1, [0, 11, 1, 8, 2, 7, 10, 3, 9, 4, 6, 5], pc set (0, 1, 2, 3, 6, 7)
161. Ginastera, Alberto: Quintet, Op.29, Row Class III 2, [0, 11, 1, 8, 2, 7, 5, 6, 4, 9, 3, 10], pc set (0, 1, 2, 3, 6, 7)
162. Ginastera, Alberto: Quintet, Op.29, Row Class V, [0, 5, 4, 7, 3, 2, 6, 9, 8, 1, 10, 11], pc set (0, 2, 3, 4, 5, 7)
163. Ginastera, Alberto: Quintet, Op.29, Row Class VII 1, [0, 9, 10, 11, 4, 3, 6, 2, 1, 5, 8, 7], pc set (0, 1, 2, 3, 6, 7)
164. Ginastera, Alberto: Quintet, Op.29, Row Class VII 2, [0, 11, 1, 8, 2, 7, 5, 6, 4, 9, 3, 10], pc set (0, 1, 2, 3, 6, 7)
165. Ginastera, Alberto: Quintet, Op.29, Row Class VII S, [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], pc set (0, 1, 2, 3, 4, 5)
166. Ginastera, Alberto: Quintet, Op.29, mvt.III, [0, 7, 3, 10, 2, 6, 9, 1, 4, 8, 11, 5], pc set (0, 1, 3, 5, 8, 9)
167. Ginastera, Alberto: Sonata for Cello and Piano, Op.49, [0, 3, 2, 1, 10, 11, 8, 9, 5, 4, 7, 6], pc set (0, 1, 2, 3, 4, 5)
168. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class III, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], pc set (0, 2, 4, 5, 7, 9)
169. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 3, [0, 9, 3, 2, 11, 6, 5, 1,

- 8, 7, 4, 10], pc set (0, 1, 3, 4, 6, 9)
170. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 4, [0, 2, 1, 5, 3, 4, 7, 8, 6, 10, 9, 11], pc set (0, 1, 2, 3, 4, 5)
171. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 6, [0, 11, 4, 3, 8, 7, 1, 2, 9, 10, 5, 6], pc set (0, 1, 4, 5, 8, 9)
172. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 7, [0, 9, 10, 11, 8, 7, 6, 3, 4, 5, 2, 1], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 9-1-1-9-11-11-
173. Ginastera, Alberto: Turbae ad Passionem Gregorianam, Op.43, mvt II, [0, 5, 1, 7, 6, 11, 8, 2, 3, 4, 9, 10], pc set (0, 1, 2, 6, 7, 8)
174. Ginastera, Alberto: Violin Concerto, Op.30, [0, 11, 2, 3, 4, 1, 6, 5, 8, 9, 10, 7], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 11-3-1-1-9-5-
175. Goehr, Alexander: Piano Trio, Op.20, [0, 6, 7, 4, 3, 8, 5, 9, 11, 2, 10, 1], pc set (0, 1, 2, 4, 5, 8)
176. Goeyvaerts, Karel: Violin concerto, No.2, [0, 11, 7, 1, 2, 9, 10, 8, 5, 6, 3, 4], pc set (0, 1, 2, 3, 5, 7)
177. Gotham, Mark: 4x4x4x4, row 3, [0, 2, 6, 10, 7, 4, 11, 9, 8, 3, 5, 1], pc set (0, 1, 3, 5, 7, 9)
178. Gotham, Mark: 4x4x4x4, row 4, [0, 2, 6, 10, 1, 4, 5, 3, 8, 9, 11, 7], pc set (0, 2, 3, 4, 6, 8)
179. Gotham, Mark: Move On!, [0, 4, 3, 10, 6, 9, 1, 5, 2, 8, 11, 7], pc set (0, 1, 3, 6, 7, 9)
180. Hamel, Peter Michael: 'Klangspirale' für 13 Spieler oder drei Orchestergruppen, [0, 10, 5, 9, 3, 4, 1, 6, 8, 11, 2, 7], pc set (0, 1, 2, 5, 7, 8)
181. Hartmann, Karl Amadeus: Symphony, No.4, [0, 1, 3, 2, 11, 4, 5, 10, 7, 6, 8, 9], pc set (0, 1, 2, 3, 4, 5)
182. Hauer, Jose Matthias: XXXII. Zwölftonspiel; für Violine, Bratsche und Cello, [0, 2, 6, 1, 10, 9, 5, 8, 11, 7, 4, 3], pc set (0, 1, 2, 4, 5, 8)
183. Hauer, Josef Matthias: 'Atonale Musik'. Klavierstücke 1922., Op.20, [0, 7, 4, 9, 5, 8, 3, 11, 2, 6, 1, 10], pc set (0, 1, 3, 4, 5, 8)
184. Hauer, Josef Matthias: 'Der Menschen Weg', Op.67, [0, 8, 5, 4, 10, 2, 7, 9, 1, 3, 11, 6], pc set (0, 1, 3, 5, 7, 9)
185. Hauer, Josef Matthias: 'Die schwarze Spinne', Op.62, [0, 4, 10, 1, 5, 8, 11, 2, 7, 9, 6, 3], pc set (0, 1, 3, 5, 8, 9)
186. Hauer, Josef Matthias: 'Emilie vor ihrem Brauttag' (Friedrich Hölderlin) für Altsolo und Orchester, Op.58, [0, 8, 3, 4, 11, 6, 9, 10, 2, 1, 5, 7], pc set (0, 1, 3, 5, 8, 9)
187. Hauer, Josef Matthias: 'Salambo', opera after Gustave Flaubert., Op.60, [0, 6, 9, 2, 8, 10, 4, 7, 1, 11, 3, 5], pc set (0, 2, 3, 4, 6, 8)
188. Hauer, Josef Matthias: 'Tanz tibetanischer Mönche' im langsamen 3/4 Takt) [Zwölftonspiel]. 8. September 1956, [0, 7, 8, 6, 3, 1, 11, 2, 10, 5, 9, 4], pc set (0, 1, 2, 5, 7, 8)
189. Hauer, Josef Matthias: 'Wandlungen' (chamber-oratorio for stage or concert, for six solo-voices, choir and orchestra; after words of Friedrich Hölderlin), Op.53, [0, 5, 11, 4, 10, 1, 6, 8, 9, 3, 7, 2], pc set (0, 1, 2, 3, 6, 7)

190. Hauer, Josef Matthias: Baustein, [0, 8, 11, 1, 6, 10, 4, 2, 3, 5, 9, 7], pc set (0, 1, 2, 3, 5, 7)
191. Hauer, Josef Matthias: Fünfte Tanzfantasie für kleines Orchester, Opus 66, [0, 10, 4, 7, 8, 11, 6, 2, 5, 9, 3, 1], pc set (0, 1, 2, 4, 5, 8)
192. Hauer, Josef Matthias: Harmonie – Melodie – Rhythmus – in kristallischer Bindung – im vierfachen Kontrapunkt [Zwölftonspiel] für Zwölftonorchester, [0, 2, 10, 9, 6, 5, 1, 4, 7, 11, 8, 3], pc set (0, 1, 3, 5, 8, 9)
193. Hauer, Josef Matthias: Hausmusik [Zwölftonspiel] für zwei Violinen und Klavier, [0, 1, 5, 3, 7, 10, 9, 6, 11, 4, 2, 8], pc set (0, 2, 3, 5, 7, 9)
194. Hauer, Josef Matthias: Kammermusik [Zwölftonspiel] für Flöte, Oboe, Baßklarinette, Fagott, zwei Violinen, Bratsche, Cello und Klavier zu vier Händen. 24. Jänner 1957, [0, 9, 3, 7, 5, 10, 1, 6, 11, 4, 2, 8], pc set (0, 2, 3, 5, 7, 9)
195. Hauer, Josef Matthias: Klavierstücke mit Überschriften nach Worten von Friedrich Hölderlin, Op.25 ;, No.10, [0, 6, 11, 10, 9, 5, 2, 3, 7, 1, 4, 8], pc set (0, 1, 2, 3, 6, 7)
196. Hauer, Josef Matthias: Langsamer Walzer [Zwölftonspiel] für Orchester. 10. Jänner 1957, [0, 8, 10, 2, 3, 6, 1, 9, 7, 4, 11, 5], pc set (0, 1, 3, 5, 7, 9)
197. Hauer, Josef Matthias: Langsamer Walzer [Zwölftonspiel] für zwei Violinen, Bratsche, Cello und Klavier zu zwei Händen, [0, 6, 2, 11, 10, 7, 3, 4, 5, 9, 1, 8], pc set (0, 1, 4, 5, 6, 8)
198. Hauer, Josef Matthias: Nomos, Op.19 (bb.106-108), [0, 10, 6, 1, 7, 4, 9, 5, 3, 8, 11, 2], pc set (0, 1, 3, 6, 7, 9)
199. Hauer, Josef Matthias: Nomos, Op.19 (bb.117-118), [0, 4, 5, 11, 7, 10, 3, 9, 6, 2, 1, 8], pc set (0, 1, 2, 5, 7, 8)
200. Hauer, Josef Matthias: Nomos, Op.19 (bb.119-120), [0, 10, 8, 6, 5, 7, 9, 2, 3, 1, 11, 4], pc set (0, 1, 2, 3, 5, 7)
201. Hauer, Josef Matthias: Nomos, Op.19 (bb.123-124), [0, 8, 11, 5, 3, 7, 4, 9, 1, 6, 10, 2], pc set (0, 1, 3, 5, 8, 9)
202. Hauer, Josef Matthias: Nomos, Op.19 (bb.125-126), [0, 11, 1, 10, 6, 8, 9, 5, 7, 3, 2, 4], pc set (0, 1, 2, 3, 5, 7)
203. Hauer, Josef Matthias: Nomos, Op.19 (bb.134-137), [0, 2, 1, 4, 5, 9, 6, 8, 10, 7, 11, 3], pc set (0, 1, 3, 4, 5, 8)
204. Hauer, Josef Matthias: Nomos, Op.19 (bb.138-140), [0, 3, 4, 2, 5, 6, 8, 7, 10, 11, 1, 9], pc set (0, 1, 2, 3, 4, 6)
205. Hauer, Josef Matthias: Nomos, Op.19 (bb.139-141), [0, 2, 10, 1, 11, 9, 8, 5, 6, 4, 7, 3], pc set (0, 1, 2, 3, 4, 5)
206. Hauer, Josef Matthias: Nomos, Op.19 (bb.141-143), [0, 10, 11, 3, 5, 6, 7, 2, 1, 4, 8, 9], pc set (0, 1, 2, 5, 7, 8)
207. Hauer, Josef Matthias: Nomos, Op.19 (bb.142-143), [0, 11, 10, 1, 5, 3, 8, 6, 9, 4, 7, 2], pc set (0, 1, 2, 3, 5, 7)

208. Hauer, Josef Matthias: Nomos, Op.19 (bb.143-145), [0, 9, 10, 2, 1, 11, 4, 6, 7, 5, 8, 3], pc set (0, 1, 2, 3, 4, 5)
209. Hauer, Josef Matthias: Nomos, Op.19 (bb.159-161), [0, 5, 1, 8, 10, 4, 6, 7, 3, 9, 11, 2], pc set (0, 1, 3, 5, 8, 9)
210. Hauer, Josef Matthias: Nomos, Op.19 (bb.171-174), [0, 7, 1, 3, 9, 6, 8, 11, 10, 5, 4, 2], pc set (0, 1, 3, 6, 7, 9)
211. Hauer, Josef Matthias: Nomos, Op.19 (bb.175-178), [0, 10, 1, 2, 6, 5, 3, 4, 8, 9, 7, 11], pc set (0, 1, 4, 5, 6, 8)
212. Hauer, Josef Matthias: Nomos, Op.19 (bb.192-193), [0, 9, 6, 2, 8, 4, 7, 10, 1, 3, 5, 11], pc set (0, 1, 3, 5, 7, 9)
213. Hauer, Josef Matthias: Nomos, Op.19 (bb.196-197), [0, 2, 8, 6, 11, 5, 4, 10, 7, 3, 1, 9], pc set (0, 1, 3, 6, 7, 9)
214. Hauer, Josef Matthias: Nomos, Op.19 (bb.213-216), [0, 2, 6, 1, 10, 4, 5, 8, 11, 7, 3, 9], pc set (0, 2, 3, 4, 6, 8)
215. Hauer, Josef Matthias: Nomos, Op.19 (bb.224-228), [0, 1, 9, 3, 4, 5, 10, 11, 6, 2, 8, 7], pc set (0, 1, 2, 4, 5, 8)
216. Hauer, Josef Matthias: Nomos, Op.19 (bb.228-230), [0, 2, 9, 6, 5, 10, 7, 3, 8, 1, 4, 11], pc set (0, 1, 3, 5, 8, 9)
217. Hauer, Josef Matthias: Nomos, Op.19 (bb.231-233), [0, 6, 10, 3, 2, 8, 9, 5, 4, 1, 11, 7], pc set (0, 1, 3, 5, 7, 9)
218. Hauer, Josef Matthias: Nomos, Op.19 (bb.234-237), [0, 11, 3, 1, 7, 4, 9, 6, 5, 10, 2, 8], pc set (0, 1, 2, 4, 5, 8)
219. Hauer, Josef Matthias: Nomos, Op.19 (bb.241-243), [0, 2, 8, 1, 4, 9, 5, 6, 3, 11, 10, 7], pc set (0, 1, 4, 5, 6, 8)
220. Hauer, Josef Matthias: Nomos, Op.19 (bb.257-262), [0, 7, 3, 8, 4, 2, 9, 1, 11, 6, 10, 5], pc set (0, 1, 4, 5, 6, 8)
221. Hauer, Josef Matthias: Nomos, Op.19 (bb.262-263), [0, 11, 2, 5, 1, 6, 9, 7, 10, 3, 4, 8], pc set (0, 1, 2, 3, 6, 7)
222. Hauer, Josef Matthias: Nomos, Op.19 (bb.272-276), [0, 1, 5, 3, 7, 2, 8, 10, 4, 6, 11, 9], pc set (0, 1, 2, 3, 5, 7)
223. Hauer, Josef Matthias: Nomos, Op.19 (bb.284-287), [0, 1, 11, 7, 6, 4, 10, 5, 2, 8, 3, 9], pc set (0, 1, 2, 5, 7, 8)
224. Hauer, Josef Matthias: Nomos, Op.19 (bb.288-291), [0, 2, 10, 7, 4, 6, 11, 3, 5, 1, 8, 9], pc set (0, 1, 3, 5, 7, 9)
225. Hauer, Josef Matthias: Nomos, Op.19 (bb.292-294), [0, 9, 2, 6, 3, 5, 10, 1, 11, 7, 4, 8], pc set (0, 1, 3, 4, 6, 9)
226. Hauer, Josef Matthias: Nomos, Op.19 (bb.325-328), [0, 5, 4, 2, 7, 6, 3, 11, 1, 8, 10, 9], pc set (0, 1,

- 2, 3, 5, 7)
227. Hauer, Josef Matthias: Nomos, Op.19 (bb.328-332), [0, 3, 2, 7, 6, 10, 9, 11, 8, 5, 1, 4], pc set (0, 1, 3, 5, 8, 9)
 228. Hauer, Josef Matthias: Nomos, Op.19 (bb.331-334), [0, 4, 3, 2, 1, 11, 7, 10, 5, 6, 8, 9], pc set (0, 1, 2, 3, 4, 5)
 229. Hauer, Josef Matthias: Nomos, Op.19 (bb.362-365), [0, 7, 5, 3, 10, 8, 4, 2, 9, 6, 11, 1], pc set (0, 2, 4, 5, 7, 9)
 230. Hauer, Josef Matthias: Nomos, Op.19 (bb.366-371), [0, 5, 1, 7, 3, 2, 4, 8, 11, 6, 10, 9], pc set (0, 1, 2, 3, 5, 7)
 231. Hauer, Josef Matthias: Nomos, Op.19 (bb.372-375), [0, 8, 6, 1, 10, 11, 5, 9, 7, 4, 3, 2], pc set (0, 1, 2, 3, 5, 7)
 232. Hauer, Josef Matthias: Nomos, Op.19 (bb.387-390), [0, 3, 7, 4, 10, 1, 11, 9, 6, 8, 2, 5], pc set (0, 1, 3, 4, 6, 9)
 233. Hauer, Josef Matthias: Nomos, Op.19 (bb.403-409), [0, 11, 2, 10, 8, 1, 5, 3, 4, 6, 7, 9], pc set (0, 1, 2, 3, 4, 6)
 234. Hauer, Josef Matthias: Nomos, Op.19 (bb.422-425), [0, 6, 4, 2, 10, 9, 8, 5, 11, 7, 1, 3], pc set (0, 1, 3, 5, 7, 9)
 235. Hauer, Josef Matthias: Nomos, Op.19 (bb.425-427), [0, 8, 10, 7, 4, 2, 3, 5, 6, 11, 1, 9], pc set (0, 1, 3, 5, 7, 9)
 236. Hauer, Josef Matthias: Nomos, Op.19 (bb.430-432), [0, 6, 8, 10, 9, 2, 7, 1, 3, 4, 5, 11], pc set (0, 2, 3, 4, 6, 8)
 237. Hauer, Josef Matthias: Nomos, Op.19 (bb.438-441), [0, 1, 10, 8, 9, 4, 3, 5, 7, 11, 6, 2], pc set (0, 1, 2, 4, 5, 8)
 238. Hauer, Josef Matthias: Nomos, Op.19 (bb.441-445), [0, 1, 9, 8, 10, 4, 6, 5, 7, 2, 3, 11], pc set (0, 1, 2, 4, 5, 8)
 239. Hauer, Josef Matthias: Nomos, Op.19 (bb.451-453), [0, 2, 4, 1, 6, 11, 3, 8, 9, 7, 5, 10], pc set (0, 1, 2, 3, 5, 7)
 240. Hauer, Josef Matthias: Nomos, Op.19 (bb.452-455), [0, 5, 7, 8, 1, 2, 3, 4, 6, 11, 10, 9], pc set (0, 1, 2, 5, 7, 8)
 241. Hauer, Josef Matthias: Nomos, Op.19 (bb.457-458), [0, 3, 4, 5, 8, 1, 6, 11, 9, 10, 2, 7], pc set (0, 1, 3, 4, 5, 8)
 242. Hauer, Josef Matthias: Nomos, Op.19 (bb.463-464), [0, 4, 6, 7, 3, 9, 1, 10, 8, 11, 5, 2], pc set (0, 1, 3, 4, 6, 9)
 243. Hauer, Josef Matthias: Nomos, Op.19 (bb.479-483), [0, 6, 10, 9, 7, 8, 11, 4, 5, 3, 2, 1], pc set (0, 1, 2, 3, 4, 6)
 244. Hauer, Josef Matthias: Nomos, Op.19 (bb.494-496), [0, 7, 8, 5, 6, 11, 2, 3, 9, 4, 1, 10], pc set (0, 1, 2, 3, 6, 7)

245. Hauer, Josef Matthias: Nomos, Op.19 (bb.50-53), [0, 2, 10, 4, 5, 3, 6, 7, 1, 8, 9, 11], pc set (0, 1, 2, 3, 5, 7)
246. Hauer, Josef Matthias: Nomos, Op.19 (bb.501-503), [0, 5, 7, 1, 3, 2, 6, 10, 11, 8, 9, 4], pc set (0, 1, 2, 3, 5, 7)
247. Hauer, Josef Matthias: Nomos, Op.19 (bb.503-507), [0, 10, 1, 2, 3, 5, 7, 11, 4, 8, 9, 6], pc set (0, 2, 3, 4, 5, 7)
248. Hauer, Josef Matthias: Nomos, Op.19 (bb.511-514), [0, 10, 1, 4, 6, 2, 9, 7, 11, 8, 5, 3], pc set (0, 2, 3, 4, 6, 8)
249. Hauer, Josef Matthias: Nomos, Op.19 (bb.517-521), [0, 2, 10, 11, 6, 4, 5, 1, 3, 9, 8, 7], pc set (0, 1, 2, 4, 6, 8)
250. Hauer, Josef Matthias: Nomos, Op.19 (bb.528-531), [0, 6, 7, 5, 8, 10, 9, 11, 4, 2, 1, 3], pc set (0, 1, 2, 3, 5, 7)
251. Hauer, Josef Matthias: Nomos, Op.19 (bb.60-63), [0, 4, 1, 2, 9, 8, 10, 5, 11, 3, 6, 7], pc set (0, 1, 4, 5, 6, 8)
252. Hauer, Josef Matthias: Nomos, Op.19 (bb.72-73), [0, 1, 7, 11, 4, 3, 9, 6, 5, 2, 10, 8], pc set (0, 1, 2, 4, 5, 8)
253. Hauer, Josef Matthias: Nomos, Op.19 (bb.73-78), [0, 8, 7, 2, 4, 11, 1, 3, 6, 5, 10, 9], pc set (0, 1, 3, 5, 8, 9)
254. Hauer, Josef Matthias: Nomos, Op.19 (bb.84-87), [0, 10, 1, 11, 5, 3, 2, 6, 7, 8, 9, 4], pc set (0, 1, 2, 3, 5, 7)
255. Hauer, Josef Matthias: Nomos, Op.19 (bb.93-94), [0, 1, 10, 8, 6, 2, 9, 4, 11, 7, 5, 3], pc set (0, 1, 2, 4, 6, 8)
256. Hauer, Josef Matthias: Nomos, Op.19 (row 1), [0, 8, 9, 5, 4, 6, 10, 11, 7, 1, 2, 3], pc set (0, 1, 2, 4, 5, 8)
257. Hauer, Josef Matthias: Nomos, Op.19 (row 2), [0, 6, 10, 4, 3, 2, 8, 7, 11, 9, 5, 1], pc set (0, 2, 3, 4, 6, 8)
258. Hauer, Josef Matthias: Paraphonie [Zwölftonspiel] für Bratsche und Klavier, [0, 4, 10, 5, 8, 1, 11, 7, 2, 9, 6, 3], pc set (0, 1, 3, 5, 8, 9)
259. Hauer, Josef Matthias: Romantische Phantasie für Orchester, [0, 10, 8, 5, 1, 9, 4, 11, 3, 7, 6, 2], pc set (0, 1, 3, 4, 5, 8)
260. Hauer, Josef Matthias: Sakraler Tanz [Zwölftonspiel] für Orchester, [0, 3, 10, 8, 5, 2, 9, 1, 11, 6, 4, 7], pc set (0, 2, 3, 5, 7, 9)
261. Hauer, Josef Matthias: Sechste Suite für Orchester, Op.47, [0, 9, 6, 2, 8, 3, 10, 11, 7, 4, 5, 1], pc set (0, 1, 3, 6, 7, 9)
262. Hauer, Josef Matthias: Symphonische Stücke für Streichorchester, Klavier und Harmonium, Op.49, [0, 4, 6, 3, 2, 8, 1, 11, 10, 7, 9, 5], pc set (0, 2, 3, 4, 6, 8)
263. Hauer, Josef Matthias: Tanz im langsamen 3/4 Takt [Zwölftonspiel] für zwei Violinen, zwei

- Bratschen und Klavier zu zwei Händen, [0, 3, 10, 2, 11, 6, 8, 7, 4, 9, 1, 5], pc set (0, 1, 2, 4, 5, 8)
264. Hauer, Josef Matthias: VIII. Zwölftonspiel für Orchester. Juni 1943, [0, 5, 10, 8, 4, 2, 11, 9, 3, 1, 7, 6], pc set (0, 1, 3, 5, 7, 9)
265. Hauer, Josef Matthias: Violinkonzert, Op.54 (9. März – 6. April 1928), [0, 7, 6, 8, 4, 11, 1, 10, 5, 9, 2, 3], pc set (0, 1, 4, 5, 6, 8)
266. Hauer, Josef Matthias: XXI. Zwölftonspiel für Orchester; mit einer Zwölftonreihe, die in sechs Tropen steht, und vom Kulturreferenten der Stadt Wien Dr. Viktor Matejka gewählt wurde. Erster Teil 2,4-Takt (Halbe = 50) mit achttaktigen Perioden; zweiter Teil im 3/4 Takt (punktierter Halbe = 40) mit sechstaktigen Perioden, [0, 3, 4, 9, 11, 10, 1, 7, 6, 2, 5, 8], pc set (0, 1, 2, 3, 6, 7)
267. Hauer, Josef Matthias: XXII. Zwölftonspiel für Klavier, [0, 2, 11, 6, 7, 10, 1, 3, 8, 4, 9, 5], pc set (0, 1, 4, 5, 6, 8)
268. Hauer, Josef Matthias: XXIII. Zwölftonspiel für Klavierquintett, [0, 4, 11, 9, 10, 2, 6, 3, 7, 5, 8, 1], pc set (0, 1, 2, 3, 5, 7)
269. Hauer, Josef Matthias: XXIV. Zwölftonspiel für Klavier, [0, 2, 9, 3, 8, 1, 4, 7, 11, 5, 6, 10], pc set (0, 1, 2, 3, 6, 7)
270. Hauer, Josef Matthias: XXIX. Zwölftonspiel für Cembalo; mit der Sokolowski-Reihe zu Bachs Geburtstag, [0, 11, 2, 1, 4, 3, 10, 5, 8, 9, 6, 7], pc set (0, 1, 2, 3, 4, 5)
271. Hauer, Josef Matthias: XXXII. Zwölftonspiel für Violine, zwei Bratschen und Cello (2/2), [0, 7, 4, 3, 11, 2, 5, 1, 10, 9, 6, 8], pc set (0, 1, 3, 4, 5, 8)
272. Hauer, Josef Matthias: Zwölftonspiel (Weihnachten 1947) für Klarinette, Violine, Bratsche, Cello und Klavier, [0, 6, 2, 10, 8, 3, 11, 4, 9, 7, 5, 1], pc set (0, 1, 3, 5, 7, 9)
273. Hauer, Josef Matthias: Zwölftonspiel 10. Juli 1957; für Klavier zu vier Händen, [0, 8, 10, 6, 2, 11, 1, 3, 9, 4, 7, 5], pc set (0, 2, 3, 4, 6, 8)
274. Hauer, Josef Matthias: Zwölftonspiel 15. Juni 1957; für Flöte, Oboe, Bassklarinette, Fagott, zwei Violinen, Viola, Violoncello & Klavier vierhändig, [0, 6, 4, 8, 3, 11, 9, 2, 7, 1, 10, 5], pc set (0, 1, 3, 5, 8, 9)
275. Hauer, Josef Matthias: Zwölftonspiel 2. Juni 1948 für Streichquartett und Klavier, [0, 3, 10, 6, 2, 11, 1, 4, 7, 9, 5, 8], pc set (0, 1, 2, 4, 5, 8)
276. Hauer, Josef Matthias: Zwölftonspiel 26. Juli 1957, für Flöte, Oboe, Bassklarinette, Fagott und Streichquartett, [0, 4, 1, 6, 8, 2, 10, 7, 3, 9, 11, 5], pc set (0, 1, 2, 4, 6, 8)
277. Hauer, Josef Matthias: Zwölftonspiel 3. Mai 1958; für Streichsextett, [0, 4, 10, 3, 7, 1, 8, 2, 11, 6, 9, 5], pc set (0, 1, 3, 4, 6, 9)
278. Hauer, Josef Matthias: Zwölftonspiel 5. September 1957; für Violine, Bratsche und Klavier, [0, 4, 2, 9, 10, 6, 11, 1, 7, 3, 8, 5], pc set (0, 1, 3, 5, 7, 9)
279. Hauer, Josef Matthias: Zwölftonspiel 7. April 1957; für zwei Violinen, Bratsche, Cello und Klavier zu vier Händen, [0, 6, 2, 9, 10, 4, 11, 3, 7, 1, 5, 8], pc set (0, 1, 3, 5, 7, 9)
280. Hauer, Josef Matthias: Zwölftonspiel 9. September 1957; für vier Solostimmen [S, A, T, B], Violine,

- Bratsche und Klavier, [0, 4, 2, 9, 10, 6, 11, 1, 7, 3, 8, 5], pc set (0, 1, 3, 5, 7, 9)
281. Hauer, Josef Matthias: Zwölftonspiel Jänner 1957; für zwei Violinen, Bratsche und Cello, [0, 10, 6, 2, 8, 3, 5, 7, 9, 4, 1, 11], pc set (0, 1, 3, 5, 7, 9)
282. Hauer, Josef Matthias: Zwölftonspiel Oktober 1956; für Klavier zu vier Händen, [0, 9, 6, 2, 8, 3, 10, 5, 1, 11, 7, 4], pc set (0, 1, 3, 6, 7, 9)
283. Hauer, Josef Matthias: Zwölftonspiel für Flöte, Horn, Violine, Bratsche, Cello und Klavier, [0, 10, 7, 2, 8, 6, 3, 4, 9, 11, 1, 5], pc set (0, 1, 2, 4, 6, 8)
284. Hauer, Josef Matthias: Zwölftonspiel für Gitarre. 24. 7. 1949, [0, 6, 10, 2, 5, 9, 1, 4, 7, 3, 11, 8], pc set (0, 1, 3, 5, 8, 9)
285. Hauer, Josef Matthias: Zwölftonspiel für Klavier. 11. Juni 1955, [0, 6, 11, 4, 2, 9, 3, 1, 5, 7, 10, 8], pc set (0, 2, 3, 5, 7, 9)
286. Hauer, Josef Matthias: Zwölftonspiel für Klavier. 17. Juli 1952, [0, 6, 4, 9, 2, 10, 7, 11, 1, 8, 5, 3], pc set (0, 1, 3, 5, 7, 9)
287. Hauer, Josef Matthias: Zwölftonspiel für Klavier. 2. Juni 1955, [0, 10, 2, 7, 3, 6, 4, 8, 1, 9, 11, 5], pc set (0, 1, 3, 5, 8, 9)
288. Hauer, Josef Matthias: Zwölftonspiel für Klavier. 24. Dezember 1946, [0, 1, 2, 6, 10, 5, 11, 4, 3, 9, 7, 8], pc set (0, 1, 4, 5, 6, 8)
289. Hauer, Josef Matthias: Zwölftonspiel für Klavier. 7. Juni 1955, [0, 4, 10, 7, 11, 8, 3, 1, 5, 6, 2, 9], pc set (0, 1, 2, 4, 5, 8)
290. Hauer, Josef Matthias: Zwölftonspiel für Klavier. März 1953, [0, 6, 8, 7, 5, 10, 2, 3, 11, 4, 9, 1], pc set (0, 1, 2, 3, 5, 7)
291. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen, Violine, Bratsche, Cello und Kontrabaß (melischer Entwurf vom 29.8.1954), [0, 4, 2, 7, 9, 6, 8, 3, 11, 5, 10, 1], pc set (0, 2, 3, 5, 7, 9)
292. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen, mit einer Zwölftonreihe von Nikolaus Fheodoroff. 10. Juli 1952, [0, 10, 6, 8, 9, 7, 11, 3, 1, 5, 2, 4], pc set (0, 1, 2, 3, 4, 6)
293. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen, mit einer Zwölftonreihe von Nikolaus Fheodoroff. 8. Juli 1952, [0, 2, 10, 6, 8, 7, 5, 9, 11, 3, 1, 4], pc set (0, 1, 2, 4, 6, 8)
294. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen, zwei Violinen, Bratsche und Cello. 19. Oktober 1954, [0, 6, 11, 2, 1, 5, 3, 8, 10, 7, 9, 4], pc set (0, 1, 2, 3, 6, 7)
295. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen. 13. März 1952, [0, 5, 9, 10, 8, 1, 4, 3, 6, 7, 11, 2], pc set (0, 1, 3, 4, 5, 8)
296. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen. 24. Juni 1952, [0, 6, 10, 7, 9, 3, 4, 1, 8, 5, 11, 2], pc set (0, 1, 3, 4, 6, 9)
297. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen. 26. Juni 1952, [0, 6, 2, 10, 9, 5, 3, 4, 8, 7, 11, 1], pc set (0, 1, 3, 5, 8, 9)
298. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen. 30. Juni 1952, I, [0, 2, 10, 4, 11, 8,

- 1, 7, 5, 3, 6, 9], pc set (0, 2, 3, 4, 6, 8)
299. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen. Mai 1955, [0, 6, 11, 4, 2, 9, 3, 1, 5, 7, 10, 8], pc set (0, 2, 3, 5, 7, 9)
300. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen und Akkordeon (Hausorchester), [0, 7, 2, 9, 6, 4, 11, 3, 10, 8, 1, 5], pc set (0, 2, 3, 5, 7, 9)
301. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen und Streichquartett, [0, 7, 2, 10, 6, 8, 3, 11, 9, 4, 1, 5], pc set (0, 1, 2, 4, 6, 8)
302. Hauer, Josef Matthias: Zwölftonspiel für Orchester. 28. 9. 1954, [0, 8, 9, 6, 10, 4, 11, 1, 2, 5, 3, 7], pc set (0, 2, 3, 4, 6, 8)
303. Hauer, Josef Matthias: Zwölftonspiel für Orchester. September 1957, [0, 8, 6, 10, 5, 7, 2, 4, 1, 9, 11, 3], pc set (0, 1, 2, 3, 5, 7)
304. Hauer, Josef Matthias: Zwölftonspiel für Violine, Cello und Klavier zu vier Händen, [0, 10, 6, 1, 8, 3, 11, 7, 2, 5, 9, 4], pc set (0, 2, 3, 5, 7, 9)
305. Hauer, Josef Matthias: Zwölftonspiel für Violine und Klavier, [0, 10, 7, 2, 8, 6, 3, 4, 9, 11, 1, 5], pc set (0, 1, 2, 4, 6, 8)
306. Hauer, Josef Matthias: Zwölftonspiel für Violine und Klavier. 3. April 1955, [0, 2, 6, 4, 9, 10, 5, 3, 7, 8, 11, 1], pc set (0, 1, 3, 5, 7, 9)
307. Hauer, Josef Matthias: Zwölftonspiel für Orchester. 28. 9. 1954, [0, 5, 7, 4, 6, 1, 9, 3, 8, 11, 10, 2], pc set (0, 1, 2, 3, 6, 7)
308. Hauer, Josef Matthias: Zwölftonspiel für zwei Violinen, [0, 2, 3, 11, 1, 10, 8, 6, 4, 9, 7, 5], pc set (0, 1, 2, 3, 4, 5)
309. Hauer, Josef Matthias: Zwölftonspiel für zwei Violinen, Bratsche, Cello und Klavier. 16. April 1958, [0, 3, 8, 2, 9, 1, 11, 5, 7, 4, 6, 10], pc set (0, 1, 2, 3, 6, 7)
310. Hauer, Josef Matthias: Zwölftonspiel für zwei Violinen, Bratsche und Cello ('Ins Räumliche übertragen'). 3. September 1953, [0, 10, 7, 2, 8, 6, 3, 4, 9, 11, 1, 5], pc set (0, 1, 2, 4, 6, 8)
311. Hauer, Josef Matthias: Zwölftonspiel in drei Teilen für zwei Violinen, Bratsche und Cello. 31. Juli 1953, [0, 10, 7, 2, 8, 6, 3, 4, 9, 11, 1, 5], pc set (0, 1, 2, 4, 6, 8)
312. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.10, [0, 4, 6, 7, 8, 10, 9, 5, 3, 2, 1, 11], pc set (0, 2, 3, 4, 6, 8)
313. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.11, [0, 4, 5, 6, 8, 9, 7, 3, 2, 1, 11, 10], pc set (0, 1, 2, 4, 5, 8)
314. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.12, [0, 3, 6, 7, 9, 10, 11, 8, 5, 4, 2, 1], pc set (0, 1, 3, 4, 6, 9)
315. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.13, [0, 3, 5, 7, 8, 10, 9, 6, 4, 2, 1, 11], pc set (0, 2, 4, 5, 7, 9)
316. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.14, [0, 2, 5, 7, 8, 10, 11, 9, 6, 4, 3, 1], pc set (0, 2, 3, 5, 7, 9)

317. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.15, [0, 1, 3, 6, 7, 9, 11, 10, 8, 5, 4, 2], pc set (0, 1, 3, 6, 7, 9)
318. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.16, [0, 1, 3, 5, 7, 10, 9, 8, 6, 4, 2, 11], pc set (0, 2, 3, 5, 7, 9)
319. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.17, [0, 1, 3, 5, 8, 9, 7, 6, 4, 2, 11, 10], pc set (0, 1, 3, 5, 8, 9)
320. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.18, [0, 3, 4, 6, 9, 10, 11, 8, 7, 5, 2, 1], pc set (0, 1, 3, 6, 7, 9)
321. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.19, [0, 1, 4, 5, 8, 9, 11, 10, 7, 6, 3, 2], pc set (0, 1, 4, 5, 8, 9)
322. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.2, [0, 1, 2, 3, 4, 10, 9, 8, 7, 6, 5, 11], pc set (0, 1, 2, 3, 4, 6)
323. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.20, [0, 1, 2, 5, 7, 8, 11, 10, 9, 6, 4, 3], pc set (0, 1, 2, 5, 7, 8)
324. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.21, [0, 1, 2, 5, 6, 10, 9, 8, 7, 4, 3, 11], pc set (0, 1, 4, 5, 6, 8)
325. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.22, [0, 1, 2, 4, 8, 9, 7, 6, 5, 3, 11, 10], pc set (0, 1, 4, 5, 6, 8)
326. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.23, [0, 3, 4, 5, 9, 10, 11, 8, 7, 6, 2, 1], pc set (0, 1, 2, 5, 7, 8)
327. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.24, [0, 3, 4, 7, 8, 10, 9, 6, 5, 2, 1, 11], pc set (0, 1, 3, 5, 8, 9)
328. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.25, [0, 3, 5, 6, 8, 9, 7, 4, 2, 1, 11, 10], pc set (0, 1, 3, 4, 6, 9)
329. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.26, [0, 3, 4, 6, 7, 8, 5, 2, 1, 11, 10, 9], pc set (0, 1, 2, 4, 5, 8)
330. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.27, [0, 2, 4, 5, 6, 7, 3, 1, 11, 10, 9, 8], pc set (0, 1, 2, 3, 5, 7)
331. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.28, [0, 5, 7, 8, 9, 10, 11, 6, 4, 3, 2, 1], pc set (0, 2, 3, 4, 5, 7)
332. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.29, [0, 1, 6, 7, 8, 9, 11, 10, 5, 4, 3, 2], pc set (0, 1, 2, 3, 6, 7)
333. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.3, [0, 2, 3, 4, 5, 10, 11, 9, 8, 7, 6, 1], pc set (0, 1, 2, 3, 5, 7)
334. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.30, [0, 1, 2, 6, 7, 8, 11, 10, 9, 5, 4, 3], pc set (0, 1, 2, 6, 7, 8)
335. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstimmigen Modi', No.31, [0,

- 1, 2, 3, 6, 7, 11, 10, 9, 8, 5, 4], pc set (0, 1, 2, 3, 6, 7)
336. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.32, [0, 1, 2, 3, 4, 6, 11, 10, 9, 8, 7, 5], pc set (0, 1, 2, 3, 4, 6)
337. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.4, [0, 2, 3, 4, 8, 10, 9, 7, 6, 5, 1, 11], pc set (0, 1, 2, 4, 6, 8)
338. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.5, [0, 2, 4, 5, 8, 10, 11, 9, 7, 6, 3, 1], pc set (0, 1, 3, 5, 7, 9)
339. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.6, [0, 2, 4, 6, 8, 10, 9, 7, 5, 3, 1, 11], pc set (0, 2, 4, 6, 8, 10)
340. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.7, [0, 2, 4, 6, 8, 9, 7, 5, 3, 1, 11, 10], pc set (0, 1, 3, 5, 7, 9)
341. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.8, [0, 2, 4, 6, 7, 8, 5, 3, 1, 11, 10, 9], pc set (0, 1, 2, 4, 6, 8)
342. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.9, [0, 4, 6, 8, 9, 10, 11, 7, 5, 3, 2, 1], pc set (0, 2, 3, 4, 6, 8)
343. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.1, [0, 1, 2, 3, 4, 5, 11, 10, 9, 8, 7, 6], pc set (0, 1, 2, 3, 4, 5)
344. Hendler, Maximilian: aus den fünf Liedern nach Texten von Elisabeth Pöschl : 'Sonnenaufgang' für Singstimme und Klavier, Op.44-1, [0, 11, 2, 1, 5, 6, 4, 3, 8, 7, 9, 10], pc set (0, 1, 2, 3, 6, 7)
345. Hendler, Maximilian: aus den fünf Liedern nach Texten von Karl Hans Haysen für Singstimme und Klavier : 'Erkenntnis', Op.45-2, [0, 9, 2, 4, 7, 11, 8, 10, 5, 1, 6, 3], pc set (0, 2, 4, 5, 7, 9)
346. Huber, Klaus: Zwei Sätze, [0, 3, 1, 10, 11, 8, 6, 9, 7, 2, 4, 5], pc set (0, 2, 3, 4, 5, 7)
347. Husa, Karel: Poème for Viola and Chamber Orchestra, mvt 1, [0, 6, 5, 7, 8, 11, 9, 10, 3, 4, 2, 1], pc set (0, 1, 2, 3, 6, 7)
348. Husa, Karel: Poème for Viola and Chamber Orchestra, mvt 3, [0, 3, 1, 2, 4, 10, 9, 11, 7, 8, 6, 5], pc set (0, 1, 2, 3, 4, 6)
349. Ives, Charles: On the Antipodes, [0, 3, 11, 8, 4, 7, 10, 9, 6, 2, 5, 1], pc set (0, 1, 4, 5, 8, 9)
350. Ives, Charles: Tone Roads, No.3, [0, 11, 1, 3, 2, 10, 5, 8, 4, 7, 6, 9], pc set (0, 1, 2, 3, 4, 5)
351. Johnston, Ben: String Quartet, No.6, [0, 5, 10, 9, 3, 7, 11, 6, 1, 2, 8, 4], pc set (0, 2, 3, 5, 7, 9)
352. Jung, Joachim: , [0, 11, 3, 10, 2, 1, 7, 8, 4, 9, 5, 6], pc set (0, 1, 2, 3, 4, 5)
353. Kahn, Erich Itor: Bagatelle für Rene Leibowitz, [0, 1, 2, 4, 6, 3, 10, 11, 5, 7, 9, 8], pc set (0, 1, 2, 3, 4, 6)
354. Kalodiki, Georgia: Six Sketches for piano, [0, 7, 6, 1, 2, 9, 8, 3, 4, 11, 5, 10], pc set (0, 1, 2, 5, 7, 8)
355. Klein, Fritz: Die Maschine: Eine extonale Selbstsatire, Op.1, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], pc set (0, 2, 4, 5, 7, 9)
356. Klein, Fritz Heinrich: Die Maschine. Eine extonale Selbstsatire von Heautontimorumenus., Op.1 (Das Maschinen-Thema), [0, 5, 7, 9, 3, 2, 11, 6, 8, 10, 4, 1], pc set (0, 2, 3, 5, 7, 9)

357. Klein, Fritz Heinrich: Variationen, Op.14, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], pc set (0, 2, 4, 5, 7, 9)
358. Klenau, Paul von: Elisabeth von England, [0, 2, 8, 11, 7, 1, 4, 10, 3, 6, 5, 9], pc set (0, 1, 2, 3, 6, 7)
359. Kokkonen, Joonas: Cello Concerto, mov. 2, row "II/A", [0, 2, 7, 4, 3, 5, 6, 1, 11, 8, 10, 9], pc set (0, 2, 3, 4, 5, 7)
360. Kokkonen, Joonas: Cello Concerto, mov. 2, row "II/B", [0, 2, 3, 1, 4, 5, 7, 8, 6, 9, 10, 11], pc set (0, 1, 2, 3, 4, 5)
361. Kokkonen, Joonas: Cello Concerto, mov. 2, row "II/C", [0, 9, 11, 10, 7, 2, 6, 3, 5, 4, 1, 8], pc set (0, 2, 3, 4, 5, 7), self-rotational interval pattern 9-2-11-9-7-4-
362. Kokkonen, Joonas: Woodwind Quintet, mov. 1, rows "I/A" and "I/B", [0, 2, 11, 9, 10, 1, 3, 6, 4, 5, 7, 8], pc set (0, 1, 2, 3, 4, 5)
363. Krenek, Ernst: Eight Piano Pieces, [0, 10, 1, 7, 6, 11, 5, 8, 3, 9, 2, 4], pc set (0, 1, 2, 3, 6, 7)
364. Krenek, Ernst: Karl V, King Francis Row, [0, 10, 5, 6, 11, 3, 9, 4, 2, 7, 1, 8], pc set (0, 1, 2, 5, 7, 8)
365. Krenek, Ernst: Kette, Kreis, und Spiegel (Circle, Chain and Mirror), Op.160, [0, 5, 6, 9, 8, 4, 10, 7, 11, 3, 1, 2], pc set (0, 1, 2, 4, 5, 8)
366. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 1, [0, 2, 4, 5, 8, 10, 6, 7, 9, 11, 1, 3], pc set (0, 1, 3, 5, 7, 9)
367. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 2, [0, 2, 3, 6, 8, 10, 5, 7, 9, 11, 1, 4], pc set (0, 1, 3, 5, 7, 9)
368. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 3, [0, 1, 4, 6, 8, 10, 5, 7, 9, 11, 2, 3], pc set (0, 1, 3, 5, 7, 9)
369. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 4, [0, 3, 5, 7, 9, 11, 6, 8, 10, 1, 2, 4], pc set (0, 1, 3, 5, 7, 9)
370. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 5, [0, 2, 4, 6, 8, 9, 5, 7, 10, 11, 1, 3], pc set (0, 1, 3, 5, 7, 9)
371. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 6, [0, 2, 4, 6, 7, 10, 5, 8, 9, 11, 1, 3], pc set (0, 1, 3, 5, 7, 9)
372. Krenek, Ernst: Quaestio temporis, Op.170, [0, 3, 11, 4, 2, 1, 7, 8, 10, 5, 9, 6], pc set (0, 1, 2, 3, 4, 5)
373. Krenek, Ernst: Sechs Vermessene, Op.168, [0, 3, 1, 6, 2, 4, 10, 5, 9, 7, 8, 11], pc set (0, 1, 2, 3, 4, 6)
374. Krenek, Ernst: Sestina, Op.161, [0, 8, 11, 10, 4, 6, 7, 1, 5, 3, 9, 2], pc set (0, 1, 2, 4, 6, 8)
375. Krenek, Ernst: Sonata, No.3, Op.92, No.4, [0, 10, 5, 8, 3, 2, 6, 7, 1, 9, 11, 4], pc set (0, 2, 3, 5, 7, 9)
376. Krenek, Ernst: String Quartet, No.6, Op.78, [0, 10, 11, 8, 1, 9, 3, 7, 2, 4, 6, 5], pc set (0, 1, 2, 3, 4, 5)
377. Krenek, Ernst: Studies in Counterpoint, [0, 4, 3, 11, 10, 9, 1, 7, 8, 6, 2, 5], pc set (0, 1, 2, 3, 6, 7)
378. Krenek, Ernst: Studies in Counterpoint (i), [0, 4, 3, 11, 10, 9, 1, 7, 8, 6, 2, 5], pc set (0, 1, 2, 3, 6, 7)
379. Krenek, Ernst: Studies in Counterpoint (ii), [0, 3, 10, 4, 9, 11, 8, 7, 5, 1, 2, 6], pc set (0, 1, 2, 3, 6, 7)
380. Krenek, Ernst: Suite, Op.84 for solo cello, [0, 4, 3, 11, 10, 9, 1, 7, 8, 6, 2, 5], pc set (0, 1, 2, 3, 6, 7)

381. Krenek, Ernst: Symeon, der Stylit, [0, 3, 10, 4, 9, 11, 8, 7, 5, 1, 2, 6], pc set (0, 1, 2, 3, 6, 7)
382. Krenek, Ernst: Symphonic Elegy for String Orchestra, Op.105, [0, 1, 9, 11, 10, 2, 3, 7, 6, 8, 4, 5], pc set (0, 1, 2, 3, 4, 5)
383. Krenek, Ernst: Zwölf Variationen in Drei Sätzen, [0, 1, 3, 10, 2, 5, 11, 7, 4, 9, 6, 8], pc set (0, 2, 3, 4, 5, 7)
384. Krenek, Ernst: Zwölf Variationen in Drei Sätzen, Op.79, [0, 1, 3, 10, 2, 5, 11, 7, 4, 9, 8, 6], pc set (0, 2, 3, 4, 5, 7)
385. Krenek, Ernst: concert for organ and string-orchestra, Op.230, [0, 11, 8, 4, 3, 6, 7, 5, 2, 9, 10, 1], pc set (0, 1, 3, 5, 8, 9)
386. Kukuck, Felicitas: 'Der Gottesknecht': 6. Kantate, [0, 11, 10, 1, 2, 3, 8, 9, 6, 5, 7, 4], pc set (0, 1, 2, 3, 4, 5)
387. Kukuck, Felicitas: 'Wo bist Du Trost'; motet, [0, 11, 10, 7, 6, 1, 2, 5, 4, 3, 9, 8], pc set (0, 1, 2, 3, 6, 7)
388. Lackner, Peter: 'An alle Außerirdischen'. Kanon für drei Singstimmen, Kontrabaß und Klavier, [0, 4, 9, 7, 11, 2, 5, 1, 8, 10, 6, 3], pc set (0, 2, 4, 5, 7, 9)
389. Lackner, Peter: 'Davongeflogene Seelen' für Singstimme, Violoncello und Klavier, [0, 10, 4, 7, 6, 1, 9, 11, 5, 2, 3, 8], pc set (0, 1, 3, 6, 7, 9)
390. Lackner, Peter: 'Der Winter', [0, 6, 3, 5, 9, 11, 7, 1, 4, 2, 10, 8], pc set (0, 1, 3, 6, 7, 9)
391. Lackner, Peter: 'Es fiel ein Reif in der Frühlingsnacht' für Singstimme und ein Melodie-Instrument, [0, 9, 4, 7, 2, 5, 1, 8, 10, 11, 3, 6], pc set (0, 2, 4, 5, 7, 9)
392. Lackner, Peter: 'Euphorbia obesa'. Kanon für Oboe, Englischhorn und Fagott., [0, 10, 2, 6, 8, 4, 1, 9, 11, 3, 7, 5], pc set (0, 2, 4, 6, 8, 10)
393. Lackner, Peter: 'Flügelaltar' für Klavier, [0, 9, 11, 10, 2, 7, 1, 8, 4, 5, 3, 6], pc set (0, 2, 3, 4, 5, 7)
394. Lackner, Peter: 'Hexentanz' für Violine und Klavier, [0, 3, 5, 7, 8, 4, 1, 10, 11, 2, 6, 9], pc set (0, 1, 3, 4, 5, 8)
395. Lackner, Peter: 'INKE TAN MAGROV' für Singstimme und Klavier, [0, 6, 5, 10, 8, 3, 7, 1, 2, 9, 11, 4], pc set (0, 2, 3, 5, 7, 9)
396. Lackner, Peter: 'Ständchen' für zwei Violinen und zwei Bratschen. 1913,2013, [0, 4, 2, 8, 11, 7, 10, 5, 9, 1, 3, 6], pc set (0, 1, 3, 5, 8, 9)
397. Lackner, Peter: 'Venus-Quadrat' für Violine und Klavier, [0, 7, 2, 5, 9, 10, 11, 6, 8, 4, 3, 1], pc set (0, 2, 4, 5, 7, 9)
398. Lackner, Peter: 'Wo ist der Freund' (erstes Lied aus dem Zyklus 'Wilde Erdbeeren' für Singstimme und Klavier), [0, 3, 6, 2, 9, 11, 7, 4, 1, 5, 10, 8], pc set (0, 1, 3, 4, 6, 9)
399. Lackner, Peter: 1. Kanonzyklus, [0, 7, 5, 9, 1, 3, 11, 8, 4, 6, 10, 2], pc set (0, 1, 3, 5, 7, 9)
400. Lackner, Peter: 2. Kanonzyklus, [0, 10, 2, 7, 9, 5, 11, 3, 1, 8, 4, 6], pc set (0, 2, 4, 5, 7, 9)
401. Lackner, Peter: 3. Kanonzyklus, [0, 6, 8, 10, 1, 3, 5, 11, 9, 7, 4, 2], pc set (0, 2, 3, 5, 7, 9)
402. Lackner, Peter: 4. Kanonzyklus, [0, 5, 3, 7, 11, 1, 9, 4, 6, 2, 10, 8], pc set (0, 1, 2, 4, 6, 8)

403. Lackner, Peter: 5. Kanonzyklus, [0, 7, 11, 9, 1, 3, 5, 8, 10, 6, 2, 4], pc set (0, 2, 3, 4, 6, 8)
404. Lackner, Peter: AGNI MEI (Kanon für Klavier. 5. Juni 2015), [0, 4, 10, 11, 1, 2, 8, 7, 3, 6, 9, 5], pc set (0, 1, 2, 3, 4, 6)
405. Lackner, Peter: Das Buch der Wandlungen I für Frauenstimmen und,oder Klavier, [0, 8, 3, 5, 1, 10, 7, 11, 4, 2, 6, 9], pc set (0, 2, 4, 5, 7, 9)
406. Lackner, Peter: Florianische Reihe, [0, 3, 9, 7, 4, 11, 5, 2, 8, 6, 1, 10], pc set (0, 1, 3, 5, 8, 9)
407. Lackner, Peter: INKE TAN MAGROV für Singstimme und Klavier (zweites Lied aus dem Zyklus 'Wilde Erdbeeren'), [0, 2, 9, 5, 8, 11, 3, 1, 6, 10, 7, 4], pc set (0, 1, 3, 4, 6, 9)
408. Lackner, Peter: KANON für A, O & Gsellmanns Weltmaschine. 8. Oktober 1958,2008, [0, 8, 10, 4, 2, 6, 9, 1, 11, 5, 7, 3], pc set (0, 2, 4, 6, 8, 10)
409. Lackner, Peter: Kanon-Polska für zwei Bratschen. 6. Juni 1993, [0, 6, 3, 1, 10, 8, 5, 11, 2, 4, 7, 9], pc set (0, 2, 3, 5, 7, 9)
410. Lackner, Peter: Kanon T6 á 2, [0, 10, 8, 3, 1, 5, 6, 4, 2, 9, 7, 11], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 10-10-7-10-4-1-
411. Lackner, Peter: Kanon für B. L., 7. Oktober 2017, [0, 9, 10, 5, 3, 7, 11, 2, 1, 6, 8, 4], pc set (0, 2, 3, 5, 7, 9)
412. Lackner, Peter: Kanon für Blockflötenquartett. April 2005, [0, 10, 11, 3, 1, 2, 8, 7, 9, 5, 4, 6], pc set (0, 1, 2, 3, 4, 5)
413. Lackner, Peter: Kanon für Cello und Klavier, [0, 2, 9, 10, 6, 5, 1, 11, 4, 3, 7, 8], pc set (0, 1, 3, 5, 8, 9)
414. Lackner, Peter: Kanon für Flöte, Akkordeon, zwei Violinen, Bratsche und Klavier, [0, 5, 3, 7, 11, 1, 9, 4, 6, 2, 10, 8], pc set (0, 1, 2, 4, 6, 8)
415. Lackner, Peter: Kanon für Flöte solo und N. N., [0, 3, 7, 10, 2, 5, 11, 8, 4, 1, 9, 6], pc set (0, 2, 4, 5, 7, 9)
416. Lackner, Peter: Kanon für Flöte und Elektronik. Februar 1999, [0, 10, 2, 7, 9, 5, 11, 3, 1, 8, 4, 6], pc set (0, 2, 4, 5, 7, 9)
417. Lackner, Peter: Kanon für Hammerklavier. März 2016, [0, 2, 1, 5, 7, 3, 11, 9, 10, 6, 4, 8], pc set (0, 1, 2, 3, 5, 7)
418. Lackner, Peter: Kanon für Kammerorchester, [0, 9, 11, 6, 2, 4, 7, 10, 8, 1, 5, 3], pc set (0, 2, 3, 5, 7, 9)
419. Lackner, Peter: Kanon für Klavier, [0, 6, 8, 10, 1, 3, 5, 11, 9, 7, 4, 2], pc set (0, 2, 3, 5, 7, 9)
420. Lackner, Peter: Kanon für Klavier. 15. Juni 1992, [0, 10, 3, 8, 6, 5, 2, 1, 11, 4, 9, 7], pc set (0, 2, 3, 5, 7, 9)
421. Lackner, Peter: Kanon für Klavier. 21. Juni 1998, [0, 7, 6, 5, 1, 4, 3, 8, 9, 10, 2, 11], pc set (0, 1, 2, 3, 6, 7)
422. Lackner, Peter: Kanon für Klavier. 26. Juni 1983, [0, 7, 5, 9, 4, 8, 6, 1, 11, 3, 10, 2], pc set (0, 1, 3, 4, 5, 8), self-rotational interval pattern 7-10-4-7-4-10-

423. Lackner, Peter: Kanon für Klavier. 27. Juni, 26. September 2002, [0, 9, 4, 1, 2, 8, 7, 10, 3, 6, 5, 11], pc set (0, 1, 4, 5, 6, 8)
424. Lackner, Peter: Kanon für Klavier. 5. April 1989, [0, 2, 9, 10, 6, 5, 1, 11, 4, 3, 7, 8], pc set (0, 1, 3, 5, 8, 9)
425. Lackner, Peter: Kanon für Klavier. April 2000, [0, 5, 3, 7, 11, 1, 9, 4, 6, 2, 10, 8], pc set (0, 1, 2, 4, 6, 8)
426. Lackner, Peter: Kanon für Klavier zu vier Händen, [0, 10, 5, 3, 7, 8, 6, 4, 11, 9, 1, 2], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 10-7-10-4-1-10-
427. Lackner, Peter: Kanon für Klavier zu vier Händen. 12. Juni 1996, [0, 4, 2, 8, 11, 10, 5, 1, 3, 9, 6, 7], pc set (0, 2, 3, 4, 6, 8)
428. Lackner, Peter: Kanon für Klavier zu vier Händen. Frühling 1984, [0, 1, 10, 7, 9, 4, 5, 11, 8, 6, 2, 3], pc set (0, 1, 3, 4, 6, 9)
429. Lackner, Peter: Kanon für Klavierquartett, [0, 8, 6, 11, 3, 9, 1, 5, 7, 2, 10, 4], pc set (0, 1, 3, 4, 6, 9)
430. Lackner, Peter: Kanon für Klavierquartett. 27. April 1991, [0, 6, 3, 5, 9, 11, 7, 1, 4, 2, 10, 8], pc set (0, 1, 3, 6, 7, 9)
431. Lackner, Peter: Kanon für Klavierquartett. 27. Juni 1991, [0, 2, 6, 9, 11, 3, 7, 5, 1, 10, 8, 4], pc set (0, 1, 3, 4, 6, 9)
432. Lackner, Peter: Kanon für Klaviertrio, [0, 2, 4, 9, 5, 7, 3, 1, 11, 6, 10, 8], pc set (0, 2, 4, 5, 7, 9)
433. Lackner, Peter: Kanon für Orgel, zweimanualiges Cembalo oder Klavier, [0, 7, 2, 11, 4, 9, 6, 8, 1, 5, 3, 10], pc set (0, 2, 4, 5, 7, 9)
434. Lackner, Peter: Kanon für Orgel. 21. November 1994, 4. Februar 1995, [0, 8, 5, 1, 4, 9, 2, 11, 7, 3, 10, 6], pc set (0, 1, 4, 5, 8, 9)
435. Lackner, Peter: Kanon für Schwegel, diatonisches Hackbrett und Violine, [0, 8, 4, 10, 6, 2, 5, 1, 9, 3, 11, 7], pc set (0, 2, 4, 6, 8, 10), self-rotational interval pattern 8-8-6-8-8-3-
436. Lackner, Peter: Kanon für Schwegel und zwei Geigen, [0, 6, 4, 2, 10, 8, 9, 3, 5, 7, 11, 1], pc set (0, 2, 4, 6, 8, 10)
437. Lackner, Peter: Kanon für Schwegelpfeife in A und Geige, [0, 9, 7, 2, 10, 4, 3, 6, 8, 1, 5, 11], pc set (0, 2, 3, 5, 7, 9)
438. Lackner, Peter: Kanon für Streichquartett, [0, 9, 3, 5, 1, 11, 7, 10, 4, 2, 6, 8], pc set (0, 2, 3, 4, 6, 8)
439. Lackner, Peter: Kanon für Streichquartett. 22. September 2003, [0, 8, 10, 4, 2, 6, 9, 1, 11, 5, 7, 3], pc set (0, 2, 4, 6, 8, 10)
440. Lackner, Peter: Kanon für Streichquartett. 3. Jänner 1990, [0, 6, 4, 8, 11, 3, 1, 7, 9, 5, 2, 10], pc set (0, 1, 3, 5, 8, 9)
441. Lackner, Peter: Kanon für Streichquartett und Orgel. 21. November 1993, [0, 10, 2, 5, 4, 7, 1, 11, 3, 9, 8, 6], pc set (0, 2, 3, 5, 7, 9)
442. Lackner, Peter: Kanon für Tenor-Hackbrett. 19. März 2014, [0, 8, 4, 6, 9, 1, 11, 3, 7, 5, 2, 10], pc set (0, 1, 3, 5, 8, 9)

443. Lackner, Peter: Kanon für Violine, Bratsche und Klavier, [0, 4, 2, 8, 11, 7, 10, 5, 9, 1, 3, 6], pc set (0, 1, 3, 5, 8, 9)
444. Lackner, Peter: Kanon für Violine, Viola und Akkordeon. 11. Juni 2007, [0, 11, 1, 2, 3, 10, 4, 9, 8, 7, 5, 6], pc set (0, 1, 2, 3, 4, 5)
445. Lackner, Peter: Kanon für Violine solo, [0, 11, 2, 7, 10, 9, 3, 4, 1, 8, 5, 6], pc set (0, 2, 3, 4, 5, 7)
446. Lackner, Peter: Kanon für Violine und Violoncello, [0, 2, 9, 10, 6, 5, 1, 11, 4, 3, 7, 8], pc set (0, 1, 3, 5, 8, 9)
447. Lackner, Peter: Kanon für acht Instrumente. Dezember 1991, März 2007, [0, 11, 3, 10, 6, 2, 7, 8, 4, 9, 1, 5], pc set (0, 1, 2, 4, 5, 8)
448. Lackner, Peter: Kanon für drei Bratschen, [0, 11, 3, 10, 6, 2, 7, 8, 4, 9, 1, 5], pc set (0, 1, 2, 4, 5, 8)
449. Lackner, Peter: Kanon für drei Violinen I, II August 1998, [0, 2, 10, 4, 8, 6, 1, 9, 11, 5, 3, 7], pc set (0, 2, 4, 6, 8, 10)
450. Lackner, Peter: Kanon für sechs Instrumente. 16. März 2009, [0, 7, 6, 3, 2, 10, 1, 8, 11, 5, 4, 9], pc set (0, 1, 3, 5, 8, 9)
451. Lackner, Peter: Kanon für sechs Posaunen. Herbst 1996, [0, 9, 1, 6, 4, 8, 11, 2, 10, 7, 5, 3], pc set (0, 1, 3, 5, 8, 9)
452. Lackner, Peter: Kanon für zwei Gitarren. September 2001, [0, 5, 3, 9, 11, 6, 7, 2, 4, 10, 8, 1], pc set (0, 1, 3, 6, 7, 9)
453. Lackner, Peter: Kanon für zwei Singstimmen und Ensemble zur Skulpturengruppe LEM von Axel Kirchmayr und einem Text von Hannes Walzl. September 2004, [0, 2, 9, 10, 5, 7, 1, 11, 4, 3, 8, 6], pc set (0, 2, 4, 5, 7, 9)
454. Lackner, Peter: Kanon für zwei Trompeten, Horn, Posaune und Tuba. 1. Mai 1993, [0, 1, 2, 10, 3, 5, 11, 9, 4, 8, 7, 6], pc set (0, 2, 3, 4, 5, 7)
455. Lackner, Peter: Kanon für zwei Violinen, [0, 7, 4, 5, 9, 2, 3, 8, 11, 10, 6, 1], pc set (0, 2, 4, 5, 7, 9)
456. Lackner, Peter: Kanon für zwei Violinen. Frühjahr 1992, [0, 2, 4, 7, 9, 11, 5, 3, 1, 10, 8, 6], pc set (0, 2, 4, 5, 7, 9)
457. Lackner, Peter: Kanon für zwei Violinen und Klavier. 1. Dezember 2004, [0, 10, 2, 6, 8, 4, 1, 9, 11, 3, 7, 5], pc set (0, 2, 4, 6, 8, 10)
458. Lackner, Peter: Kanon für zwei Violinen und Klavier. Frühjahr 1984, [0, 1, 10, 7, 9, 4, 5, 11, 8, 6, 2, 3], pc set (0, 1, 3, 4, 6, 9)
459. Lackner, Peter: Kanon à 3, [0, 11, 6, 10, 2, 7, 3, 4, 9, 5, 1, 8], pc set (0, 1, 4, 5, 6, 8)
460. Lackner, Peter: Kanon à 4 – ‘Für Harald Fripertinger zum 50. Geburtstag’, [0, 10, 3, 6, 5, 8, 1, 11, 9, 4, 7, 2], pc set (0, 2, 3, 5, 7, 9)
461. Lackner, Peter: Kanon á 4, [0, 4, 2, 8, 11, 7, 10, 5, 9, 1, 3, 6], pc set (0, 1, 3, 5, 8, 9)
462. Lackner, Peter: Kanon á 5 für Klaus Chudoba, [0, 2, 10, 8, 6, 11, 3, 1, 5, 7, 9, 4], pc set (0, 2, 3, 4, 6, 8)
463. Lackner, Peter: Moebius-Band für Flöte, Violine, Violoncello und Klavier, [0, 3, 6, 2, 9, 11, 7, 4, 1,

- 5, 10, 8], pc set (0, 1, 3, 4, 6, 9)
464. Lackner, Peter: Moebius-Band für sechs Violinen, [0, 3, 6, 2, 9, 11, 7, 4, 1, 5, 10, 8], pc set (0, 1, 3, 4, 6, 9)
465. Lackner, Peter: Moebiusband I für zwei Melodieinstrumente, [0, 6, 8, 2, 7, 1, 11, 5, 3, 9, 4, 10], pc set (0, 1, 2, 6, 7, 8)
466. Lackner, Peter: Moebiusband für Violine und Klavier (Chinesenfolter I), [0, 2, 4, 6, 10, 5, 1, 11, 9, 7, 3, 8], pc set (0, 1, 2, 4, 6, 8)
467. Lackner, Peter: Reihenspiel für Orgel, [0, 9, 6, 11, 5, 4, 10, 7, 2, 1, 8, 3], pc set (0, 1, 2, 5, 7, 8)
468. Lackner, Peter: Salambo-Kanon (à 4); Bad Aussee, 2. Februar 2008, [0, 6, 9, 2, 8, 10, 4, 7, 1, 11, 3, 5], pc set (0, 2, 3, 4, 6, 8)
469. Lackner, Peter: Sponsions-Kanon, [0, 4, 1, 10, 3, 7, 9, 5, 8, 11, 6, 2], pc set (0, 1, 3, 4, 6, 9)
470. Lackner, Peter: TACET (drittes Lied aus dem Zyklus 'Wilde Erdbeeren'), [0, 2, 9, 5, 8, 11, 4, 7, 10, 6, 1, 3], pc set (0, 1, 3, 4, 6, 9)
471. Lackner, Peter: Trauermusik für Fagott, Kontrafagott und Pauke, [0, 6, 2, 8, 10, 4, 11, 5, 9, 3, 1, 7], pc set (0, 2, 4, 6, 8, 10)
472. Lackner, Peter: kgV (3,4) [zweistimmiger Kanon für Klavier], [0, 10, 2, 3, 5, 7, 1, 11, 9, 8, 4, 6], pc set (0, 2, 4, 5, 7, 9)
473. Lang, Bernhard: 'Der Golem' nach Gustav Meyrinck, [0, 4, 7, 8, 11, 3, 5, 2, 9, 1, 10, 6], pc set (0, 1, 4, 5, 8, 9)
474. Lang, Bernhard: Der Reigen, [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6], pc set (0, 1, 2, 3, 4, 5)
475. Lang, Bernhard: Hemma (Music Theatre Hemma Klagenfurt 2015), [0, 5, 10, 2, 3, 1, 7, 9, 8, 4, 11, 6], pc set (0, 2, 3, 4, 5, 7)
476. Lang, Bernhard: Monadologie XIII a; 'The Saucy Maid', [0, 1, 5, 2, 4, 9, 3, 10, 8, 11, 7, 6], pc set (0, 1, 3, 4, 5, 8)
477. Lang, Klaus: 'Von der Ligurischen Küste zum Trasimenischen See'; Trauermusik für Violine und Klavier, [0, 5, 9, 8, 10, 7, 1, 4, 2, 3, 11, 6], pc set (0, 2, 3, 4, 5, 7)
478. Leibowitz, René: String Quartet, No.3, Op.26, [0, 8, 9, 7, 6, 1, 2, 5, 4, 10, 11, 3], pc set (0, 1, 2, 3, 6, 7)
479. Leibowitz, René: Trois pièces pour piano, Op.19, [0, 4, 3, 1, 2, 5, 6, 9, 10, 8, 7, 11], pc set (0, 1, 2, 3, 4, 5)
480. Lewin, David: Just a Minute, Roger, [0, 11, 4, 5, 7, 3, 2, 6, 8, 1, 10, 9], pc set (0, 1, 4, 5, 6, 8)
481. Ligeti, György: Le Grand Macabre, [0, 6, 5, 11, 10, 4, 9, 3, 2, 8, 7, 1], pc set (0, 1, 2, 6, 7, 8), self-rotational interval pattern 6-11-6-11-6-5-
482. Lu, Shi-Lin: A Family of Red-Crowned Cranes, [0, 2, 9, 7, 4, 6, 11, 8, 1, 3, 10, 5], pc set (0, 2, 3, 5, 7, 9)
483. Lu, Yen: A Bird Flying By, [0, 6, 3, 4, 8, 7, 11, 5, 10, 2, 9, 1], pc set (0, 1, 2, 4, 5, 8)
484. Luo, Zhong-Rong: Chang'e, [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6], pc set (0, 2, 4, 5, 7, 9)

485. Luo, Zhong-Rong: Dusk, row 1, [0, 2, 7, 5, 10, 8, 6, 3, 1, 11, 9, 4], pc set (0, 2, 3, 5, 7, 9)
486. Luo, Zhong-Rong: Dusk, row 2, [0, 3, 7, 5, 8, 10, 1, 11, 6, 2, 4, 9], pc set (0, 2, 4, 5, 7, 9)
487. Luo, Zhong-Rong: Evening, [0, 2, 7, 5, 10, 8, 6, 3, 1, 11, 9, 4], pc set (0, 2, 3, 5, 7, 9)
488. Luo, Zhong-Rong: Morning Glory, [0, 2, 5, 9, 7, 10, 3, 11, 1, 4, 6, 8], pc set (0, 2, 4, 5, 7, 9)
489. Luo, Zhong-Rong: Picking lotus flowers at the riverside, [0, 2, 5, 7, 10, 3, 1, 4, 6, 9, 11, 8], pc set (0, 2, 4, 5, 7, 9)
490. Luo, Zhong-Rong: Sonatina, mvt 3, [0, 2, 7, 4, 11, 8, 5, 9, 10, 1, 3, 6], pc set (0, 1, 3, 5, 8, 9)
491. Luo, Zhong-Rong: String Quartet, No.2, [0, 3, 5, 10, 6, 8, 11, 1, 9, 2, 4, 7], pc set (0, 2, 3, 5, 7, 9)
492. Luo, Zhong-Rong: String Quartet, No.3, row 1, [0, 2, 4, 7, 5, 10, 8, 1, 6, 3, 9, 11], pc set (0, 2, 3, 5, 7, 9)
493. Luo, Zhong-Rong: String Quartet, No.3, row 3, [0, 2, 7, 9, 11, 1, 3, 6, 10, 4, 5, 8], pc set (0, 1, 2, 3, 5, 7)
494. Luo, Zhong-Rong: Three Piano Pieces, “Arabeque”, row 1, [0, 2, 5, 10, 6, 1, 3, 8, 11, 9, 7, 4], pc set (0, 1, 4, 5, 6, 8)
495. Luo, Zhong-Rong: Three Piano Pieces, “Arabeque”, row 2, [0, 2, 7, 9, 11, 4, 6, 8, 1, 3, 10, 5], pc set (0, 2, 4, 5, 7, 9)
496. Lutyens, Elisabeth: Essence Of Our Happinesses, Op.69, mvt II, Part I, [0, 11, 1, 10, 2, 3, 8, 9, 5, 6, 4, 7], pc set (0, 1, 2, 3, 4, 5)
497. Lutyens, Elisabeth: Five Little Pieces for Clarinet and Piano, [0, 8, 4, 1, 10, 2, 9, 3, 5, 6, 11, 7], pc set (0, 2, 3, 4, 6, 8)
498. Lutyens, Elisabeth: Islands, Op.80, [0, 11, 7, 3, 8, 10, 9, 6, 4, 5, 1, 2], pc set (0, 1, 3, 4, 5, 8)
499. Lutyens, Elisabeth: Motet (Excerpta Tractati Logico-Philosophici), Op.27, [0, 11, 3, 7, 8, 4, 2, 6, 5, 1, 9, 10], pc set (0, 1, 4, 5, 8, 9)
500. Lutyens, Elisabeth: Présages, Op.53, [0, 1, 11, 2, 10, 8, 5, 3, 4, 7, 9, 6], pc set (0, 1, 2, 3, 4, 6)
501. Lutyens, Elisabeth: Quincunx, Op.44, [0, 6, 11, 1, 5, 2, 7, 3, 4, 9, 10, 8], pc set (0, 1, 2, 3, 6, 7)
502. Lutyens, Elisabeth: The Numbered, Altered Primary Row (swap pitches 2 and 3), [0, 11, 10, 1, 2, 9, 3, 4, 8, 5, 7, 6], pc set (0, 1, 2, 3, 4, 5)
503. Lutyens, Elisabeth: The Numbered, Primary Row, [0, 10, 11, 1, 2, 9, 3, 4, 8, 5, 7, 6], pc set (0, 1, 2, 3, 4, 5)
504. Maderna, Bruno: Improvvisazione N. 1, [0, 11, 4, 8, 3, 2, 7, 6, 1, 5, 10, 9], pc set (0, 1, 2, 4, 5, 8)
505. Maderna, Bruno: Musica su due dimensioni, [0, 2, 9, 4, 6, 11, 8, 10, 1, 3, 5, 7], pc set (0, 2, 3, 5, 7, 9)
506. Mamlok, Ursula: Haiku Settings, No.5, [0, 11, 8, 7, 4, 3, 5, 6, 9, 10, 1, 2], pc set (0, 1, 4, 5, 8, 9)
507. Mamlok, Ursula: Panta Rhei, [0, 7, 4, 11, 8, 3, 10, 9, 6, 2, 5, 1], pc set (0, 1, 4, 5, 8, 9)
508. Mamlok, Ursula: Panta Rhei, secondary row (mvt 4, Piano), [0, 11, 8, 3, 4, 7, 2, 1, 6, 9, 10, 5], pc set (0, 1, 4, 5, 8, 9)
509. Martin, Frank: Petite complainte, [0, 11, 10, 6, 2, 4, 5, 9, 8, 7, 3, 1], pc set (0, 1, 2, 4, 6, 8)

510. Martino, Donald: Fantasy Variations, [0, 3, 1, 10, 2, 8, 11, 5, 6, 9, 7, 4], pc set (0, 1, 2, 3, 5, 7)
511. Martino, Donald: Notturmo (Row B), [0, 7, 11, 10, 9, 8, 2, 1, 6, 3, 4, 5], pc set (0, 1, 2, 3, 4, 5)
512. Matthias, Hauer Josef: Zwölftonspiel für Holzbläser, Streicher und Klavier. April 1951, [0, 4, 9, 11, 7, 2, 3, 6, 8, 10, 5, 1], pc set (0, 2, 4, 5, 7, 9)
513. Matthias, Josef: Salambo, Op.60, [0, 6, 9, 2, 8, 10, 4, 7, 1, 11, 3, 5], pc set (0, 2, 3, 4, 6, 8)
514. Messiaen, Olivier: Livre d'orgue, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], pc set (0, 1, 2, 3, 4, 5)
515. Messiaen, Olivier: Mode de valeurs et d'intensités, Series 1, [0, 11, 6, 5, 4, 3, 1, 10, 9, 7, 2, 8], pc set (0, 1, 2, 3, 6, 7)
516. Mittendorfer, Josef: aleatoric row, [0, 2, 7, 1, 8, 6, 10, 5, 4, 11, 3, 9], pc set (0, 1, 2, 6, 7, 8)
517. Moevs, Robert: Musica da Camera, [0, 1, 11, 3, 4, 2, 9, 10, 8, 7, 5, 6], pc set (0, 1, 2, 3, 4, 5)
518. Morris, Robert: By Far, [0, 1, 4, 11, 3, 2, 6, 7, 5, 10, 8, 9], pc set (0, 1, 2, 3, 4, 5)
519. Morris, Robert: Canonic Variations, [0, 3, 11, 1, 4, 8, 5, 6, 9, 10, 2, 7], pc set (0, 1, 3, 4, 5, 8)
520. Morris, Robert: Clash, [0, 3, 11, 10, 8, 1, 7, 9, 2, 6, 4, 5], pc set (0, 2, 3, 4, 5, 7)
521. Morris, Robert: Concerto for Piano and Strings, [0, 1, 6, 11, 7, 5, 10, 8, 4, 3, 2, 9], pc set (0, 1, 2, 6, 7, 8)
522. Morris, Robert: Cuts, [0, 10, 11, 7, 3, 8, 6, 9, 4, 5, 1, 2], pc set (0, 1, 3, 4, 5, 8)
523. Morris, Robert: Entanglements, [0, 3, 10, 5, 11, 6, 1, 7, 9, 2, 8, 4], pc set (0, 1, 2, 5, 7, 8)
524. Morris, Robert: Exchanges, [0, 4, 3, 1, 9, 5, 8, 6, 2, 10, 11, 7], pc set (0, 1, 2, 4, 5, 8)
525. Morris, Robert: Knot Lilacs, [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6], pc set (0, 1, 3, 4, 5, 8)
526. Morris, Robert: Not Lilacs, [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6], pc set (0, 1, 3, 4, 5, 8)
527. Morris, Robert: Pari Passu, row 1, [0, 6, 10, 11, 2, 3, 9, 1, 7, 8, 4, 5], pc set (0, 1, 2, 4, 5, 8)
528. Morris, Robert: Refrains, [0, 3, 4, 2, 6, 10, 1, 8, 11, 7, 5, 9], pc set (0, 2, 3, 4, 6, 8)
529. Morris, Robert: Roundelay, row 1, [0, 7, 4, 11, 9, 2, 6, 3, 10, 5, 8, 1], pc set (0, 2, 4, 5, 7, 9)
530. Morris, Robert: Roundelay, row 2, [0, 5, 9, 7, 8, 10, 4, 11, 1, 6, 2, 3], pc set (0, 2, 3, 4, 5, 7)
531. Morris, Robert: Roundelay, row 3, [0, 10, 9, 3, 4, 6, 8, 11, 2, 7, 1, 5], pc set (0, 1, 3, 6, 7, 9)
532. Morris, Robert: Roundelay, row 4, [0, 3, 11, 10, 7, 2, 6, 9, 5, 4, 1, 8], pc set (0, 1, 3, 4, 5, 8), self-rotational interval pattern 3-8-11-9-7-4-
533. Morris, Robert: Roundelay, row 5, [0, 3, 11, 4, 1, 2, 8, 10, 5, 9, 7, 6], pc set (0, 1, 2, 3, 4, 5)
534. Morris, Robert: Roundelay, row 6, [0, 10, 5, 11, 4, 6, 8, 7, 2, 3, 9, 1], pc set (0, 1, 2, 6, 7, 8)
535. Morris, Robert: Something New, [0, 9, 4, 8, 11, 7, 3, 6, 10, 5, 2, 1], pc set (0, 1, 3, 4, 5, 8)
536. Morris, Robert: Strange Flowers, Occasional Storms, [0, 1, 8, 3, 5, 4, 10, 6, 9, 7, 11, 2], pc set (0, 1, 3, 4, 5, 8)
537. Morris, Robert: Terrane, [0, 11, 1, 3, 2, 5, 6, 4, 9, 7, 8, 10], pc set (0, 1, 2, 3, 4, 6)
538. Morris, Robert: Three Musicians, [0, 9, 7, 6, 8, 1, 11, 2, 4, 5, 3, 10], pc set (0, 1, 2, 3, 6, 7)
539. Morris, Robert: Tournament for 12 trombones, [0, 7, 6, 4, 11, 8, 5, 9, 1, 3, 2, 10], pc set (0, 1, 4, 5, 6, 8)
540. Morris, Robert: Tête-à-Tête, [0, 3, 11, 10, 1, 8, 2, 6, 9, 5, 4, 7], pc set (0, 2, 3, 4, 5, 7)

541. Morris, Robert: ...gradually..., [0, 1, 8, 3, 5, 4, 6, 7, 9, 11, 2, 10], pc set (0, 1, 3, 4, 5, 8)
542. Nichols, Jeff: ...its darkening opposite, or Set Portrait in a Convex Mirror, [0, 4, 8, 7, 11, 2, 3, 6, 1, 9, 10, 5], pc set (0, 1, 3, 5, 8, 9)
543. Nono, Luigi: Canti per tredici, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], pc set (0, 1, 2, 3, 4, 5)
544. Nono, Luigi: Composizione per orchestra, No.1, [0, 1, 7, 6, 2, 8, 4, 3, 5, 10, 11, 9], pc set (0, 1, 2, 6, 7, 8)
545. Nono, Luigi: Cori di Didone, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], pc set (0, 1, 2, 3, 4, 5)
546. Nono, Luigi: Il canto sospeso, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], pc set (0, 1, 2, 3, 4, 5)
547. Nono, Luigi: Incontri, [0, 2, 3, 8, 9, 6, 4, 5, 7, 11, 1, 10], pc set (0, 1, 3, 6, 7, 9)
548. Nono, Luigi: Intolleranza, Soprano 1, [0, 3, 4, 7, 8, 5, 6, 9, 10, 1, 2, 11], pc set (0, 1, 3, 4, 5, 8), self-rotational interval pattern 3-1-3-1-9-1-
549. Nono, Luigi: La terra e la compagna (sketch), Series 1, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], pc set (0, 1, 2, 3, 4, 5)
550. Nono, Luigi: La terra e la compagna (sketch), Series 2, [0, 6, 1, 7, 11, 5, 2, 8, 10, 4, 3, 9], pc set (0, 1, 2, 6, 7, 8)
551. Nono, Luigi: La terra e la compagna (sketch), Series 3, [0, 9, 6, 3, 1, 4, 7, 10, 11, 8, 5, 2], pc set (0, 1, 3, 4, 6, 9)
552. Nono, Luigi: La terra e la compagna (sketch), Series 5, [0, 7, 2, 4, 9, 10, 5, 1, 6, 11, 8, 3], pc set (0, 2, 3, 5, 7, 9)
553. Nono, Luigi: La terra e la compagna (sketch), Series 7, [0, 5, 3, 10, 7, 1, 8, 9, 2, 6, 11, 4], pc set (0, 2, 3, 5, 7, 9)
554. Nono, Luigi: La terra e la compagna (sketch), Series 8, [0, 4, 5, 11, 3, 6, 10, 2, 7, 9, 1, 8], pc set (0, 1, 2, 3, 6, 7)
555. Nono, Luigi: Variazioni canoniche sulla serie dell'Op.41 di Arnold Schönberg, [0, 1, 9, 8, 4, 5, 7, 6, 10, 11, 3, 2], pc set (0, 1, 4, 5, 8, 9)
556. Papaioannou, Yannis: Songs of the Lake, No.1, [0, 8, 5, 7, 6, 11, 2, 10, 1, 3, 9, 4], pc set (0, 1, 2, 3, 6, 7)
557. Papaioannou, Yannis: Songs of the Lake, No.2, [0, 7, 4, 6, 5, 1, 9, 2, 8, 10, 3, 11], pc set (0, 1, 2, 3, 6, 7)
558. Papaioannou, Yannis: Songs of the Lake, No.4, [0, 5, 11, 9, 6, 10, 7, 2, 3, 1, 4, 8], pc set (0, 1, 2, 3, 6, 7)
559. Papaioannou, Yannis: Suite, "XP", [0, 4, 2, 1, 6, 8, 3, 9, 7, 10, 5, 11], pc set (0, 1, 2, 4, 6, 8)
560. Papaioannou, Yannis: Suite, "YP", [0, 10, 9, 8, 1, 4, 5, 7, 3, 6, 2, 11], pc set (0, 1, 2, 4, 5, 8)
561. Pentland, Barbara: String Quartet, No.3, [0, 11, 3, 6, 5, 9, 10, 8, 1, 2, 7, 4], pc set (0, 1, 3, 6, 7, 9)
562. Perle, George: First string quartet, [0, 1, 3, 6, 10, 9, 8, 7, 4, 5, 11, 2], pc set (0, 1, 3, 4, 6, 9)
563. Pousseur, Henri: Trois Chants Sacrés, [0, 10, 11, 4, 1, 5, 9, 6, 3, 7, 2, 8], pc set (0, 1, 2, 3, 6, 7)
564. Preßl, Hermann Markus: 'A 5' für Bassklarinette, Vibraphon und drei Bratschen, [0, 6, 5, 8, 10, 7, 3,

- 2, 4, 9, 1, 11], pc set (0, 1, 2, 3, 5, 7)
565. Preßl, Hermann Markus: Finstersonnen, [0, 3, 9, 6, 11, 5, 1, 2, 7, 8, 10, 4], pc set (0, 1, 3, 6, 7, 9)
566. Preßl, Hermann Markus: N. N. 50; 'Die Zeremonie des Abschieds', [0, 9, 4, 2, 7, 5, 8, 1, 6, 3, 11, 10], pc set (0, 2, 4, 5, 7, 9)
567. Preßl, Hermann Markus: Fier Fafeln für Fier Fiolen, [0, 7, 8, 11, 9, 4, 6, 10, 1, 5, 3, 2], pc set (0, 1, 3, 4, 5, 8)
568. Pärt, Arvo: Diagrams, [0, 11, 2, 1, 3, 4, 9, 10, 7, 8, 6, 5], pc set (0, 1, 2, 3, 4, 5)
569. Pärt, Arvo: Perpetuum Mobile, [0, 11, 10, 5, 6, 9, 7, 1, 2, 8, 3, 4], pc set (0, 1, 2, 3, 6, 7)
570. Pärt, Arvo: Symphony, No.1, [0, 1, 2, 7, 6, 3, 5, 11, 10, 4, 9, 8], pc set (0, 1, 2, 3, 6, 7)
571. Reynolds, Roger: Ambages, [0, 1, 4, 5, 7, 6, 8, 9, 10, 11, 2, 3], pc set (0, 1, 2, 3, 6, 7)
572. Riegebauer, Sigrid: Toccata, [0, 3, 1, 2, 11, 10, 4, 5, 8, 7, 9, 6], pc set (0, 1, 2, 3, 4, 5)
573. Rochberg, George: Sonata-Fantasia, [0, 11, 10, 4, 5, 6, 9, 8, 7, 1, 2, 3], pc set (0, 1, 2, 6, 7, 8), self-rotational interval pattern 11-11-6-1-1-3-
574. Rochberg, George: String Quartet, No.2 with soprano solo, [0, 11, 6, 5, 1, 2, 8, 7, 3, 4, 9, 10], pc set (0, 1, 2, 3, 6, 7)
575. Rochberg, George: Symphony, No.2, [0, 8, 1, 4, 9, 5, 6, 2, 3, 10, 11, 7], pc set (0, 1, 4, 5, 8, 9)
576. Sande, Henrik: 'Volkslied' für zwei Singstimmen und Klavier. 24. 12. 2015, [0, 2, 4, 5, 7, 9, 10, 8, 6, 3, 1, 11], pc set (0, 2, 4, 5, 7, 9)
577. Santoro, Claudio: Peças para Piano, [0, 11, 4, 5, 1, 9, 2, 3, 7, 8, 6, 10], pc set (0, 1, 4, 5, 6, 8)
578. Santoro, Claudio: Preludes 18-20, [0, 9, 1, 3, 2, 8, 10, 4, 6, 5, 7, 11], pc set (0, 1, 2, 3, 6, 7)
579. Santoro, Claudio: Six Piano Pieces, [0, 10, 4, 1, 11, 2, 5, 6, 3, 9, 7, 8], pc set (0, 1, 2, 3, 4, 6)
580. Santoro, Claudio: Sonata, No.1, [0, 10, 3, 8, 11, 1, 2, 9, 7, 4, 5, 6], pc set (0, 2, 3, 4, 5, 7)
581. Schnittke, Alfred: Concerto, No.2 for Violin and Chamber Orchestra, [0, 11, 1, 2, 10, 3, 4, 9, 5, 6, 8, 7], pc set (0, 1, 2, 3, 4, 5)
582. Schnittke, Alfred: Concerto Grosso, No.1, mvt 2, [0, 11, 2, 1, 8, 7, 10, 9, 6, 5, 4, 3], pc set (0, 1, 2, 3, 6, 7)
583. Schnittke, Alfred: Concerto Grosso, No.3, (mvt 3, 4), row 6, [0, 11, 2, 1, 9, 10, 7, 8, 4, 3, 6, 5], pc set (0, 1, 2, 3, 4, 5)
584. Schnittke, Alfred: Concerto Grosso, No.3, (mvt 3, 4), row 7, [0, 3, 11, 9, 10, 1, 4, 2, 7, 8, 5, 6], pc set (0, 1, 2, 3, 4, 6)
585. Schnittke, Alfred: Concerto Grosso, No.3, (mvt 3, 4), row 8, [0, 11, 7, 9, 10, 8, 6, 5, 3, 4, 1, 2], pc set (0, 1, 2, 3, 4, 5)
586. Schnittke, Alfred: Concerto Grosso, No.3, monogram 1, [0, 5, 1, 4, 10, 8, 11, 9, 3, 6, 2, 7], pc set (0, 1, 3, 5, 8, 9)
587. Schnittke, Alfred: Concerto Grosso, No.3, monogram 3, [0, 11, 2, 1, 3, 4, 10, 9, 7, 8, 5, 6], pc set (0, 1, 2, 3, 4, 5)
588. Schnittke, Alfred: Concerto Grosso, No.3, [0, 5, 1, 4, 10, 8, 11, 9, 3, 6, 2, 7], pc set (0, 1, 3, 5, 8, 9)

589. Schnittke, Alfred: Sonata, No.1 for Violin and Piano, mvt 1, [0, 3, 6, 10, 2, 11, 8, 5, 9, 1, 4, 7], pc set (0, 1, 2, 4, 5, 8)
590. Schnittke, Alfred: Sonata, No.1 for Violin and Piano, mvt 2, [0, 3, 7, 10, 2, 11, 6, 9, 1, 4, 8, 5], pc set (0, 1, 3, 4, 5, 8), self-rotational interval pattern 3-4-3-4-9-7-
591. Schnittke, Alfred: Sonata, No.2 for Cello and Piano, mvt 2, [0, 2, 3, 1, 4, 5, 11, 10, 7, 9, 8, 6], pc set (0, 1, 2, 3, 4, 5)
592. Schnittke, Alfred: String Quartet, No.1, [0, 2, 1, 10, 3, 11, 5, 9, 4, 7, 8, 6], pc set (0, 1, 2, 3, 4, 5)
593. Schnittke, Alfred: String Quartet, No.4, [0, 11, 10, 1, 3, 2, 4, 9, 8, 6, 5, 7], pc set (0, 1, 2, 3, 4, 5)
594. Schnittke, Alfred: String Quartet, No.4, mvt 2, m.40, [0, 5, 10, 3, 2, 7, 8, 1, 6, 11, 4, 9], pc set (0, 2, 4, 5, 7, 9)
595. Schnittke, Alfred: String Quartet, No.4, mvt 4, m.122, [0, 1, 11, 2, 10, 3, 4, 9, 8, 7, 6, 5], pc set (0, 1, 2, 3, 4, 5)
596. Schnittke, Alfred: String Quartet, No.4, mvt 4, m.31, [0, 11, 9, 10, 8, 7, 6, 5, 3, 4, 2, 1], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 11-10-1-10-11-11-
597. Schnittke, Alfred: Symphony, No.7, mvt 3, row X, [0, 1, 10, 11, 2, 3, 9, 4, 5, 8, 7, 6], pc set (0, 1, 2, 3, 4, 5)
598. Schnittke, Alfred: Symphony, No.7, mvt 3, row y, [0, 1, 11, 10, 8, 9, 7, 6, 5, 4, 3, 2], pc set (0, 1, 2, 3, 4, 5)
599. Schnittke, Alfred: Viola Concerto, [0, 11, 5, 2, 1, 6, 3, 8, 7, 4, 10, 9], pc set (0, 1, 2, 3, 6, 7)
600. Schnittke, Alfred: Violin Sonata 2, [0, 10, 11, 9, 6, 8, 7, 5, 4, 1, 2, 3], pc set (0, 1, 2, 3, 4, 6)
601. Schoenberg, Arnold: A Survivor From Warsaw, Op.46, [0, 1, 6, 2, 10, 9, 5, 4, 11, 3, 7, 8], pc set (0, 1, 2, 4, 5, 8)
602. Schoenberg, Arnold: A Survivor From Warsaw, Op.46 (alternative), [0, 1, 6, 2, 10, 9, 4, 7, 3, 8, 11, 5], pc set (0, 1, 2, 4, 5, 8)
603. Schoenberg, Arnold: Accompaniment to a Film Scene, Op.34, [0, 3, 11, 1, 10, 9, 6, 8, 7, 5, 2, 4], pc set (0, 1, 2, 3, 4, 6)
604. Schoenberg, Arnold: Fantasy for Piano Four Hands, II (fragment), [0, 3, 6, 1, 7, 8, 2, 5, 11, 4, 10, 9], pc set (0, 1, 2, 5, 7, 8)
605. Schoenberg, Arnold: Fantasy for Piano Four Hands, I, [0, 4, 2, 5, 3, 7, 11, 10, 1, 8, 9, 6], pc set (0, 2, 3, 4, 5, 7)
606. Schoenberg, Arnold: Fantasy for Violin and Piano, Op.47, [0, 11, 3, 1, 7, 9, 5, 6, 2, 4, 10, 8], pc set (0, 2, 3, 4, 6, 8)
607. Schoenberg, Arnold: Five Piano Pieces, Op.23, No.5, [0, 8, 10, 6, 7, 5, 9, 1, 3, 2, 11, 4], pc set (0, 1, 2, 3, 5, 7)
608. Schoenberg, Arnold: Four Pieces for Mixed Chorus, No.1, Op.27, No.1, [0, 11, 8, 2, 1, 7, 9, 10, 4, 3, 5, 6], pc set (0, 1, 2, 3, 6, 7)
609. Schoenberg, Arnold: Four Pieces for Mixed Chorus, No.2, Op.27, No.2, [0, 11, 4, 10, 2, 8, 3, 7, 6,

- 5, 9, 1], pc set (0, 2, 3, 4, 6, 8)
610. Schoenberg, Arnold: Four Pieces for Mixed Chorus, No.3, Op.27, No.3, [0, 11, 7, 9, 10, 8, 4, 5, 1, 3, 2, 6], pc set (0, 1, 2, 3, 4, 5)
611. Schoenberg, Arnold: Four Pieces for Mixed Chorus, No.4, Op.27, No.4, [0, 2, 9, 5, 7, 3, 10, 11, 1, 8, 4, 6], pc set (0, 2, 3, 5, 7, 9)
612. Schoenberg, Arnold: Modern Psalms, The First Psalm, Op.50c, [0, 11, 8, 4, 7, 3, 1, 5, 2, 6, 9, 10], pc set (0, 1, 4, 5, 8, 9)
613. Schoenberg, Arnold: Moses und Aron, [0, 1, 7, 5, 6, 4, 10, 8, 9, 11, 2, 3], pc set (0, 1, 2, 3, 6, 7)
614. Schoenberg, Arnold: Ode To Napoleon Buonaparte, Op.41 (view 1), [0, 11, 3, 4, 8, 7, 2, 1, 5, 6, 10, 9], pc set (0, 1, 4, 5, 8, 9), self-rotational interval pattern 11-4-1-4-11-7-
615. Schoenberg, Arnold: Ode To Napoleon Buonaparte, Op.41 (view 2), [0, 1, 9, 8, 4, 5, 7, 6, 10, 11, 3, 2], pc set (0, 1, 4, 5, 8, 9)
616. Schoenberg, Arnold: Piano Concerto, Op.42, [0, 7, 11, 2, 1, 9, 3, 5, 10, 6, 8, 4], pc set (0, 1, 2, 3, 5, 7)
617. Schoenberg, Arnold: Prelude To A Suite From "Genesis", Op.44, [0, 8, 4, 7, 6, 2, 1, 10, 3, 5, 11, 9], pc set (0, 1, 2, 4, 6, 8)
618. Schoenberg, Arnold: Psalm 130, De Profundis (unfinished), Op.50B, [0, 6, 5, 1, 11, 7, 4, 8, 9, 3, 2, 10], pc set (0, 1, 2, 6, 7, 8)
619. Schoenberg, Arnold: Serenade, mvt 4, "Sonett", Op.24, [0, 10, 11, 7, 8, 9, 4, 2, 5, 1, 3, 6], pc set (0, 1, 2, 3, 4, 5)
620. Schoenberg, Arnold: Serenade, mvt 5, "Tanzscene", Op.24, [0, 1, 3, 6, 7, 9, 8, 10, 11, 2, 4, 5], pc set (0, 1, 3, 6, 7, 9)
621. Schoenberg, Arnold: Six Pieces for Male Chorus, No.1, Op.35, [0, 9, 1, 3, 2, 11, 6, 8, 7, 4, 10, 5], pc set (0, 1, 2, 3, 4, 6)
622. Schoenberg, Arnold: Six Pieces for Male Chorus, No.2, Op.35, [0, 3, 1, 7, 6, 8, 11, 5, 4, 9, 10, 2], pc set (0, 1, 2, 5, 7, 8)
623. Schoenberg, Arnold: Six Pieces for Male Chorus, No.5, Op.35, [0, 6, 9, 1, 2, 10, 7, 3, 11, 5, 4, 8], pc set (0, 1, 2, 4, 5, 8)
624. Schoenberg, Arnold: Sonata For Organ, [0, 6, 10, 2, 8, 1, 7, 5, 9, 4, 11, 3], pc set (0, 1, 2, 4, 6, 8)
625. Schoenberg, Arnold: String Quartet, No.4, Op.37, [0, 11, 7, 8, 3, 1, 2, 10, 6, 5, 4, 9], pc set (0, 1, 4, 5, 6, 8)
626. Schoenberg, Arnold: String Trio, Op.45, [0, 8, 1, 7, 2, 11, 9, 6, 4, 5, 3, 10], pc set (0, 1, 2, 3, 6, 7)
627. Schoenberg, Arnold: Suite, Op.29, [0, 4, 3, 7, 11, 8, 9, 6, 5, 1, 2, 10], pc set (0, 1, 4, 5, 8, 9)
628. Schoenberg, Arnold: Suite for Piano, Op.25, [0, 1, 3, 9, 2, 11, 4, 10, 7, 8, 5, 6], pc set (0, 1, 2, 3, 4, 6)
629. Schoenberg, Arnold: Three Satires for Mixed Chorus, No.3, Op.28, No.3, [0, 1, 11, 3, 9, 5, 2, 4, 10, 6, 8, 7], pc set (0, 2, 3, 4, 6, 8)

630. Schoenberg, Arnold: Three Songs, No.2, “Tot”, Op.48, [0, 1, 7, 11, 8, 2, 6, 5, 10, 9, 3, 4], pc set (0, 1, 2, 3, 6, 7)
631. Schoenberg, Arnold: Three Songs, No.3, “Madchenlied”, Op.48, [0, 6, 8, 10, 2, 4, 9, 5, 3, 11, 7, 1], pc set (0, 2, 4, 6, 8, 10)
632. Schoenberg, Arnold: Three Times a Thousand Years, Op.50a, [0, 2, 11, 9, 10, 4, 3, 7, 5, 6, 8, 1], pc set (0, 1, 2, 3, 5, 7)
633. Schoenberg, Arnold: Two Piano Pieces, No.1, Op.33a, [0, 7, 2, 1, 11, 8, 3, 5, 9, 10, 4, 6], pc set (0, 1, 2, 3, 6, 7)
634. Schoenberg, Arnold: Two Piano Pieces, No.2, Op.33b, [0, 2, 6, 4, 10, 9, 7, 11, 8, 5, 1, 3], pc set (0, 1, 3, 5, 7, 9)
635. Schoenberg, Arnold: Variations for Orchestra, Op.31, [0, 6, 8, 5, 7, 11, 4, 3, 9, 10, 1, 2], pc set (0, 1, 2, 3, 6, 7)
636. Schoenberg, Arnold: Violin Concerto, Op.36, [0, 1, 6, 2, 7, 9, 3, 4, 10, 11, 5, 8], pc set (0, 1, 2, 5, 7, 8)
637. Schoenberg, Arnold: Violin Phantasy, Op.47, [0, 11, 3, 1, 7, 9, 6, 2, 10, 5, 8, 4], pc set (0, 2, 3, 4, 6, 8)
638. Schoenberg, Arnold: Von Heute Auf Morgen, Op.32, [0, 1, 7, 11, 9, 3, 6, 5, 2, 10, 8, 4], pc set (0, 2, 3, 4, 6, 8)
639. Schoenberg, Arnold: Wind Quintet, Op.26, [0, 4, 6, 8, 10, 9, 7, 11, 1, 3, 5, 2], pc set (0, 2, 3, 4, 6, 8)
640. Schuller, Gunther: Transformation, [0, 2, 4, 3, 8, 11, 9, 6, 5, 10, 7, 1], pc set (0, 1, 2, 4, 5, 8)
641. Schwantner, Joseph: ...and the mountains rising nowhere, [0, 11, 8, 7, 4, 3, 2, 1, 10, 9, 6, 5], pc set (0, 1, 4, 5, 8, 9), self-rotational interval pattern 11-9-11-9-11-11-
642. Schwantner, Joseph: Elixir (Consortium VIII), [0, 8, 4, 3, 7, 11, 10, 6, 9, 5, 1, 2], pc set (0, 1, 4, 5, 8, 9)
643. Schwantner, Joseph: Elixir (Consortium VIII), m.22, [0, 1, 4, 5, 8, 9, 6, 7, 10, 11, 2, 3], pc set (0, 1, 4, 5, 8, 9), self-rotational interval pattern 1-3-1-3-1-9-
644. Schwantner, Joseph: In Aeternum (Derived Row), [0, 3, 11, 2, 10, 1, 7, 4, 8, 5, 9, 6], pc set (0, 1, 2, 3, 4, 5)
645. Schwantner, Joseph: In Aeternum (Principal Row), [0, 4, 11, 6, 10, 5, 1, 9, 2, 7, 3, 8], pc set (0, 1, 2, 6, 7, 8)
646. Schwantner, Joseph: Modus Caelestis (A), [0, 6, 7, 1, 11, 5, 4, 10, 8, 2, 3, 9], pc set (0, 1, 2, 6, 7, 8)
647. Schwantner, Joseph: Modus Caelestis (m. 39), [0, 6, 11, 10, 5, 9, 4, 8, 3, 2, 7, 1], pc set (0, 1, 2, 3, 6, 7)
648. Schwantner, Joseph: Wild Angels of the Open Hills, 2, “Angels of the Shadowed Ancient Land,” m. 21, [0, 8, 9, 11, 3, 7, 6, 5, 2, 4, 10, 1], pc set (0, 1, 2, 4, 5, 8)
649. Searle, Humphrey: Toccata alla Passacaglia, Op.31, [0, 5, 6, 1, 10, 7, 9, 8, 3, 2, 4, 11], pc set (0, 1,

- 2, 5, 7, 8)
650. Seiber, Mátyás: Concert Piece for Violin and Piano, [0, 1, 7, 6, 11, 10, 4, 5, 9, 8, 2, 3], pc set (0, 1, 2, 3, 6, 7)
651. Seiber, Mátyás: Sonata for Violin and Piano, [0, 1, 11, 10, 7, 6, 8, 9, 4, 3, 5, 2], pc set (0, 1, 2, 3, 6, 7)
652. Seiber, Mátyás: String Quartet, No.2, [0, 2, 3, 1, 4, 11, 5, 10, 7, 9, 8, 6], pc set (0, 1, 2, 3, 4, 5)
653. Seiber, Mátyás: Ulysses, [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], pc set (0, 1, 4, 5, 8, 9)
654. Sengstschmid, Johann: Meditation für Orgel, Op.43a, [0, 6, 3, 1, 10, 8, 5, 2, 11, 9, 7, 4], pc set (0, 2, 3, 5, 7, 9)
655. Sessions, Roger: Piano Sonata, No.3, mvt 2, [0, 1, 5, 4, 8, 2, 11, 10, 6, 7, 3, 9], pc set (0, 1, 2, 4, 5, 8)
656. Sessions, Roger: When Lilacs Last in the Dooryard Bloom'd, [0, 2, 4, 10, 5, 8, 9, 1, 11, 7, 6, 3], pc set (0, 1, 3, 5, 7, 9)
657. Shapey, Ralph: String Quartet, No.9, [0, 8, 9, 3, 5, 1, 2, 6, 4, 10, 11, 7], pc set (0, 1, 3, 5, 8, 9)
658. Shostakovich, Dmitri: Symphony, No.14, mov. I, [0, 11, 9, 4, 3, 10, 8, 7, 5, 6, 1, 2], pc set (0, 1, 2, 3, 6, 7)
659. Slonimsky, Nicholas: No. 1214a Thirds (Twelve-Tone Patterns), [0, 4, 8, 11, 3, 7, 6, 10, 2, 5, 9, 1], pc set (0, 1, 4, 5, 8, 9), self-rotational interval pattern 4-4-3-4-4-11-
660. Slonimsky, Nicholas: No. 1215a Fourths (Twelve-Tone Patterns), [0, 5, 10, 3, 8, 1, 7, 2, 9, 4, 11, 6], pc set (0, 2, 4, 5, 7, 9)
661. Slonimsky, Nicholas: No. 1216a Foutths (Twelve-Tone Patterns), [0, 5, 10, 3, 7, 2, 9, 4, 8, 1, 6, 11], pc set (0, 2, 4, 5, 7, 9)
662. Slonimsky, Nicholas: No. 1217a Fourths (Twelve-Tone Patterns), [0, 5, 10, 3, 11, 6, 1, 8, 4, 9, 2, 7], pc set (0, 1, 2, 5, 7, 8)
663. Slonimsky, Nicholas: No. 1223a Sixths (Twelve-Tone Patterns), [0, 8, 4, 1, 5, 9, 6, 2, 10, 7, 11, 3], pc set (0, 1, 4, 5, 8, 9), self-rotational interval pattern 8-8-9-4-4-9-
664. Slonimsky, Nicholas: No. 1224a Sixths (Twelve-Tone Patterns), [0, 9, 6, 3, 7, 10, 1, 4, 8, 5, 2, 11], pc set (0, 1, 3, 4, 6, 9)
665. Slonimsky, Nicholas: No. 1225a Sixths (Twelve-Tone Patterns), [0, 8, 4, 7, 11, 3, 6, 2, 10, 1, 5, 9], pc set (0, 1, 4, 5, 8, 9), self-rotational interval pattern 8-8-3-4-4-3-
666. Slonimsky, Nicholas: No. 1226a Minor Sevenths (Twelve-Tone Patterns), [0, 10, 8, 2, 4, 6, 1, 11, 9, 3, 5, 7], pc set (0, 2, 4, 6, 8, 10), self-rotational interval pattern 10-10-6-2-2-7-
667. Slonimsky, Nicholas: No. 1227a Minor Sevenths (Twelve-Tone Patterns), [0, 10, 4, 2, 8, 6, 1, 11, 9, 7, 5, 3], pc set (0, 2, 4, 6, 8, 10)
668. Slonimsky, Nicholas: No. 1228a Minor Sevenths (Twelve-Tone Patterns), [0, 10, 2, 4, 8, 6, 11, 1, 5, 3, 7, 9], pc set (0, 2, 4, 6, 8, 10)
669. Slonimsky, Nicholas: No. 1229a Major Sevenths (Twelve-Tone Patterns), [0, 11, 10, 9, 8, 7, 1, 2, 3,

- 4, 5, 6], pc set (0, 1, 2, 3, 4, 5)
670. Slonimsky, Nicholas: No. 1230a Major Sevenths (Twelve-Tone Patterns), [0, 11, 3, 4, 8, 7, 1, 2, 6, 5, 9, 10], pc set (0, 1, 4, 5, 8, 9)
671. Slonimsky, Nicholas: No. 1231a Major Sevenths (Twelve-Tone Patterns), [0, 11, 4, 3, 8, 7, 1, 2, 9, 10, 5, 6], pc set (0, 1, 4, 5, 8, 9)
672. Slonimsky, Nicholas: No. 1232a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], pc set (0, 1, 2, 3, 4, 5)
673. Slonimsky, Nicholas: No. 1233a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], pc set (0, 1, 2, 3, 4, 5)
674. Slonimsky, Nicholas: No. 1234a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], pc set (0, 1, 2, 3, 4, 5)
675. Slonimsky, Nicholas: No. 1235a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], pc set (0, 1, 2, 3, 4, 5)
676. Slonimsky, Nicholas: No. 1236a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals), [0, 11, 9, 2, 4, 7, 5, 6, 8, 3, 1, 10], pc set (0, 2, 4, 5, 7, 9)
677. Slonimsky, Nicholas: No. 1237a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals), [0, 11, 9, 7, 2, 4, 6, 5, 3, 1, 8, 10], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 11-10-10-7-2-2-
678. Slonimsky, Nicholas: No. 1238a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals), [0, 9, 7, 5, 3, 2, 4, 6, 8, 1, 10, 11], pc set (0, 2, 3, 5, 7, 9)
679. Slonimsky, Nicholas: No. 1239a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals), [0, 11, 2, 9, 4, 7, 6, 5, 8, 3, 10, 1], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 11-3-7-7-3-11-
680. Slonimsky, Nicholas: No. 1240a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals), [0, 11, 9, 2, 4, 7, 5, 3, 6, 8, 1, 10], pc set (0, 2, 4, 5, 7, 9)
681. Slonimsky, Nicholas: No. 1241a Mutually Exclusive Diminished-Seventh Chords (Twelve-Tone Spirals), [0, 9, 6, 3, 11, 5, 2, 8, 7, 10, 1, 4], pc set (0, 1, 3, 6, 7, 9)
682. Slonimsky, Nicholas: No. 1242a Mutually Exclusive Diminished-Seventh Chords (Twelve-Tone Spirals), [0, 8, 4, 11, 3, 7, 1, 9, 5, 10, 2, 6], pc set (0, 1, 4, 5, 8, 9)
683. Slonimsky, Nicholas: No. 1244a Crossing Sixths (Crossing Intervals), [0, 3, 8, 7, 4, 11, 1, 2, 10, 5, 6, 9], pc set (0, 1, 4, 5, 8, 9)
684. Slonimsky, Nicholas: No. 1245a Crossing Fifths (Crossing Intervals), [0, 5, 7, 10, 2, 3, 9, 8, 4, 1, 11, 6], pc set (0, 2, 4, 5, 7, 9)
685. Slonimsky, Nicholas: No. 1246a Crossing Fourths (Crossing Intervals), [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6], pc set (0, 2, 4, 5, 7, 9)
686. Slonimsky, Nicholas: No. 1247a Crossing Thirds (Crossing Intervals), [0, 3, 4, 11, 7, 8, 10, 5, 2, 1, 6, 9], pc set (0, 1, 4, 5, 8, 9)

687. Slonimsky, Nicholas: No. 1248a Crossing Thirds (Crossing Intervals), [0, 5, 4, 1, 8, 9, 11, 6, 3, 2, 7, 10], pc set (0, 1, 4, 5, 8, 9)
688. Slonimsky, Nicholas: No. 1250a Crossing Seconds (Crossing Intervals), [0, 11, 2, 9, 4, 7, 6, 5, 8, 3, 10, 1], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 11-3-7-7-3-11-
689. Slonimsky, Nicholas: No. 1252a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 5, 9, 2, 6, 8, 11, 4], pc set (0, 2, 3, 5, 7, 9)
690. Slonimsky, Nicholas: No. 1252b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 5, 3, 10, 6, 2, 11, 7, 4, 1, 9], pc set (0, 2, 3, 5, 7, 9)
691. Slonimsky, Nicholas: No. 1254a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 5, 8, 11, 3, 6, 9, 1], pc set (0, 2, 3, 5, 7, 9)
692. Slonimsky, Nicholas: No. 1254b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 3, 1, 10, 6, 4, 11, 7, 5, 2, 9], pc set (0, 2, 3, 5, 7, 9)
693. Slonimsky, Nicholas: No. 1255a [Slonimsky: Moto Perpetuo] Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 6, 9, 2, 5, 8, 11, 3], pc set (0, 1, 3, 6, 7, 9)
694. Slonimsky, Nicholas: No. 1255b [Slonimsky: Moto Perpetuo] Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 3, 2, 9, 6, 5, 1, 10, 7, 4, 11], pc set (0, 1, 3, 6, 7, 9)
695. Slonimsky, Nicholas: No. 1256a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 5, 8, 11, 4, 6, 9, 1], pc set (0, 2, 4, 5, 7, 9)
696. Slonimsky, Nicholas: No. 1256b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 9, 4, 2, 11, 7, 5, 1, 8, 6, 3, 10], pc set (0, 2, 4, 5, 7, 9)
697. Slonimsky, Nicholas: No. 1257a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 3, 7, 10, 1, 6, 9, 2, 5], pc set (0, 1, 4, 5, 8, 9)
698. Slonimsky, Nicholas: No. 1257b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 3, 11, 7, 5, 2, 10, 6, 1, 9], pc set (0, 1, 4, 5, 8, 9)
699. Slonimsky, Nicholas: No. 1258a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 6, 9, 1, 5, 8, 11, 4], pc set (0, 1, 3, 5, 8, 9)
700. Slonimsky, Nicholas: No. 1258b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 5, 3, 11, 7, 2, 10, 6, 4, 1, 9], pc set (0, 1, 3, 5, 8, 9)
701. Slonimsky, Nicholas: No. 1259a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 2, 6, 9, 1, 5, 7, 10, 3], pc set (0, 1, 3, 5, 7, 9)
702. Slonimsky, Nicholas: No. 1259b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 2, 10, 7, 5, 1, 9, 6, 3, 11], pc set (0, 1, 3, 5, 7, 9)
703. Slonimsky, Nicholas: No. 1260a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 6, 9, 1, 5, 8, 11, 3], pc set (0, 1, 3, 5, 7, 9)
704. Slonimsky, Nicholas: No. 1260b Quadrtonal Arpeggios (Division of Twelve Tones into Four

- Mutually Exclusive Triads), [0, 8, 3, 2, 10, 6, 5, 1, 9, 7, 4, 11], pc set (0, 1, 3, 5, 7, 9)
705. Slonimsky, Nicholas: No. 1263a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 6, 9, 1, 4, 8, 11, 5], pc set (0, 1, 3, 5, 8, 9)
706. Slonimsky, Nicholas: No. 1263b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 5, 3, 11, 7, 6, 2, 9, 4, 1, 10], pc set (0, 1, 3, 5, 8, 9)
707. Slonimsky, Nicholas: No. 1265b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 9, 3, 1, 10, 6, 4, 11, 7, 5, 2, 8], pc set (0, 1, 3, 4, 6, 9)
708. Slonimsky, Nicholas: No. 1266b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 9, 3, 2, 11, 6, 5, 1, 8, 7, 4, 10], pc set (0, 1, 3, 4, 6, 9)
709. Slonimsky, Nicholas: No. 1267a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 4, 8, 11, 5, 6, 9, 2], pc set (0, 1, 3, 4, 6, 9)
710. Slonimsky, Nicholas: No. 1267b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 9, 4, 1, 10, 7, 5, 2, 8, 6, 3, 11], pc set (0, 1, 3, 4, 6, 9)
711. Slonimsky, Nicholas: No. 1270a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 10, 2, 6, 7, 11, 3, 5, 9, 1], pc set (0, 2, 4, 6, 8, 10), self-rotational interval pattern 4-4-2-4-4-1-
712. Slonimsky, Nicholas: No. 1270b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 2, 10, 6, 3, 11, 7, 5, 1, 9], pc set (0, 2, 4, 6, 8, 10), self-rotational interval pattern 8-8-10-8-8-9-
713. Slonimsky, Nicholas: No. 1273a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 5, 9, 6, 2, 11, 8, 4], pc set (0, 2, 3, 5, 7, 9)
714. Slonimsky, Nicholas: No. 1273b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 5, 1, 2, 6, 9, 8, 4, 11], pc set (0, 2, 3, 5, 7, 9)
715. Slonimsky, Nicholas: No. 1275a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 5, 9, 6, 1, 11, 8, 3], pc set (0, 2, 3, 5, 7, 9)
716. Slonimsky, Nicholas: No. 1275b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 5, 2, 1, 6, 9, 8, 3, 11], pc set (0, 2, 3, 5, 7, 9)
717. Slonimsky, Nicholas: No. 1276a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 6, 9, 5, 2, 11, 8, 3], pc set (0, 1, 3, 6, 7, 9)
718. Slonimsky, Nicholas: No. 1276b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 6, 1, 2, 5, 9, 8, 3, 11], pc set (0, 1, 3, 6, 7, 9)
719. Slonimsky, Nicholas: No. 1277a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 5, 8, 4, 11, 9, 6, 1], pc set (0, 2, 4, 5, 7, 9)
720. Slonimsky, Nicholas: No. 1277b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 5, 2, 4, 8, 11, 9, 6, 1], pc set (0, 2, 4, 5, 7, 9)
721. Slonimsky, Nicholas: No. 1278a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 3, 7, 10, 6, 1, 9, 5, 2], pc set (0, 1, 4, 5, 8, 9)

722. Slonimsky, Nicholas: No. 1278b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 7, 3, 6, 10, 1, 9, 5, 2], pc set (0, 1, 4, 5, 8, 9)
723. Slonimsky, Nicholas: No. 1279a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 6, 9, 5, 1, 11, 8, 4], pc set (0, 1, 3, 5, 8, 9)
724. Slonimsky, Nicholas: No. 1279b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 6, 2, 1, 5, 9, 8, 4, 11], pc set (0, 1, 3, 5, 8, 9)
725. Slonimsky, Nicholas: No. 1280a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 2, 6, 9, 5, 1, 10, 7, 3], pc set (0, 1, 3, 5, 7, 9)
726. Slonimsky, Nicholas: No. 1280b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 6, 2, 5, 9, 1, 10, 7, 3], pc set (0, 1, 3, 5, 7, 9)
727. Slonimsky, Nicholas: No. 1281a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 6, 9, 5, 1, 11, 8, 3], pc set (0, 1, 3, 5, 7, 9)
728. Slonimsky, Nicholas: No. 1281b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 6, 2, 1, 5, 9, 8, 3, 11], pc set (0, 1, 3, 5, 7, 9)
729. Slonimsky, Nicholas: No. 1284a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 6, 9, 4, 1, 11, 8, 5], pc set (0, 1, 3, 5, 8, 9)
730. Slonimsky, Nicholas: No. 1284b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 6, 2, 1, 4, 9, 8, 5, 11], pc set (0, 1, 3, 5, 8, 9)
731. Slonimsky, Nicholas: No. 1286a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 4, 7, 2, 10, 8, 5, 11], pc set (0, 1, 3, 4, 6, 9)
732. Slonimsky, Nicholas: No. 1286b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 4, 1, 10, 2, 7, 8, 5, 11], pc set (0, 1, 3, 4, 6, 9)
733. Slonimsky, Nicholas: No. 1287a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 2, 5, 8, 4, 11, 10, 7, 1], pc set (0, 1, 3, 4, 6, 9)
734. Slonimsky, Nicholas: No. 1287b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 5, 2, 11, 4, 8, 7, 1, 10], pc set (0, 1, 3, 4, 6, 9)
735. Slonimsky, Nicholas: No. 1288a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 4, 8, 5, 11, 9, 6, 2], pc set (0, 1, 3, 4, 6, 9)
736. Slonimsky, Nicholas: No. 1288b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 4, 1, 11, 5, 8, 6, 2, 9], pc set (0, 1, 3, 4, 6, 9)
737. Slonimsky, Nicholas: No. 1290a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 9, 1, 5, 6, 2, 10, 7, 3, 11], pc set (0, 1, 4, 5, 8, 9)
738. Slonimsky, Nicholas: No. 1290b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 9, 5, 1, 10, 2, 6, 7, 3, 11], pc set (0, 1, 4, 5, 8, 9), self-rotational interval pattern 4-4-1-8-8-9-
739. Slonimsky, Nicholas: No. 1291a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 10, 2, 6, 7, 3, 11, 9, 5, 1], pc set (0, 2, 4, 6, 8, 10)

740. Slonimsky, Nicholas: No. 1291b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 10, 6, 2, 11, 3, 7, 9, 5, 1], pc set (0, 2, 4, 6, 8, 10), self-rotational interval pattern 4-4-2-8-8-9-
741. Slonimsky, Nicholas: No. 1292a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 3, 7, 10, 6, 2, 1, 9, 5], pc set (0, 1, 4, 5, 8, 9)
742. Slonimsky, Nicholas: No. 1292b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 7, 3, 2, 6, 10, 9, 5, 1], pc set (0, 1, 4, 5, 8, 9)
743. Slonimsky, Nicholas: No. 1293a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 2-2-1-2-2-9-
744. Slonimsky, Nicholas: No. 1293b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 3, 1, 11, 10, 8, 6, 9, 7, 5, 4, 2], pc set (0, 2, 3, 4, 5, 7), self-rotational interval pattern 3-10-10-11-10-10-
745. Slonimsky, Nicholas: No. 1294a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 9, 4, 7, 5, 2, 6, 3, 10, 1, 11, 8], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 9-7-3-10-9-4-
746. Slonimsky, Nicholas: No. 1294b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 8, 11, 1, 10, 3, 6, 2, 5, 7, 4, 9], pc set (0, 2, 3, 4, 5, 7), self-rotational interval pattern 8-3-2-9-5-3-
747. Slonimsky, Nicholas: No. 1295a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 2, 5, 4, 3, 1, 6, 8, 11, 10, 9, 7], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 2-3-11-11-10-5-
748. Slonimsky, Nicholas: No. 1295b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 7, 9, 10, 11, 8, 6, 1, 3, 4, 5, 2], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 7-2-1-1-9-10-
749. Slonimsky, Nicholas: No. 1296a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 7, 8, 3, 4, 11, 6, 1, 2, 9, 10, 5], pc set (0, 1, 4, 5, 8, 9), self-rotational interval pattern 7-1-7-1-7-7-
750. Slonimsky, Nicholas: No. 1296b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 5, 10, 9, 2, 1, 6, 11, 4, 3, 8, 7], pc set (0, 1, 3, 4, 5, 8), self-rotational interval pattern 5-5-11-5-11-5-
751. Slonimsky, Nicholas: No. 1297a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 11, 9, 7, 2, 4, 6, 5, 3, 1, 8, 10], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 11-10-10-7-2-2-
752. Slonimsky, Nicholas: No. 1297b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 10, 8, 1, 3, 5, 6, 4, 2, 7, 9, 11], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern 10-10-5-2-2-1-

753. Slonimsky, Nicholas: No. 1298a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns),
[0, 11, 1, 10, 2, 9, 6, 5, 7, 4, 8, 3], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern
11-2-9-4-7-9-
754. Slonimsky, Nicholas: No. 1298b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns),
[0, 3, 8, 4, 7, 5, 6, 9, 2, 10, 1, 11], pc set (0, 1, 3, 4, 5, 8), self-rotational interval pattern
3-5-8-3-10-1-
755. Slonimsky, Nicholas: No. 1299a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns),
[0, 9, 2, 7, 4, 5, 6, 3, 8, 1, 10, 11], pc set (0, 2, 4, 5, 7, 9), self-rotational interval pattern
9-5-5-9-1-1-
756. Slonimsky, Nicholas: No. 1299b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns),
[0, 11, 10, 1, 8, 3, 6, 5, 4, 7, 2, 9], pc set (0, 2, 3, 4, 5, 7), self-rotational interval pattern
11-11-3-7-7-3-
757. Slonimsky, Nicholas: No. 1300a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns),
[0, 11, 1, 10, 2, 9, 6, 5, 7, 4, 8, 3], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern
11-2-9-4-7-9-
758. Slonimsky, Nicholas: No. 1300b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns),
[0, 3, 8, 4, 7, 5, 6, 9, 2, 10, 1, 11], pc set (0, 1, 3, 4, 5, 8), self-rotational interval pattern
3-5-8-3-10-1-
759. Slonimsky, Nicholas: No. 1301 Invertible Dodecaphonic Progressions – With all Different Intervals,
[0, 1, 4, 8, 3, 5, 11, 9, 2, 10, 7, 6], pc set (0, 1, 3, 4, 5, 8)
760. Slonimsky, Nicholas: No. 1302 Invertible Dodecaphonic Progressions – With all Different Intervals,
[0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6], pc set (0, 1, 3, 4, 5, 8)
761. Slonimsky, Nicholas: No. 1303 Invertible Dodecaphonic Progressions – With all Different Intervals,
[0, 2, 3, 7, 10, 5, 11, 4, 1, 9, 8, 6], pc set (0, 2, 4, 5, 7, 9)
762. Slonimsky, Nicholas: No. 1304 Invertible Dodecaphonic Progressions – With all Different Intervals.
(On a Minor Triad), [0, 3, 7, 8, 10, 5, 11, 4, 2, 1, 9, 6], pc set (0, 2, 4, 5, 7, 9)
763. Slonimsky, Nicholas: No. 1305 Invertible Dodecaphonic Progressions – With all Different Intervals.
(On a Major Sixth-Chord), [0, 3, 8, 10, 11, 7, 1, 5, 4, 2, 9, 6], pc set (0, 1, 3, 4, 5, 8)
764. Slonimsky, Nicholas: No. 1306 Invertible Dodecaphonic Progressions – With all Different Intervals.
(On a Major Triad), [0, 4, 7, 8, 3, 5, 11, 9, 2, 1, 10, 6], pc set (0, 1, 3, 4, 5, 8)
765. Slonimsky, Nicholas: No. 1307 Invertible Dodecaphonic Progressions – With all Different Intervals.
(On a Minor Sixth-Chord), [0, 4, 9, 8, 11, 1, 7, 5, 2, 3, 10, 6], pc set (0, 1, 3, 4, 5, 8)
766. Slonimsky, Nicholas: No. 1308 Invertible Dodecaphonic Progressions – With all Different Intervals.
(On a Minor Six-Four Chord), [0, 5, 8, 10, 9, 1, 7, 3, 4, 2, 11, 6], pc set (0, 1, 3, 4, 5, 8)
767. Slonimsky, Nicholas: No. 1309 Invertible Dodecaphonic Progressions – With all Different Intervals.
(On a Major Six-Four Chord), [0, 5, 9, 8, 10, 1, 7, 4, 2, 3, 11, 6], pc set (0, 1, 3, 4, 5, 8)
768. Slonimsky, Nicholas: No. 1310 Invertible Dodecaphonic Progressions – With all Different Intervals,

- [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6], pc set (0, 1, 2, 3, 4, 5)
769. Slonimsky, Nicholas: No. 1311 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 9, 10, 2, 5, 11, 8, 4, 3, 1, 6], pc set (0, 2, 4, 5, 7, 9)
770. Slonimsky, Nicholas: No. 1312 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 10, 2, 3, 5, 11, 9, 8, 4, 1, 6], pc set (0, 2, 4, 5, 7, 9)
771. Slonimsky, Nicholas: No. 1313 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 11, 2, 4, 3, 9, 10, 8, 5, 1, 6], pc set (0, 1, 3, 4, 5, 8)
772. Slonimsky, Nicholas: No. 1314 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 2, 7, 4, 5, 9, 3, 11, 10, 1, 8, 6], pc set (0, 2, 4, 5, 7, 9)
773. Slonimsky, Nicholas: No. 1315 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 4, 5, 2, 7, 9, 3, 1, 8, 11, 10, 6], pc set (0, 2, 4, 5, 7, 9)
774. Slonimsky, Nicholas: No. 1316 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 7, 4, 5, 9, 2, 8, 3, 11, 10, 1, 6], pc set (0, 2, 4, 5, 7, 9)
775. Slonimsky, Nicholas: No. 1317 Invertible Dodecaphonic Progressions – With all Different Intervals. (Mother Chord), [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], pc set (0, 2, 4, 5, 7, 9)
776. Slonimsky, Nicholas: No. 1318 Invertible Dodecaphonic Progressions – With all Different Intervals. (Grandmother Chord), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], pc set (0, 1, 2, 3, 4, 5)
777. Slonimsky, Nicholas: No. 639 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 5, 4, 3, 6, 7, 8, 11, 10, 9], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 1-1-3-11-11-3-
778. Slonimsky, Nicholas: No. 640 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 11, 10, 7, 8, 9, 6, 5, 4, 1, 2, 3], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 11-11-9-1-1-9-
779. Slonimsky, Nicholas: No. 641 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 7, 6, 5, 4, 8, 9, 10, 11], pc set (0, 1, 2, 3, 6, 7)
780. Slonimsky, Nicholas: No. 642 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 4, 5, 11, 10, 9, 8, 7, 6], pc set (0, 1, 2, 3, 4, 5)
781. Slonimsky, Nicholas: No. 643 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 6, 7, 8, 9, 10, 11, 5, 4, 3, 2, 1], pc set (0, 1, 2, 3, 4, 6)
782. Slonimsky, Nicholas: No. 644 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 6, 7, 8, 9, 10, 11, 5, 4, 3, 2, 1], pc set (0, 1, 2, 3, 4, 6)
783. Slonimsky, Nicholas: No. 915 Miscellaneous Patterns (Diatessaron Progression; Equal Division of Five Octaves into Twelve Parts), [0, 10, 2, 8, 4, 6, 5, 3, 7, 1, 9, 11], pc set (0, 2, 4, 6, 8, 10), self-rotational interval pattern 10-4-6-8-2-11-
784. Smith, Hale: Contours for Orchestra, [0, 5, 6, 4, 10, 11, 7, 2, 1, 3, 9, 8], pc set (0, 1, 2, 6, 7, 8)
785. Spinner, Leopold: Chamber Symphony, Op.28, [0, 11, 10, 6, 4, 5, 2, 1, 3, 7, 8, 9], pc set (0, 1, 2, 6, 7, 8)

786. Spinner, Leopold: Concert for Piano and Orchestra, Op.4, [0, 2, 1, 9, 11, 3, 4, 7, 5, 6, 10, 8], pc set (0, 1, 2, 3, 4, 6)
787. Spinner, Leopold: Fantasy for Piano, Op.9, [0, 1, 4, 5, 2, 3, 8, 9, 6, 7, 10, 11], pc set (0, 1, 2, 3, 4, 5)
788. Spinner, Leopold: Fünf Lieder, Op.8, [0, 3, 4, 7, 8, 5, 11, 9, 10, 2, 6, 1], pc set (0, 1, 3, 4, 5, 8)
789. Spinner, Leopold: Ich lieb' eine Blume for Four-part mixed Choir, [0, 11, 2, 4, 9, 7, 1, 3, 10, 8, 5, 6], pc set (0, 2, 4, 5, 7, 9)
790. Spinner, Leopold: Ouverture for Orchestra, Op.5, [0, 11, 2, 10, 8, 1, 7, 5, 6, 9, 3, 4], pc set (0, 1, 2, 3, 4, 6)
791. Spinner, Leopold: Quintet, Op.14, [0, 6, 4, 2, 8, 5, 1, 9, 10, 11, 7, 3], pc set (0, 2, 3, 4, 6, 8)
792. Spinner, Leopold: Ricercata, Op.21, [0, 11, 8, 10, 2, 1, 4, 3, 7, 9, 6, 5], pc set (0, 1, 2, 3, 4, 6)
793. Spinner, Leopold: Sonata for Clarinet and Piano, Op.17, [0, 3, 4, 1, 2, 5, 11, 8, 7, 10, 9, 6], pc set (0, 1, 2, 3, 4, 5)
794. Spinner, Leopold: Sonata for Piano, Op.3, [0, 9, 8, 6, 7, 10, 1, 4, 5, 3, 2, 11], pc set (0, 1, 2, 3, 4, 6)
795. Spinner, Leopold: Sonata for Violin and Piano, Op.1, [0, 7, 6, 1, 3, 8, 5, 10, 2, 9, 4, 11], pc set (0, 1, 2, 5, 7, 8)
796. Spinner, Leopold: Sonatina for Cello and Piano, Op.26, [0, 1, 11, 2, 4, 3, 9, 10, 8, 5, 7, 6], pc set (0, 1, 2, 3, 4, 5)
797. Spinner, Leopold: Sonatina for Wind Instruments, Op.23, [0, 9, 1, 5, 4, 2, 8, 10, 11, 7, 3, 6], pc set (0, 1, 3, 4, 5, 8)
798. Spinner, Leopold: String Quartet, No.2, Op.7, [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], pc set (0, 1, 4, 5, 8, 9)
799. Spinner, Leopold: String Quartet, Op.2, [0, 1, 7, 6, 11, 10, 4, 5, 8, 9, 3, 2], pc set (0, 1, 2, 3, 6, 7)
800. Spinner, Leopold: Trio for Clarinet, Cello and Piano, [0, 1, 7, 6, 5, 11, 10, 3, 4, 2, 9, 8], pc set (0, 1, 2, 6, 7, 8)
801. Spinner, Leopold: Trio for Violin, Cello, and Piano, Op.6, [0, 1, 7, 4, 10, 9, 6, 5, 11, 8, 2, 3], pc set (0, 1, 3, 4, 6, 9)
802. Spinner, Leopold: Variations for Violin and Piano, Op.19, [0, 8, 9, 1, 2, 4, 3, 5, 6, 10, 11, 7], pc set (0, 1, 4, 5, 6, 8)
803. Spinner, Leopold: Zwei Lieder, Op.24, [0, 11, 1, 4, 3, 7, 5, 6, 9, 8, 10, 2], pc set (0, 1, 2, 4, 5, 8)
804. Steinbauer, Othmar: Violinsonate, No.1, Op.15, [0, 5, 2, 10, 7, 3, 11, 8, 4, 1, 6, 9], pc set (0, 2, 4, 5, 7, 9)
805. Stockhausen, Karlheinz: Choral, [0, 1, 10, 6, 8, 3, 5, 2, 4, 11, 9, 7], pc set (0, 2, 3, 5, 7, 9)
806. Stockhausen, Karlheinz: Gruppen, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6], pc set (0, 1, 2, 3, 4, 5)
807. Stockhausen, Karlheinz: Klavierstück IV row 3, [0, 7, 1, 10, 11, 9, 5, 8, 4, 3, 2, 6], pc set (0, 1, 2, 3, 4, 6)
808. Stockhausen, Karlheinz: Klavierstück IX, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6], pc set (0, 1, 2, 3, 4, 5)

809. Stockhausen, Karlheinz: Klavierstück VII, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6], pc set (0, 1, 2, 3, 4, 5)
810. Stockhausen, Karlheinz: Klavierstück X, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6], pc set (0, 1, 2, 3, 4, 5)
811. Stockhausen, Karlheinz: Kreuzspiel, [0, 10, 9, 11, 7, 2, 8, 1, 4, 6, 5, 3], pc set (0, 2, 3, 4, 5, 7)
812. Stockhausen, Karlheinz: Licht, Eve formula, [0, 4, 3, 2, 5, 6, 10, 11, 9, 1, 7, 8], pc set (0, 1, 2, 3, 4, 6)
813. Stockhausen, Karlheinz: Plus-Minus, [0, 1, 7, 9, 8, 6, 3, 10, 2, 5, 11, 4], pc set (0, 1, 2, 3, 6, 7)
814. Stockhausen, Karlheinz: Tierkreis, Aries, [0, 3, 2, 9, 7, 8, 11, 6, 1, 5, 4, 10], pc set (0, 1, 2, 5, 7, 8)
815. Stockhausen, Karlheinz: Tierkreis, Cancer, [0, 7, 11, 10, 9, 8, 3, 6, 4, 1, 5, 2], pc set (0, 1, 2, 3, 4, 5)
816. Stockhausen, Karlheinz: Tierkreis, Sagittarius, [0, 6, 5, 2, 3, 4, 7, 8, 9, 10, 11, 1], pc set (0, 1, 2, 3, 4, 6)
817. Stockhausen, Karlheinz: Tierkreis, Scorpio, [0, 4, 3, 11, 7, 8, 10, 9, 2, 5, 1, 6], pc set (0, 1, 4, 5, 8, 9)
818. Stravinsky, Igor: A Sermon, a Narrative and a Prayer, [0, 1, 9, 11, 10, 7, 8, 3, 4, 6, 5, 2], pc set (0, 1, 2, 3, 4, 6)
819. Stravinsky, Igor: Agon, “Pas de deux”, “Four trios”, [0, 1, 4, 3, 2, 5, 6, 9, 8, 11, 10, 7], pc set (0, 1, 2, 3, 4, 5)
820. Stravinsky, Igor: Canticum Sacrum, II, [0, 11, 9, 6, 10, 8, 7, 5, 2, 4, 3, 1], pc set (0, 1, 2, 3, 4, 6)
821. Stravinsky, Igor: Canticum Sacrum, II & IV, [0, 11, 1, 3, 4, 2, 7, 6, 9, 5, 8, 10], pc set (0, 1, 2, 3, 4, 5)
822. Stravinsky, Igor: Elegy for J.F.K., [0, 6, 4, 2, 8, 9, 3, 1, 11, 10, 7, 5], pc set (0, 1, 3, 5, 7, 9)
823. Stravinsky, Igor: Fanfare for a New Theater, [0, 11, 1, 3, 4, 2, 5, 7, 6, 8, 10, 9], pc set (0, 1, 2, 3, 4, 5)
824. Stravinsky, Igor: Introitus “T. S. Eliot in Memoriam”, [0, 5, 6, 4, 8, 9, 3, 2, 1, 10, 11, 7], pc set (0, 1, 2, 4, 5, 8)
825. Stravinsky, Igor: Movements, [0, 1, 7, 5, 6, 11, 9, 8, 10, 3, 4, 2], pc set (0, 1, 2, 6, 7, 8)
826. Stravinsky, Igor: Requiem Canticles, 1st series, [0, 2, 10, 11, 1, 8, 6, 7, 9, 4, 3, 5], pc set (0, 1, 2, 3, 4, 6)
827. Stravinsky, Igor: Variations “Aldous Huxley in Memoriam”, [0, 10, 7, 9, 2, 8, 6, 11, 1, 5, 4, 3], pc set (0, 1, 2, 3, 5, 7)
828. Talma, Louise: Passacaglia and Fugue, [0, 4, 2, 9, 11, 7, 8, 3, 1, 6, 5, 10], pc set (0, 2, 4, 5, 7, 9)
829. Talma, Louise: Piano Sonata 2, mvt 4, first row, [0, 4, 8, 2, 5, 10, 1, 11, 6, 9, 7, 3], pc set (0, 1, 3, 5, 7, 9)
830. Talma, Louise: Six Etudes, Etude 1, [0, 3, 6, 8, 10, 2, 5, 7, 9, 1, 11, 4], pc set (0, 1, 3, 5, 7, 9)
831. Talma, Louise: Six Etudes, Etude 4, [0, 1, 5, 9, 4, 8, 7, 6, 11, 2, 10, 3], pc set (0, 1, 4, 5, 8, 9)
832. Talma, Louise: Six Etudes, Etude 5, [0, 4, 6, 11, 8, 3, 9, 1, 5, 7, 2, 10], pc set (0, 1, 3, 5, 8, 9)
833. Talma, Louise: Six Etudes, Etude 6, [0, 8, 6, 9, 4, 5, 2, 1, 3, 10, 7, 11], pc set (0, 1, 2, 4, 5, 8)
834. Talma, Louise: Three Bagatelles, Bagatelle 3, [0, 3, 4, 1, 5, 8, 10, 7, 2, 11, 6, 9], pc set (0, 1, 3, 4, 5,

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835. Toufektsis, Orestis: MIKRO-ALLAXI (EpiEnteka II), für 15 Musiker, [0, 8, 3, 7, 2, 4, 10, 11, 1, 6, 9, 5], pc set (0, 1, 4, 5, 6, 8)
836. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 1A, [0, 10, 9, 1, 4, 8, 7, 2, 5, 11, 3, 6], pc set (0, 1, 2, 4, 5, 8)
837. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 3, [0, 10, 8, 4, 3, 6, 5, 11, 9, 1, 2, 7], pc set (0, 1, 3, 5, 7, 9)
838. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 5, [0, 4, 3, 10, 6, 9, 1, 5, 2, 8, 11, 7], pc set (0, 1, 3, 6, 7, 9)
839. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 7, [0, 2, 11, 8, 5, 3, 10, 9, 1, 7, 6, 4], pc set (0, 1, 3, 4, 6, 9)
840. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 8, [0, 4, 3, 11, 6, 8, 2, 9, 10, 7, 1, 5], pc set (0, 1, 3, 5, 8, 9)
841. Tranchell, Peter: Septet : [for] 2 violins, oboe, clarinet, horn, bassoon, cello : fifth dodecaфония, [0, 2, 1, 10, 3, 4, 11, 6, 5, 9, 8, 7], pc set (0, 1, 2, 3, 4, 6)
842. Tranchell, Peter: Twice a Kiss sketch 1, [0, 9, 1, 2, 4, 8, 5, 7, 10, 6, 3, 11], pc set (0, 1, 4, 5, 6, 8)
843. Tranchell, Peter: Twice a Kiss sketch 2, [0, 9, 1, 2, 4, 8, 3, 11, 5, 6, 7, 10], pc set (0, 1, 4, 5, 6, 8)
844. Tranchell, Peter: Twice a Kiss sketch 3, [0, 1, 2, 4, 8, 9, 7, 5, 3, 6, 10, 11], pc set (0, 1, 4, 5, 6, 8)
845. Urbanner, Erich: Adagio, [0, 3, 1, 11, 10, 9, 8, 7, 6, 4, 2, 5], pc set (0, 1, 2, 3, 4, 6)
846. Volkonsky, Andrei: Musica Stricta, mvt 2, row A, [0, 6, 8, 9, 11, 10, 1, 7, 2, 3, 5, 4], pc set (0, 1, 2, 3, 4, 6)
847. Volkonsky, Andrei: Musica Stricta, mvt 2, row D, [0, 4, 9, 2, 8, 10, 11, 1, 3, 7, 5, 6], pc set (0, 1, 2, 4, 6, 8)
848. Volkonsky, Andrei: Musica Stricta, mvt 4, row G, [0, 6, 5, 4, 3, 2, 1, 11, 9, 10, 8, 7], pc set (0, 1, 2, 3, 4, 6)
849. Volkonsky, Andrei: Musica Stricta, mvt 4, row H, [0, 6, 4, 9, 8, 2, 7, 1, 11, 5, 10, 3], pc set (0, 1, 3, 5, 7, 9)
850. Wang, Jian-Zhong: Five Pieces for Piano no. 1, "Pastorale" (variant), [0, 3, 5, 7, 4, 2, 11, 9, 6, 8, 10, 1], pc set (0, 2, 3, 4, 5, 7)
851. Wang, Xi-Lin: A Dilapidated Tombstone, [0, 4, 6, 3, 2, 10, 11, 5, 8, 9, 7, 1], pc set (0, 2, 3, 4, 6, 8)
852. Weber, Ben: Fantasia (Variations), Op.25, [0, 1, 5, 9, 10, 2, 6, 11, 7, 4, 3, 8], pc set (0, 1, 3, 4, 5, 8)
853. Weber, Ben: Five Bagatelles for Piano, Op.2, mvt ii, [0, 1, 2, 9, 6, 7, 4, 8, 5, 11, 10, 3], pc set (0, 1, 2, 5, 7, 8)
854. Weber, Ben: Humoreske, Op.49, [0, 2, 4, 5, 7, 10, 1, 11, 9, 8, 6, 3], pc set (0, 2, 3, 5, 7, 9)
855. Webern, Anton: Op.32 (un-finished), initial sketch, [0, 1, 9, 11, 3, 2, 7, 6, 10, 8, 4, 5], pc set (0, 1, 2, 3, 4, 6)
856. Webern, Anton: Op.32 (un-finished), later sketch, [0, 1, 2, 11, 10, 9, 5, 4, 3, 6, 7, 8], pc set (0, 1, 2,

- 3, 4, 5)
857. Webern, Anton: 3 Lieder, “Erlösung”, Op.18, No.2, [0, 3, 11, 2, 10, 1, 9, 5, 8, 4, 7, 6], pc set (0, 1, 2, 3, 4, 5)
858. Webern, Anton: 3 Volkstexte, “Heiland, Unsere Missetaten...”, Op.17, No.3, [0, 9, 8, 7, 11, 10, 4, 5, 6, 3, 2, 1], pc set (0, 1, 2, 3, 4, 5)
859. Webern, Anton: 3 Volkstexte, “Liebste Jungfrau”, Op.17, No.2, [0, 11, 10, 6, 7, 1, 2, 5, 4, 3, 8, 9], pc set (0, 1, 2, 3, 6, 7)
860. Webern, Anton: Cantata I, Op.29, [0, 8, 11, 10, 2, 1, 4, 3, 7, 6, 9, 5], pc set (0, 1, 2, 3, 4, 6)
861. Webern, Anton: Concerto for Nine Instruments (Konzert), Op.24, [0, 11, 3, 4, 8, 7, 9, 5, 6, 1, 2, 10], pc set (0, 1, 4, 5, 8, 9)
862. Webern, Anton: Klavierstück, [0, 1, 2, 11, 10, 4, 5, 6, 9, 8, 7, 3], pc set (0, 1, 2, 3, 4, 6)
863. Webern, Anton: Quartet for Violin, Clarinet, Tenor Sax, And Piano, Op.22, [0, 9, 8, 11, 10, 2, 3, 4, 5, 7, 1, 6], pc set (0, 1, 2, 3, 4, 6)
864. Webern, Anton: String Quartet, Op.28, [0, 11, 2, 1, 5, 6, 3, 4, 8, 7, 10, 9], pc set (0, 1, 2, 3, 6, 7)
865. Webern, Anton: String Trio, Op.20, [0, 11, 6, 5, 10, 9, 1, 2, 7, 8, 4, 3], pc set (0, 1, 2, 3, 6, 7)
866. Webern, Anton: Symphony, Op.21, [0, 3, 2, 1, 5, 4, 10, 11, 7, 8, 9, 6], pc set (0, 1, 2, 3, 4, 5)
867. Webern, Anton: Three Songs on Texts by Hildegard Jone, Op.25, [0, 9, 8, 11, 6, 10, 7, 4, 3, 5, 2, 1], pc set (0, 1, 2, 3, 4, 6)
868. Webern, Anton: Variations for Orchestra, Op.30, [0, 1, 4, 3, 2, 5, 6, 9, 8, 7, 10, 11], pc set (0, 1, 2, 3, 4, 5)
869. Webern, Anton: Variations for Piano, Op.27, [0, 8, 7, 11, 10, 9, 3, 1, 4, 2, 6, 5], pc set (0, 1, 2, 3, 4, 5)
870. Westergaard, Peter: Mr. and Mrs. Discobbolos, [0, 2, 1, 4, 3, 5, 8, 6, 10, 7, 11, 9], pc set (0, 1, 2, 3, 4, 5)
871. Wilson, Olly: Piece for Four’, [0, 8, 9, 4, 2, 6, 7, 11, 10, 3, 5, 1], pc set (0, 1, 3, 5, 7, 9)
872. Wolpe, Stefan: Four Studies on Basic Rows, No.1 – Study on Tritones, [0, 6, 7, 1, 2, 8, 11, 5, 10, 4, 9, 3], pc set (0, 1, 2, 6, 7, 8)
873. Wolpe, Stefan: Four Studies on Basic Rows, No.2 – Study on Thirds, [0, 11, 9, 8, 10, 7, 6, 5, 3, 2, 4, 1], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 11-10-11-2-9-11-
874. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 2, [0, 2, 4, 6, 8, 10, 11, 1, 3, 5, 7, 9], pc set (0, 2, 4, 6, 8, 10), self-rotational interval pattern 2-2-2-2-2-1-
875. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 3, [0, 3, 1, 4, 2, 5, 6, 9, 7, 10, 8, 11], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 3-10-3-10-3-1-
876. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 4, [0, 4, 8, 2, 6, 10, 3, 7, 11, 5, 9, 1], pc set (0, 2, 4, 6, 8, 10), self-rotational interval pattern 4-4-6-4-4-5-
877. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 9, [0, 9, 1, 10, 2, 11, 6, 3, 7, 4, 8, 5], pc set (0, 1, 2, 3, 4, 5), self-rotational interval pattern 9-4-9-4-9-7-

878. Wuorinen, Charles: Flute Variations II, [0, 1, 3, 2, 5, 4, 9, 10, 6, 8, 7, 11], pc set (0, 1, 2, 3, 4, 5)
879. Wuorinen, Charles: Piano Concerto, No.3, [0, 5, 2, 1, 11, 3, 10, 9, 4, 6, 8, 7], pc set (0, 1, 2, 3, 4, 6)
880. Wuorinen, Charles: Reliquary for Igor Stravinsky, [0, 11, 7, 5, 6, 8, 2, 4, 9, 3, 1, 10], pc set (0, 1, 2, 3, 6, 7)
881. Wuorinen, Charles: Second Sonata, Source set, [0, 2, 10, 3, 5, 7, 6, 4, 1, 11, 9, 8], pc set (0, 2, 4, 5, 7, 9)
882. Wuorinen, Charles: Second Sonata, Voice 2, [0, 2, 10, 9, 11, 1, 6, 4, 7, 5, 3, 8], pc set (0, 1, 2, 3, 4, 5)
883. Wuorinen, Charles: Second Sonata, Voice 3, [0, 2, 4, 3, 5, 1, 9, 7, 11, 10, 8, 6], pc set (0, 1, 2, 3, 4, 5)
884. Wuorinen, Charles: Sonata for Piano, [0, 3, 2, 4, 5, 1, 11, 8, 9, 7, 6, 10], pc set (0, 1, 2, 3, 4, 5)
885. Wuorinen, Charles: Third Piano Sonata, [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6], pc set (0, 2, 4, 5, 7, 9)
886. Yun, Isang: Funf Stücke für Klavier, Stück 1, Row 1, [0, 4, 2, 6, 5, 8, 7, 9, 3, 1, 10, 11], pc set (0, 2, 3, 4, 6, 8)
887. Yun, Isang: Funf Stücke für Klavier, Stück 1, Row 2, [0, 11, 10, 4, 2, 1, 3, 6, 5, 9, 7, 8], pc set (0, 1, 2, 3, 4, 6)
888. Yun, Isang: Funf Stücke für Klavier, Stück 3, Row 1, [0, 11, 1, 9, 10, 7, 5, 6, 8, 2, 3, 4], pc set (0, 1, 2, 3, 4, 6)
889. Yun, Isang: Funf Stücke für Klavier, Stück 3, Row 2, [0, 4, 2, 8, 5, 6, 7, 9, 3, 11, 10, 1], pc set (0, 2, 3, 4, 6, 8)
890. Yun, Isang: Funf Stücke für Klavier, Stück 4, [0, 1, 7, 8, 11, 3, 4, 9, 5, 2, 6, 10], pc set (0, 1, 4, 5, 6, 8)
891. Yun, Isang: Funf Stücke für Klavier, Stück 5, [0, 11, 6, 3, 2, 10, 9, 1, 5, 4, 8, 7], pc set (0, 1, 2, 4, 5, 8)
892. Yun, Isang: Gasa, [0, 11, 7, 8, 6, 5, 2, 9, 10, 1, 3, 4], pc set (0, 1, 2, 3, 6, 7)
893. Yun, Isang: Riul für Klarinette und Klavier, [0, 5, 6, 9, 8, 4, 3, 7, 1, 2, 11, 10], pc set (0, 1, 2, 4, 5, 8)
894. Zappa, Frank: Brown Shoes Don't Make It, [0, 11, 3, 2, 9, 1, 7, 8, 4, 10, 5, 6], pc set (0, 1, 2, 3, 4, 6)
895. Zappa, Frank: Waltz, [0, 11, 3, 2, 9, 1, 7, 8, 4, 10, 5, 6], pc set (0, 1, 2, 3, 4, 6)
896. Zenk, Ludwig: An einen Springbrunnen, Op.6, No.1, [0, 2, 3, 7, 6, 10, 9, 1, 5, 11, 4, 8], pc set (0, 1, 3, 5, 8, 9)
897. Zenk, Ludwig: Piano Sonata, Op.1, [0, 1, 8, 4, 6, 5, 2, 10, 9, 3, 11, 7], pc set (0, 1, 4, 5, 6, 8)
898. Zhou, Jin-Min: Piano Quintet, Scherzo, [0, 10, 5, 4, 6, 11, 7, 9, 2, 3, 1, 8], pc set (0, 1, 2, 6, 7, 8)
899. Zillig, Wilfried: Das Opfer, [0, 11, 3, 4, 8, 7, 10, 9, 1, 2, 6, 5], pc set (0, 1, 4, 5, 8, 9), self-rotational interval pattern 11-4-1-4-11-3-
900. Zimmerman, Bernd Alois: Perspektiven, [0, 2, 10, 8, 4, 6, 3, 1, 5, 7, 11, 9], pc set (0, 2, 4, 6, 8, 10)

901. Zimmermann, Bernd Alois: 'Ich wandte mich um und sah alles Unrecht das geschah unter der Sonne', [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], pc set (0, 1, 2, 3, 4, 5)
902. Hauer, Josef Matthias: Zwölftonspiel für Orchester. 28. 9. 1954, [0, 5, 7, 4, 6, 1, 9, 3, 8, 11, 10, 2], pc set (0, 1, 2, 3, 6, 7)

Transposition Combinatorial

When two rows are combinatorial, the first hexachord of each complements the other meaning that they make up the total chromatic together. This list gives rows in this section that are combinatorial by transposition, i.e. combinatoriality holds between P0 and at least one transposition of P. The transposition(s) are given after the row. In this case, there is only one transposition-combinatorial hexachord, and only one interval, so they are all P0-P6

1. Carter, Elliott: Night Fantasies, [0, 10, 3, 11, 8, 7, 1, 2, 5, 9, 4, 6], P0-P6
2. Copland, Aaron: Inscape, ("Y form" or "Row 1"), [0, 4, 3, 11, 2, 7, 6, 8, 10, 9, 5, 1], P0-P6
3. Hauer, Josef Matthias: 'Atonale Musik'. Klavierstücke 1922., Op.20, [0, 7, 4, 9, 5, 8, 3, 11, 2, 6, 1, 10], P0-P6
4. Hauer, Josef Matthias: Nomos, Op.19 (bb.134-137), [0, 2, 1, 4, 5, 9, 6, 8, 10, 7, 11, 3], P0-P6
5. Hauer, Josef Matthias: Nomos, Op.19 (bb.457-458), [0, 3, 4, 5, 8, 1, 6, 11, 9, 10, 2, 7], P0-P6
6. Hauer, Josef Matthias: Romantische Phantasie für Orchester, [0, 10, 8, 5, 1, 9, 4, 11, 3, 7, 6, 2], P0-P6
7. Hauer, Josef Matthias: XXXII. Zwölftonspiel für Violine, zwei Bratschen und Cello (2/2), [0, 7, 4, 3, 11, 2, 5, 1, 10, 9, 6, 8], P0-P6
8. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen. 13. März 1952, [0, 5, 9, 10, 8, 1, 4, 3, 6, 7, 11, 2], P0-P6
9. Lackner, Peter: 'Hexentanz' für Violine und Klavier, [0, 3, 5, 7, 8, 4, 1, 10, 11, 2, 6, 9], P0-P6
10. Lackner, Peter: Kanon für Klavier. 26. Juni 1983, [0, 7, 5, 9, 4, 8, 6, 1, 11, 3, 10, 2], P0-P6
11. Lang, Bernhard: Monadologie XIII a; 'The Saucy Maid', [0, 1, 5, 2, 4, 9, 3, 10, 8, 11, 7, 6], P0-P6
12. Lutyens, Elisabeth: Islands, Op.80, [0, 11, 7, 3, 8, 10, 9, 6, 4, 5, 1, 2], P0-P6
13. Morris, Robert: Canonic Variations, [0, 3, 11, 1, 4, 8, 5, 6, 9, 10, 2, 7], P0-P6
14. Morris, Robert: Cuts, [0, 10, 11, 7, 3, 8, 6, 9, 4, 5, 1, 2], P0-P6
15. Morris, Robert: Knot Lilacs, [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6], P0-P6
16. Morris, Robert: Not Lilacs, [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6], P0-P6
17. Morris, Robert: Roundelay, row 4, [0, 3, 11, 10, 7, 2, 6, 9, 5, 4, 1, 8], P0-P6
18. Morris, Robert: Something New, [0, 9, 4, 8, 11, 7, 3, 6, 10, 5, 2, 1], P0-P6
19. Morris, Robert: Strange Flowers, Occasional Storms, [0, 1, 8, 3, 5, 4, 10, 6, 9, 7, 11, 2], P0-P6
20. Morris, Robert: ...gradually..., [0, 1, 8, 3, 5, 4, 6, 7, 9, 11, 2, 10], P0-P6

21. Nono, Luigi: Intolleranza, Soprano 1, [0, 3, 4, 7, 8, 5, 6, 9, 10, 1, 2, 11], P0-P6
22. Preßl, Herrmann Markus: Fier Fafeln für Fier Fiolen, [0, 7, 8, 11, 9, 4, 6, 10, 1, 5, 3, 2], P0-P6
23. Schnittke, Alfred: Sonata, No.1 for Violin and Piano, mvt 2, [0, 3, 7, 10, 2, 11, 6, 9, 1, 4, 8, 5], P0-P6
24. Slonimsky, Nicholas: No. 1296b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 5, 10, 9, 2, 1, 6, 11, 4, 3, 8, 7], P0-P6
25. Slonimsky, Nicholas: No. 1298b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 3, 8, 4, 7, 5, 6, 9, 2, 10, 1, 11], P0-P6
26. Slonimsky, Nicholas: No. 1300b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 3, 8, 4, 7, 5, 6, 9, 2, 10, 1, 11], P0-P6
27. Slonimsky, Nicholas: No. 1301 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 1, 4, 8, 3, 5, 11, 9, 2, 10, 7, 6], P0-P6
28. Slonimsky, Nicholas: No. 1302 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 1, 4, 2, 9, 5, 11, 3, 8, 10, 7, 6], P0-P6
29. Slonimsky, Nicholas: No. 1305 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Major Sixth-Chord), [0, 3, 8, 10, 11, 7, 1, 5, 4, 2, 9, 6], P0-P6
30. Slonimsky, Nicholas: No. 1306 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Major Triad), [0, 4, 7, 8, 3, 5, 11, 9, 2, 1, 10, 6], P0-P6
31. Slonimsky, Nicholas: No. 1307 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Minor Sixth-Chord), [0, 4, 9, 8, 11, 1, 7, 5, 2, 3, 10, 6], P0-P6
32. Slonimsky, Nicholas: No. 1308 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Minor Six-Four Chord), [0, 5, 8, 10, 9, 1, 7, 3, 4, 2, 11, 6], P0-P6
33. Slonimsky, Nicholas: No. 1309 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Major Six-Four Chord), [0, 5, 9, 8, 10, 1, 7, 4, 2, 3, 11, 6], P0-P6
34. Slonimsky, Nicholas: No. 1313 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 11, 2, 4, 3, 9, 10, 8, 5, 1, 6], P0-P6
35. Slonimsky, Nicholas: No. 410 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 7, 3, 11, 10, 6, 2, 1, 9, 5, 4], P0-P6
36. Slonimsky, Nicholas: No. 417 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 4, 3, 2, 7, 6, 5, 10, 9, 8, 1], P0-P6
37. Slonimsky, Nicholas: No. 420 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 7, 3, 2, 10, 6, 5, 1, 9, 8, 4], P0-P6
38. Slonimsky, Nicholas: No. 456 Infrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 7, 3, 2, 10, 6, 5, 1, 9, 8, 4], P0-P6
39. Slonimsky, Nicholas: No. 466 Infrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 7, 3, 11, 10, 6, 2, 1, 9, 5, 4], P0-P6
40. Slonimsky, Nicholas: No. 493 Inter-Ultrappolation (Sesquitone Progression; Equal Division of One

- Octave into Four Parts), [0, 1, 5, 3, 4, 8, 6, 7, 11, 9, 10, 2], P0-P6
41. Slonimsky, Nicholas: No. 500 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 4, 3, 2, 7, 6, 5, 10, 9, 8, 1], P0-P6
 42. Slonimsky, Nicholas: No. 503 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 7, 3, 2, 10, 6, 5, 1, 9, 8, 4], P0-P6
 43. Slonimsky, Nicholas: No. 746 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 1, 5, 9, 10, 2, 6, 7, 11, 3, 4, 8], P0-P6
 44. Slonimsky, Nicholas: No. 795 Infra-Ultrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 8, 1, 9, 5, 10, 6, 2, 7, 3, 11, 4], P0-P6
 45. Spinner, Leopold: Fünf Lieder, Op.8, [0, 3, 4, 7, 8, 5, 11, 9, 10, 2, 6, 1], P0-P6
 46. Spinner, Leopold: Sonatina for Wind Instruments, Op.23, [0, 9, 1, 5, 4, 2, 8, 10, 11, 7, 3, 6], P0-P6
 47. Talma, Louise: Three Bagatelles, Bagatelle 3, [0, 3, 4, 1, 5, 8, 10, 7, 2, 11, 6, 9], P0-P6
 48. Weber, Ben: Fantasia (Variations), Op.25, [0, 1, 5, 9, 10, 2, 6, 11, 7, 4, 3, 8], P0-P6

Inversion Combinatorial

These rows are combinatorial by inversion. There are 13 such hexachords and some are combinatorial in more than one transposition, so the specific forms are given in the form P0-IX, or P0-IX,Y in the case of more than one match.

1. Argento, Dominick: A Water Bird Talk, Lecturer Row, [0, 9, 5, 10, 2, 6, 3, 11, 8, 4, 1, 7], P0-I1
2. Argento, Dominick: From the Diary of Virginia Woolf, [0, 7, 6, 2, 11, 5, 3, 1, 8, 9, 4, 10], P0-I3
3. Atterberg, Kurt: Symphony 9 [Bbm], Op.54, 'Sinfonia visionaria', [0, 1, 5, 6, 7, 4, 8, 11, 10, 9, 2, 3], P0-I3
4. Babbitt, Milton: The Crowded Air, [0, 8, 5, 7, 10, 6, 11, 1, 9, 3, 2, 4], P0-I9
5. Bach, Johann Sebastian: Chromatische Fantasie, [0, 3, 6, 9, 11, 2, 5, 8, 10, 1, 4, 7], P0-I7
6. Bartók, Béla: String Quartet, No.4, [0, 5, 6, 11, 4, 9, 10, 3, 8, 1, 2, 7], P0-I7
7. Bartók, Béla: Violin Concerto, No.2, mvt 1, [0, 2, 8, 1, 9, 4, 10, 6, 3, 7, 11, 5], P0-I7
8. Bartók, Béla: Violin Concerto, No.2, mvt 3, [0, 8, 2, 9, 1, 4, 10, 7, 6, 3, 11, 5], P0-I7
9. Beecroft, Norma: Improvvvisazioni Concertanti, No.1, [0, 1, 11, 9, 3, 2, 7, 6, 10, 8, 4, 5], P0-I7
10. Bennett, Richard Rodney: Five Studies for Piano, [0, 3, 5, 6, 11, 9, 4, 2, 7, 8, 10, 1], P0-I1,7
11. Berg, Alban: Lulu, Lulu (title character) row, [0, 2, 3, 5, 7, 9, 1, 10, 11, 4, 6, 8], P0-I1
12. Berg, Alban: Lulu, Schoolboy row, [0, 2, 6, 10, 4, 7, 8, 3, 5, 9, 11, 1], P0-I3
13. Berg, Alban: Lulu, permutation of main row, [0, 4, 2, 7, 9, 6, 8, 11, 3, 1, 5, 10], P0-I5
14. Berg, Alban: Lyric Suite, mvt III, [0, 11, 7, 1, 2, 9, 3, 8, 10, 4, 5, 6], P0-I5
15. Berger, Arthur: Chamber Music for Thirteen Players, [0, 1, 11, 7, 10, 9, 6, 5, 8, 4, 2, 3], P0-I3
16. Berio, Luciano: Chamber Music, [0, 9, 3, 5, 7, 10, 2, 11, 4, 6, 8, 1], P0-I11

17. Bischof, Rainer: 'Und so sink ich leise in mich selbst hinein'. Österreichischer Liederzyklus für Mezzosopran und Violine, Op.17, [0, 6, 5, 11, 4, 9, 3, 2, 8, 7, 1, 10], P0-I7
18. Boulez, Pierre: 2nd Piano Sonata, mvt II, Section 1, [0, 2, 1, 11, 3, 9, 8, 10, 7, 6, 5, 4], P0-I7
19. Boulez, Pierre: Le Soleil des eaux, series I, [0, 6, 10, 2, 5, 1, 7, 11, 3, 4, 8, 9], P0-I9
20. Boulez, Pierre: Le Soleil des eaux, series II, [0, 6, 10, 2, 5, 1, 4, 7, 11, 8, 3, 9], P0-I9
21. Boulez, Pierre: Le Soleil des eaux, series III, [0, 11, 7, 2, 6, 5, 4, 8, 10, 1, 3, 9], P0-I3
22. Boulez, Pierre: Pli selon pli, [0, 1, 8, 6, 7, 9, 4, 5, 11, 3, 2, 10], P0-I11
23. Boulez, Pierre: Structures Ia, [0, 11, 6, 5, 4, 3, 1, 10, 9, 7, 2, 8], P0-I1
24. Cage, John: Sonata for Clarinet, [0, 1, 10, 11, 9, 7, 6, 5, 4, 8, 3, 2], P0-I3
25. Cage, John: Sonata for Clarinet, mvt 2, [0, 11, 9, 10, 8, 6, 5, 4, 3, 7, 2, 1], P0-I1
26. Cage, John: Two pieces for Piano, [0, 11, 8, 3, 4, 2, 9, 7, 1, 5, 10, 6], P0-I9
27. Carlos, Juan: Canciones y Baladas, Balada II, [0, 4, 10, 6, 3, 8, 7, 2, 5, 9, 1, 11], P0-I5
28. Coltrane, John: Miles Mode, [0, 3, 5, 2, 7, 9, 10, 8, 1, 11, 6, 4], P0-I1
29. Cordero, Roque: Concerto for Violin, mvt 2A, [0, 11, 6, 4, 7, 8, 5, 9, 3, 10, 1, 2], P0-I9
30. Cordero, Roque: Soliloquios, [0, 1, 5, 11, 3, 2, 9, 8, 4, 10, 6, 7], P0-I9
31. Cordero, Roque: Violin Concerto mvt 1-3, [0, 11, 6, 4, 8, 7, 5, 1, 3, 2, 10, 9], P0-I9
32. Crosse, Gordon: Elegy for Small Orchestra, Op.1, [0, 11, 3, 1, 9, 10, 5, 6, 2, 4, 8, 7], P0-I5
33. Dallapiccola, Luigi: 'Intermezzo' from the 'Ciaccona' (of 'Ciaccona, intermezzo e adagio'), [0, 5, 6, 3, 8, 9, 7, 11, 10, 2, 1, 4], P0-I7
34. Dallapiccola, Luigi: Canti di Liberationi, No.2, [0, 5, 8, 3, 1, 9, 10, 4, 2, 11, 7, 6], P0-I7
35. Dallapiccola, Luigi: Canti di Liberazione, [0, 1, 5, 8, 10, 4, 3, 7, 9, 2, 11, 6], P0-I7
36. Dallapiccola, Luigi: Cinque canti, [0, 11, 5, 8, 6, 2, 7, 3, 1, 4, 10, 9], P0-I3,9
37. Dallapiccola, Luigi: Commiato, [0, 6, 5, 3, 9, 11, 10, 8, 7, 1, 2, 4], P0-I1,7
38. Dallapiccola, Luigi: Dialoghi, [0, 1, 10, 2, 6, 4, 5, 3, 7, 11, 8, 9], P0-I9
39. Dallapiccola, Luigi: Il Prigioniero, "Hope", [0, 1, 2, 3, 11, 5, 4, 10, 6, 7, 9, 8], P0-I9
40. Dallapiccola, Luigi: Il prigioniero, "Prayer", [0, 3, 6, 11, 9, 2, 1, 7, 8, 4, 5, 10], P0-I7
41. Dallapiccola, Luigi: Liriche greche c: Sex Carmina Alcaei, [0, 3, 5, 6, 2, 9, 8, 7, 4, 1, 10, 11], P0-I1
42. Dallapiccola, Luigi: Quaderno musicale di Annalibera, [0, 1, 5, 8, 10, 4, 3, 7, 9, 2, 11, 6], P0-I7
43. Dallapiccola, Luigi: Quattro liriche di Antonio Machado, i, iv, [0, 3, 5, 6, 8, 9, 11, 10, 7, 4, 2, 1], P0-I7
44. Dallapiccola, Luigi: Requiescant, [0, 2, 1, 3, 4, 6, 7, 9, 8, 10, 5, 11], P0-I11
45. Dallapiccola, Luigi: Requiescant (alternative view), [0, 2, 1, 7, 11, 8, 9, 6, 10, 4, 3, 5], P0-I5
46. Dallapiccola, Luigi: Tempus, 'Exhortatio', [0, 11, 9, 3, 5, 6, 4, 7, 8, 2, 1, 10], P0-I1,7
47. Dallapiccola, Luigi: Tempus, 'Ploratus', [0, 1, 7, 6, 10, 4, 3, 2, 5, 11, 9, 8], P0-I3,9
48. Dallapiccola, Luigi: Ulisse [opera], [0, 2, 1, 3, 9, 8, 11, 10, 4, 6, 5, 7], P0-I7
49. Dallapiccola, Luigi: Variazioni per orchestra, [0, 1, 5, 8, 10, 4, 3, 7, 9, 2, 11, 6], P0-I7
50. Davies, Peter Maxwell: Five Pieces for Piano, Op.2, No.2, [0, 7, 11, 1, 3, 5, 8, 6, 4, 9, 10, 2], P0-I9

51. Davies, Peter Maxwell: Sonata for Trumpet and Piano, Op.1, [0, 7, 6, 2, 11, 10, 8, 9, 1, 5, 3, 4], P0-I3
52. Denisov, Edison: Five Etudes for Solo Bassoon, row A, [0, 6, 1, 7, 8, 3, 2, 9, 10, 5, 11, 4], P0-I5
53. Denisov, Edison: Five Etudes for Solo Bassoon, row D, [0, 6, 1, 7, 8, 3, 2, 9, 10, 11, 5, 4], P0-I5
54. Denisov, Edison: Five Etudes for Solo Bassoon, row F, [0, 6, 1, 7, 3, 2, 8, 9, 10, 5, 11, 4], P0-I11
55. Dessau, Paul: >Guernica< for piano, [0, 7, 6, 2, 10, 11, 5, 9, 1, 3, 4, 8], P0-I3
56. Dessau, Paul: Les Voix, [0, 11, 6, 8, 9, 3, 4, 10, 5, 7, 2, 1], P0-I1
57. Eder, Helmut: Concerto for violin and orchestra, Op.32, [0, 9, 6, 2, 11, 3, 8, 1, 7, 5, 10, 4], P0-I7
58. Eisler, Hanns: Deutsche Symphonie, mvt 5, [0, 1, 3, 5, 8, 9, 6, 11, 10, 4, 2, 7], P0-I7
59. Eisler, Hanns: Deutsche Symphonie, mvt 9, [0, 4, 1, 10, 8, 6, 3, 11, 9, 2, 5, 7], P0-I3
60. Eisler, Hanns: Deutsche Symphonie, mvts 1, 10, [0, 10, 6, 1, 11, 7, 5, 8, 9, 3, 4, 2], P0-I3
61. Eisler, Hanns: Five Pieces for Orchestra, mvt 4, [0, 10, 9, 8, 6, 7, 3, 4, 5, 11, 1, 2], P0-I11
62. Eisler, Hanns: Five Pieces for Orchestra, mvt 5, [0, 2, 6, 4, 10, 9, 11, 1, 7, 5, 8, 3], P0-I5
63. Eisler, Hanns: Sonata for Piano, No.2 ("in Form von Variationen"), Op.6, row variant 1, [0, 4, 6, 3, 2, 1, 9, 10, 7, 8, 5, 11], P0-I11
64. Eisler, Hanns: Sonata for Piano, No.2 ("in Form von Variationen"), Op.6, row variant 2, [0, 4, 3, 2, 6, 1, 9, 10, 7, 8, 5, 11], P0-I11
65. Eisler, Hanns: Sonata for Piano, No.2 ("in Form von Variationen"), Op.6, row variant 5, [0, 3, 2, 4, 6, 1, 9, 10, 7, 8, 5, 11], P0-I11
66. Eisler, Hanns: String Quartet, [0, 9, 3, 2, 11, 1, 4, 5, 10, 7, 8, 6], P0-I7
67. Eisler, Hanns: Variations for Piano, [0, 3, 10, 6, 5, 8, 1, 11, 2, 4, 7, 9], P0-I7
68. Eisler, Hanns: Zwei Elegien, No.2 (An die Überlebenden), [0, 1, 4, 3, 2, 6, 8, 11, 10, 9, 5, 7], P0-I11
69. Evans, Bill: Twelve Tone Tune Two, [0, 9, 11, 1, 10, 3, 2, 6, 4, 5, 8, 7], P0-I5
70. Fano, Michel: Sonata for Two Pianos, [0, 6, 10, 7, 9, 8, 3, 2, 4, 1, 5, 11], P0-I11
71. Fine, Vivian: Four Songs, No.2, "Comfort To A Youth That Had Lost His Love", [0, 1, 2, 6, 9, 10, 11, 3, 5, 4, 7, 8], P0-I5
72. Finney, Ross Lee: Concerto for Alto Sax, [0, 1, 3, 4, 6, 9, 11, 10, 8, 7, 5, 2], P0-I11
73. Florey, Hans: Die Aussicht, [0, 9, 11, 8, 2, 10, 5, 6, 7, 4, 3, 1], P0-I3
74. Florey, Hans: Hexaeder für Klavier, [0, 9, 4, 8, 5, 10, 11, 3, 2, 6, 1, 7], P0-I11
75. Florey, Hans: Hälfte des Lebens, [0, 3, 4, 1, 7, 11, 6, 9, 10, 8, 2, 5], P0-I9
76. Florey, Hans: I Ging, [0, 7, 2, 10, 11, 6, 5, 1, 9, 8, 4, 3], P0-I3
77. Florey, Hans: Magischer Würfel mit 6 Spiegelpunkten, [0, 10, 1, 7, 4, 6, 5, 8, 3, 9, 2, 11], P0-I3,9
78. Florey, Hans: Sechs Kanonzyklen einunddesselben magischen Quadrates, [0, 10, 1, 7, 4, 6, 5, 8, 3, 9, 2, 11], P0-I3,9
79. Florey, Hans: Triptychon, [0, 8, 9, 3, 7, 2, 1, 10, 5, 6, 11, 4], P0-I1
80. Florey, Hans: Zwölftonspiel für Streichquartett. 3. Dezember 1965, [0, 10, 2, 5, 3, 4, 1, 8, 9, 6, 7,

11], P0-I11

81. Gerhard, Roberto: Capriccio for Solo Flute, [0, 11, 9, 3, 1, 10, 8, 6, 4, 7, 2, 5], P0-I5
82. Gerhard, Roberto: Hymnody, [0, 10, 11, 8, 2, 9, 4, 5, 1, 6, 7, 3], P0-I3
83. Gerhard, Roberto: String Quartet, [0, 7, 8, 2, 6, 10, 9, 11, 4, 5, 1, 3], P0-I11
84. Gerhard, Roberto: String Quartet, No.2, [0, 1, 5, 2, 8, 7, 10, 9, 6, 11, 4, 3], P0-I11
85. Gerhard, Roberto: Three Impromptus, [0, 8, 1, 10, 4, 6, 7, 5, 3, 2, 9, 11], P0-I3
86. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 3, [0, 5, 6, 11, 2, 1, 8, 7, 10, 4, 9, 3], P0-I9
87. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 4, [0, 9, 10, 11, 6, 5, 8, 7, 2, 3, 4, 1], P0-I1
88. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 8, [0, 1, 7, 6, 8, 9, 3, 2, 4, 5, 11, 10], P0-I11
89. Ginastera, Alberto: Quintet, Op.29, Row Class III 1, [0, 11, 1, 8, 2, 7, 10, 3, 9, 4, 6, 5], P0-I5
90. Ginastera, Alberto: Quintet, Op.29, Row Class III 2, [0, 11, 1, 8, 2, 7, 5, 6, 4, 9, 3, 10], P0-I5
91. Ginastera, Alberto: Quintet, Op.29, Row Class VII 1, [0, 9, 10, 11, 4, 3, 6, 2, 1, 5, 8, 7], P0-I5
92. Ginastera, Alberto: Quintet, Op.29, Row Class VII 2, [0, 11, 1, 8, 2, 7, 5, 6, 4, 9, 3, 10], P0-I5
93. Ginastera, Alberto: Quintet, Op.29, mvt.III, [0, 7, 3, 10, 2, 6, 9, 1, 4, 8, 11, 5], P0-I11
94. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class III S, [0, 6, 11, 5, 8, 2, 7, 1, 4, 10, 3, 9], P0-I3,9
95. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 2, [0, 3, 6, 9, 2, 5, 8, 11, 4, 7, 10, 1], P0-I1
96. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 3, [0, 9, 3, 2, 11, 6, 5, 1, 8, 7, 4, 10], P0-I7
97. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 5, [0, 7, 1, 6, 4, 11, 5, 10, 8, 3, 9, 2], P0-I9
98. Goehr, Alexander: Piano Trio, Op.20, [0, 6, 7, 4, 3, 8, 5, 9, 11, 2, 10, 1], P0-I5
99. Goeyvaerts, Karel: Violin concerto, No.2, [0, 11, 7, 1, 2, 9, 10, 8, 5, 6, 3, 4], P0-I5
100. Gotham, Mark: 4x4x4x4, row 3, [0, 2, 6, 10, 7, 4, 11, 9, 8, 3, 5, 1], P0-I3
101. Gotham, Mark: 4x4x4x4, row 4, [0, 2, 6, 10, 1, 4, 5, 3, 8, 9, 11, 7], P0-I9
102. Gotham, Mark: Move On!, [0, 4, 3, 10, 6, 9, 1, 5, 2, 8, 11, 7], P0-I5,11
103. Hamel, Peter Michael: 'Klangspirale' für 13 Spieler oder drei Orchestergruppen, [0, 10, 5, 9, 3, 4, 1, 6, 8, 11, 2, 7], P0-I11
104. Hauer, Jose Matthias: XXXII. Zwölftonspiel; für Violine, Bratsche und Cello, [0, 2, 6, 1, 10, 9, 5, 8, 11, 7, 4, 3], P0-I5
105. Hauer, Josef Matthias: 'Der Menschen Weg', Op.67, [0, 8, 5, 4, 10, 2, 7, 9, 1, 3, 11, 6], P0-I11
106. Hauer, Josef Matthias: 'Die schwarze Spinne', Op.62, [0, 4, 10, 1, 5, 8, 11, 2, 7, 9, 6, 3], P0-I7
107. Hauer, Josef Matthias: 'Emilie vor ihrem Brauttag' (Friedrich Hölderlin) für Altsolo und Orchester, Op.58, [0, 8, 3, 4, 11, 6, 9, 10, 2, 1, 5, 7], P0-I1
108. Hauer, Josef Matthias: 'Salambo', opera after Gustave Flaubert, Op.60, [0, 6, 9, 2, 8, 10, 4, 7, 1, 11, 3, 5], P0-I1

109. Hauer, Josef Matthias: 'Tanz tibetanischer Mönche' im langsamen 3/4 Takt) [Zwölftonspiel]. 8. September 1956, [0, 7, 8, 6, 3, 1, 11, 2, 10, 5, 9, 4], P0-I5
110. Hauer, Josef Matthias: 'Wandlungen' (chamber-oratorio for stage or concert, for six solo-voices, choir and orchestra; after words of Friedrich Hölderlin), Op.53, [0, 5, 11, 4, 10, 1, 6, 8, 9, 3, 7, 2], P0-I7
111. Hauer, Josef Matthias: Baustein, [0, 8, 11, 1, 6, 10, 4, 2, 3, 5, 9, 7], P0-I3
112. Hauer, Josef Matthias: Fünfte Tanzfantasie für kleines Orchester, Opus 66, [0, 10, 4, 7, 8, 11, 6, 2, 5, 9, 3, 1], P0-I1
113. Hauer, Josef Matthias: Harmonie – Melodie – Rhythmus – in kristallischer Bindung – im vierfachen Kontrapunkt [Zwölftonspiel] für Zwölftonorchester, [0, 2, 10, 9, 6, 5, 1, 4, 7, 11, 8, 3], P0-I1
114. Hauer, Josef Matthias: Hausmusik [Zwölftonspiel] für zwei Violinen und Klavier, [0, 1, 5, 3, 7, 10, 9, 6, 11, 4, 2, 8], P0-I9
115. Hauer, Josef Matthias: Kammermusik [Zwölftonspiel] für Flöte, Oboe, Baßklarinette, Fagott, zwei Violinen, Bratsche, Cello und Klavier zu vier Händen. 24. Jänner 1957, [0, 9, 3, 7, 5, 10, 1, 6, 11, 4, 2, 8], P0-I11
116. Hauer, Josef Matthias: Klavierstücke mit Überschriften nach Worten von Friedrich Hölderlin, Op.25 ;, No.10, [0, 6, 11, 10, 9, 5, 2, 3, 7, 1, 4, 8], P0-I1
117. Hauer, Josef Matthias: Langsamer Walzer [Zwölftonspiel] für Orchester. 10. Jänner 1957, [0, 8, 10, 2, 3, 6, 1, 9, 7, 4, 11, 5], P0-I7
118. Hauer, Josef Matthias: Langsamer Walzer [Zwölftonspiel] für zwei Violinen, Bratsche, Cello und Klavier zu zwei Händen, [0, 6, 2, 11, 10, 7, 3, 4, 5, 9, 1, 8], P0-I3
119. Hauer, Josef Matthias: Nomos, Op.19 (bb.106-108), [0, 10, 6, 1, 7, 4, 9, 5, 3, 8, 11, 2], P0-I3,9
120. Hauer, Josef Matthias: Nomos, Op.19 (bb.117-118), [0, 4, 5, 11, 7, 10, 3, 9, 6, 2, 1, 8], P0-I1
121. Hauer, Josef Matthias: Nomos, Op.19 (bb.119-120), [0, 10, 8, 6, 5, 7, 9, 2, 3, 1, 11, 4], P0-I9
122. Hauer, Josef Matthias: Nomos, Op.19 (bb.123-124), [0, 8, 11, 5, 3, 7, 4, 9, 1, 6, 10, 2], P0-I9
123. Hauer, Josef Matthias: Nomos, Op.19 (bb.125-126), [0, 11, 1, 10, 6, 8, 9, 5, 7, 3, 2, 4], P0-I3
124. Hauer, Josef Matthias: Nomos, Op.19 (bb.138-140), [0, 3, 4, 2, 5, 6, 8, 7, 10, 11, 1, 9], P0-I1
125. Hauer, Josef Matthias: Nomos, Op.19 (bb.141-143), [0, 10, 11, 3, 5, 6, 7, 2, 1, 4, 8, 9], P0-I7
126. Hauer, Josef Matthias: Nomos, Op.19 (bb.142-143), [0, 11, 10, 1, 5, 3, 8, 6, 9, 4, 7, 2], P0-I7
127. Hauer, Josef Matthias: Nomos, Op.19 (bb.159-161), [0, 5, 1, 8, 10, 4, 6, 7, 3, 9, 11, 2], P0-I7
128. Hauer, Josef Matthias: Nomos, Op.19 (bb.171-174), [0, 7, 1, 3, 9, 6, 8, 11, 10, 5, 4, 2], P0-I5,11
129. Hauer, Josef Matthias: Nomos, Op.19 (bb.175-178), [0, 10, 1, 2, 6, 5, 3, 4, 8, 9, 7, 11], P0-I9
130. Hauer, Josef Matthias: Nomos, Op.19 (bb.192-193), [0, 9, 6, 2, 8, 4, 7, 10, 1, 3, 5, 11], P0-I7
131. Hauer, Josef Matthias: Nomos, Op.19 (bb.196-197), [0, 2, 8, 6, 11, 5, 4, 10, 7, 3, 1, 9], P0-I3,9
132. Hauer, Josef Matthias: Nomos, Op.19 (bb.213-216), [0, 2, 6, 1, 10, 4, 5, 8, 11, 7, 3, 9], P0-I9
133. Hauer, Josef Matthias: Nomos, Op.19 (bb.224-228), [0, 1, 9, 3, 4, 5, 10, 11, 6, 2, 8, 7], P0-I11
134. Hauer, Josef Matthias: Nomos, Op.19 (bb.228-230), [0, 2, 9, 6, 5, 10, 7, 3, 8, 1, 4, 11], P0-I1

135. Hauer, Josef Matthias: Nomos, Op.19 (bb.231-233), [0, 6, 10, 3, 2, 8, 9, 5, 4, 1, 11, 7], P0-I7
136. Hauer, Josef Matthias: Nomos, Op.19 (bb.234-237), [0, 11, 3, 1, 7, 4, 9, 6, 5, 10, 2, 8], P0-I9
137. Hauer, Josef Matthias: Nomos, Op.19 (bb.241-243), [0, 2, 8, 1, 4, 9, 5, 6, 3, 11, 10, 7], P0-I7
138. Hauer, Josef Matthias: Nomos, Op.19 (bb.257-262), [0, 7, 3, 8, 4, 2, 9, 1, 11, 6, 10, 5], P0-I1
139. Hauer, Josef Matthias: Nomos, Op.19 (bb.262-263), [0, 11, 2, 5, 1, 6, 9, 7, 10, 3, 4, 8], P0-I9
140. Hauer, Josef Matthias: Nomos, Op.19 (bb.272-276), [0, 1, 5, 3, 7, 2, 8, 10, 4, 6, 11, 9], P0-I11
141. Hauer, Josef Matthias: Nomos, Op.19 (bb.284-287), [0, 1, 11, 7, 6, 4, 10, 5, 2, 8, 3, 9], P0-I9
142. Hauer, Josef Matthias: Nomos, Op.19 (bb.288-291), [0, 2, 10, 7, 4, 6, 11, 3, 5, 1, 8, 9], P0-I3
143. Hauer, Josef Matthias: Nomos, Op.19 (bb.292-294), [0, 9, 2, 6, 3, 5, 10, 1, 11, 7, 4, 8], P0-I1
144. Hauer, Josef Matthias: Nomos, Op.19 (bb.325-328), [0, 5, 4, 2, 7, 6, 3, 11, 1, 8, 10, 9], P0-I3
145. Hauer, Josef Matthias: Nomos, Op.19 (bb.328-332), [0, 3, 2, 7, 6, 10, 9, 11, 8, 5, 1, 4], P0-I11
146. Hauer, Josef Matthias: Nomos, Op.19 (bb.366-371), [0, 5, 1, 7, 3, 2, 4, 8, 11, 6, 10, 9], P0-I11
147. Hauer, Josef Matthias: Nomos, Op.19 (bb.372-375), [0, 8, 6, 1, 10, 11, 5, 9, 7, 4, 3, 2], P0-I3
148. Hauer, Josef Matthias: Nomos, Op.19 (bb.387-390), [0, 3, 7, 4, 10, 1, 11, 9, 6, 8, 2, 5], P0-I9
149. Hauer, Josef Matthias: Nomos, Op.19 (bb.403-409), [0, 11, 2, 10, 8, 1, 5, 3, 4, 6, 7, 9], P0-I5
150. Hauer, Josef Matthias: Nomos, Op.19 (bb.422-425), [0, 6, 4, 2, 10, 9, 8, 5, 11, 7, 1, 3], P0-I5
151. Hauer, Josef Matthias: Nomos, Op.19 (bb.425-427), [0, 8, 10, 7, 4, 2, 3, 5, 6, 11, 1, 9], P0-I1
152. Hauer, Josef Matthias: Nomos, Op.19 (bb.430-432), [0, 6, 8, 10, 9, 2, 7, 1, 3, 4, 5, 11], P0-I1
153. Hauer, Josef Matthias: Nomos, Op.19 (bb.438-441), [0, 1, 10, 8, 9, 4, 3, 5, 7, 11, 6, 2], P0-I3
154. Hauer, Josef Matthias: Nomos, Op.19 (bb.441-445), [0, 1, 9, 8, 10, 4, 6, 5, 7, 2, 3, 11], P0-I3
155. Hauer, Josef Matthias: Nomos, Op.19 (bb.451-453), [0, 2, 4, 1, 6, 11, 3, 8, 9, 7, 5, 10], P0-I9
156. Hauer, Josef Matthias: Nomos, Op.19 (bb.452-455), [0, 5, 7, 8, 1, 2, 3, 4, 6, 11, 10, 9], P0-I11
157. Hauer, Josef Matthias: Nomos, Op.19 (bb.463-464), [0, 4, 6, 7, 3, 9, 1, 10, 8, 11, 5, 2], P0-I5
158. Hauer, Josef Matthias: Nomos, Op.19 (bb.479-483), [0, 6, 10, 9, 7, 8, 11, 4, 5, 3, 2, 1], P0-I11
159. Hauer, Josef Matthias: Nomos, Op.19 (bb.494-496), [0, 7, 8, 5, 6, 11, 2, 3, 9, 4, 1, 10], P0-I9
160. Hauer, Josef Matthias: Nomos, Op.19 (bb.50-53), [0, 2, 10, 4, 5, 3, 6, 7, 1, 8, 9, 11], P0-I11
161. Hauer, Josef Matthias: Nomos, Op.19 (bb.501-503), [0, 5, 7, 1, 3, 2, 6, 10, 11, 8, 9, 4], P0-I11
162. Hauer, Josef Matthias: Nomos, Op.19 (bb.511-514), [0, 10, 1, 4, 6, 2, 9, 7, 11, 8, 5, 3], P0-I9
163. Hauer, Josef Matthias: Nomos, Op.19 (bb.517-521), [0, 2, 10, 11, 6, 4, 5, 1, 3, 9, 8, 7], P0-I7
164. Hauer, Josef Matthias: Nomos, Op.19 (bb.528-531), [0, 6, 7, 5, 8, 10, 9, 11, 4, 2, 1, 3], P0-I9
165. Hauer, Josef Matthias: Nomos, Op.19 (bb.60-63), [0, 4, 1, 2, 9, 8, 10, 5, 11, 3, 6, 7], P0-I7
166. Hauer, Josef Matthias: Nomos, Op.19 (bb.72-73), [0, 1, 7, 11, 4, 3, 9, 6, 5, 2, 10, 8], P0-I9
167. Hauer, Josef Matthias: Nomos, Op.19 (bb.73-78), [0, 8, 7, 2, 4, 11, 1, 3, 6, 5, 10, 9], P0-I5
168. Hauer, Josef Matthias: Nomos, Op.19 (bb.84-87), [0, 10, 1, 11, 5, 3, 2, 6, 7, 8, 9, 4], P0-I7
169. Hauer, Josef Matthias: Nomos, Op.19 (bb.93-94), [0, 1, 10, 8, 6, 2, 9, 4, 11, 7, 5, 3], P0-I5
170. Hauer, Josef Matthias: Nomos, Op.19 (row 1), [0, 8, 9, 5, 4, 6, 10, 11, 7, 1, 2, 3], P0-I7
171. Hauer, Josef Matthias: Nomos, Op.19 (row 2), [0, 6, 10, 4, 3, 2, 8, 7, 11, 9, 5, 1], P0-I11

172. Hauer, Josef Matthias: Paraphonie [Zwölftonspiel] für Bratsche und Klavier, [0, 4, 10, 5, 8, 1, 11, 7, 2, 9, 6, 3], P0-I7
173. Hauer, Josef Matthias: Sakraler Tanz [Zwölftonspiel] für Orchester, [0, 3, 10, 8, 5, 2, 9, 1, 11, 6, 4, 7], P0-I9
174. Hauer, Josef Matthias: Sechste Suite für Orchester, Op.47, [0, 9, 6, 2, 8, 3, 10, 11, 7, 4, 5, 1], P0-I1,7
175. Hauer, Josef Matthias: Symphonische Stücke für Streichorchester, Klavier und Harmonium, Op.49, [0, 4, 6, 3, 2, 8, 1, 11, 10, 7, 9, 5], P0-I1
176. Hauer, Josef Matthias: Tanz im langsamen 3/4 Takt [Zwölftonspiel] für zwei Violinen, zwei Bratschen und Klavier zu zwei Händen, [0, 3, 10, 2, 11, 6, 8, 7, 4, 9, 1, 5], P0-I7
177. Hauer, Josef Matthias: VIII. Zwölftonspiel für Orchester. Juni 1943, [0, 5, 10, 8, 4, 2, 11, 9, 3, 1, 7, 6], P0-I11
178. Hauer, Josef Matthias: Violinkonzert, Op.54 (9. März – 6. April 1928), [0, 7, 6, 8, 4, 11, 1, 10, 5, 9, 2, 3], P0-I9
179. Hauer, Josef Matthias: XXI. Zwölftonspiel für Orchester; mit einer Zwölftonreihe, die in sechs Tropen steht, und vom Kulturreferenten der Stadt Wien Dr. Viktor Matejka gewählt wurde. Erster Teil 2,4-Takt (Halbe = 50) mit achttaktigen Perioden; zweiter Teil im 3/4 Takt (punktierter Halbe = 40) mit sechstaktigen Perioden, [0, 3, 4, 9, 11, 10, 1, 7, 6, 2, 5, 8], P0-I5
180. Hauer, Josef Matthias: XXII. Zwölftonspiel für Klavier, [0, 2, 11, 6, 7, 10, 1, 3, 8, 4, 9, 5], P0-I3
181. Hauer, Josef Matthias: XXIII. Zwölftonspiel für Klavierquintett, [0, 4, 11, 9, 10, 2, 6, 3, 7, 5, 8, 1], P0-I5
182. Hauer, Josef Matthias: XXIV. Zwölftonspiel für Klavier, [0, 2, 9, 3, 8, 1, 4, 7, 11, 5, 6, 10], P0-I7
183. Hauer, Josef Matthias: Zwölftonspiel (Weihnachten 1947) für Klarinette, Violine, Bratsche, Cello und Klavier, [0, 6, 2, 10, 8, 3, 11, 4, 9, 7, 5, 1], P0-I7
184. Hauer, Josef Matthias: Zwölftonspiel 10. Juli 1957; für Klavier zu vier Händen, [0, 8, 10, 6, 2, 11, 1, 3, 9, 4, 7, 5], P0-I3
185. Hauer, Josef Matthias: Zwölftonspiel 15. Juni 1957; für Flöte, Oboe, Bassklarinette, Fagott, zwei Violinen, Viola, Violoncello & Klavier vierhändig, [0, 6, 4, 8, 3, 11, 9, 2, 7, 1, 10, 5], P0-I1
186. Hauer, Josef Matthias: Zwölftonspiel 2. Juni 1948 für Streichquartett und Klavier, [0, 3, 10, 6, 2, 11, 1, 4, 7, 9, 5, 8], P0-I7
187. Hauer, Josef Matthias: Zwölftonspiel 26. Juli 1957, für Flöte, Oboe, Bassklarinette, Fagott und Streichquartett, [0, 4, 1, 6, 8, 2, 10, 7, 3, 9, 11, 5], P0-I11
188. Hauer, Josef Matthias: Zwölftonspiel 3. Mai 1958; für Streichsextett, [0, 4, 10, 3, 7, 1, 8, 2, 11, 6, 9, 5], P0-I9
189. Hauer, Josef Matthias: Zwölftonspiel 5. September 1957; für Violine, Bratsche und Klavier, [0, 4, 2, 9, 10, 6, 11, 1, 7, 3, 8, 5], P0-I5
190. Hauer, Josef Matthias: Zwölftonspiel 7. April 1957; für zwei Violinen, Bratsche, Cello und Klavier

zu vier Händen, [0, 6, 2, 9, 10, 4, 11, 3, 7, 1, 5, 8], P0-I5

191. Hauer, Josef Matthias: Zwölftonspiel 9. September 1957; für vier Solostimmen [S, A, T, B], Violine, Bratsche und Klavier, [0, 4, 2, 9, 10, 6, 11, 1, 7, 3, 8, 5], P0-I5
192. Hauer, Josef Matthias: Zwölftonspiel Jänner 1957; für zwei Violinen, Bratsche und Cello, [0, 10, 6, 2, 8, 3, 5, 7, 9, 4, 1, 11], P0-I7
193. Hauer, Josef Matthias: Zwölftonspiel Oktober 1956; für Klavier zu vier Händen, [0, 9, 6, 2, 8, 3, 10, 5, 1, 11, 7, 4], P0-I1,7
194. Hauer, Josef Matthias: Zwölftonspiel für Flöte, Horn, Violine, Bratsche, Cello und Klavier, [0, 10, 7, 2, 8, 6, 3, 4, 9, 11, 1, 5], P0-I11
195. Hauer, Josef Matthias: Zwölftonspiel für Gitarre. 24. 7. 1949, [0, 6, 10, 2, 5, 9, 1, 4, 7, 3, 11, 8], P0-I1
196. Hauer, Josef Matthias: Zwölftonspiel für Klavier. 11. Juni 1955, [0, 6, 11, 4, 2, 9, 3, 1, 5, 7, 10, 8], P0-I7
197. Hauer, Josef Matthias: Zwölftonspiel für Klavier. 17. Juli 1952, [0, 6, 4, 9, 2, 10, 7, 11, 1, 8, 5, 3], P0-I5
198. Hauer, Josef Matthias: Zwölftonspiel für Klavier. 2. Juni 1955, [0, 10, 2, 7, 3, 6, 4, 8, 1, 9, 11, 5], P0-I11
199. Hauer, Josef Matthias: Zwölftonspiel für Klavier. 24. Dezember 1946, [0, 1, 2, 6, 10, 5, 11, 4, 3, 9, 7, 8], P0-I9
200. Hauer, Josef Matthias: Zwölftonspiel für Klavier. 7. Juni 1955, [0, 4, 10, 7, 11, 8, 3, 1, 5, 6, 2, 9], P0-I1
201. Hauer, Josef Matthias: Zwölftonspiel für Klavier. März 1953, [0, 6, 8, 7, 5, 10, 2, 3, 11, 4, 9, 1], P0-I9
202. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen, Violine, Bratsche, Cello und Kontrabaß (melischer Entwurf vom 29.8.1954), [0, 4, 2, 7, 9, 6, 8, 3, 11, 5, 10, 1], P0-I5
203. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen, mit einer Zwölftonreihe von Nikolaus Fheodoroff. 10. Juli 1952, [0, 10, 6, 8, 9, 7, 11, 3, 1, 5, 2, 4], P0-I11
204. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen, mit einer Zwölftonreihe von Nikolaus Fheodoroff. 8. Juli 1952, [0, 2, 10, 6, 8, 7, 5, 9, 11, 3, 1, 4], P0-I11
205. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen, zwei Violinen, Bratsche und Cello. 19. Oktober 1954, [0, 6, 11, 2, 1, 5, 3, 8, 10, 7, 9, 4], P0-I9
206. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen. 24. Juni 1952, [0, 6, 10, 7, 9, 3, 4, 1, 8, 5, 11, 2], P0-I11
207. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen. 26. Juni 1952, [0, 6, 2, 10, 9, 5, 3, 4, 8, 7, 11, 1], P0-I1
208. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen. 30. Juni 1952, I, [0, 2, 10, 4, 11, 8, 1, 7, 5, 3, 6, 9], P0-I5

209. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen. Mai 1955, [0, 6, 11, 4, 2, 9, 3, 1, 5, 7, 10, 8], P0-I7
210. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen und Akkordeon (Hausorchester), [0, 7, 2, 9, 6, 4, 11, 3, 10, 8, 1, 5], P0-I5
211. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu vier Händen und Streichquartett, [0, 7, 2, 10, 6, 8, 3, 11, 9, 4, 1, 5], P0-I11
212. Hauer, Josef Matthias: Zwölftonspiel für Oechester. 28. 9. 1954, [0, 8, 9, 6, 10, 4, 11, 1, 2, 5, 3, 7], P0-I11
213. Hauer, Josef Matthias: Zwölftonspiel für Orchester. September 1957, [0, 8, 6, 10, 5, 7, 2, 4, 1, 9, 11, 3], P0-I9
214. Hauer, Josef Matthias: Zwölftonspiel für Violine, Cello und Klavier zu vier Händen, [0, 10, 6, 1, 8, 3, 11, 7, 2, 5, 9, 4], P0-I5
215. Hauer, Josef Matthias: Zwölftonspiel für Violine und Klavier, [0, 10, 7, 2, 8, 6, 3, 4, 9, 11, 1, 5], P0-I11
216. Hauer, Josef Matthias: Zwölftonspiel für Violine und Klavier. 3. April 1955, [0, 2, 6, 4, 9, 10, 5, 3, 7, 8, 11, 1], P0-I5
217. Hauer, Josef Matthias: Zwölftonspiel für Orchester. 28. 9. 1954, [0, 5, 7, 4, 6, 1, 9, 3, 8, 11, 10, 2], P0-I3
218. Hauer, Josef Matthias: Zwölftonspiel für zwei Violinen, Bratsche, Cello und Klavier. 16. April 1958, [0, 3, 8, 2, 9, 1, 11, 5, 7, 4, 6, 10], P0-I7
219. Hauer, Josef Matthias: Zwölftonspiel für zwei Violinen, Bratsche und Cello ('Ins Räumliche übertragen'). 3. September 1953, [0, 10, 7, 2, 8, 6, 3, 4, 9, 11, 1, 5], P0-I11
220. Hauer, Josef Matthias: Zwölftonspiel in drei Teilen für zwei Violinen, Bratsche und Cello. 31. Juli 1953, [0, 10, 7, 2, 8, 6, 3, 4, 9, 11, 1, 5], P0-I11
221. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.10, [0, 4, 6, 7, 8, 10, 9, 5, 3, 2, 1, 11], P0-I9
222. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.11, [0, 4, 5, 6, 8, 9, 7, 3, 2, 1, 11, 10], P0-I7
223. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.12, [0, 3, 6, 7, 9, 10, 11, 8, 5, 4, 2, 1], P0-I11
224. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.14, [0, 2, 5, 7, 8, 10, 11, 9, 6, 4, 3, 1], P0-I11
225. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.15, [0, 1, 3, 6, 7, 9, 11, 10, 8, 5, 4, 2], P0-I5,11
226. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.16, [0, 1, 3, 5, 7, 10, 9, 8, 6, 4, 2, 11], P0-I9
227. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.17, [0,

- 1, 3, 5, 8, 9, 7, 6, 4, 2, 11, 10], P0-I7
228. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.18, [0, 3, 4, 6, 9, 10, 11, 8, 7, 5, 2, 1], P0-I5,11
229. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.2, [0, 1, 2, 3, 4, 10, 9, 8, 7, 6, 5, 11], P0-I9
230. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.20, [0, 1, 2, 5, 7, 8, 11, 10, 9, 6, 4, 3], P0-I11
231. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.21, [0, 1, 2, 5, 6, 10, 9, 8, 7, 4, 3, 11], P0-I9
232. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.22, [0, 1, 2, 4, 8, 9, 7, 6, 5, 3, 11, 10], P0-I7
233. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.23, [0, 3, 4, 5, 9, 10, 11, 8, 7, 6, 2, 1], P0-I11
234. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.24, [0, 3, 4, 7, 8, 10, 9, 6, 5, 2, 1, 11], P0-I9
235. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.25, [0, 3, 5, 6, 8, 9, 7, 4, 2, 1, 11, 10], P0-I7
236. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.26, [0, 3, 4, 6, 7, 8, 5, 2, 1, 11, 10, 9], P0-I5
237. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.27, [0, 2, 4, 5, 6, 7, 3, 1, 11, 10, 9, 8], P0-I3
238. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.29, [0, 1, 6, 7, 8, 9, 11, 10, 5, 4, 3, 2], P0-I11
239. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.3, [0, 2, 3, 4, 5, 10, 11, 9, 8, 7, 6, 1], P0-I11
240. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.31, [0, 1, 2, 3, 6, 7, 11, 10, 9, 8, 5, 4], P0-I11
241. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.32, [0, 1, 2, 3, 4, 6, 11, 10, 9, 8, 7, 5], P0-I11
242. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.4, [0, 2, 3, 4, 8, 10, 9, 7, 6, 5, 1, 11], P0-I9
243. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.5, [0, 2, 4, 5, 8, 10, 11, 9, 7, 6, 3, 1], P0-I11
244. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.7, [0, 2, 4, 6, 8, 9, 7, 5, 3, 1, 11, 10], P0-I7
245. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.8, [0, 2, 4, 6, 7, 8, 5, 3, 1, 11, 10, 9], P0-I5

246. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölfstönigen Modi', No.9, [0, 4, 6, 8, 9, 10, 11, 7, 5, 3, 2, 1], P0-I11
247. Hendler, Maximilian: aus den fünf Liedern nach Texten von Elisabeth Pöschl : 'Sonnenaufgang' für Singstimme und Klavier, Op.44-1, [0, 11, 2, 1, 5, 6, 4, 3, 8, 7, 9, 10], P0-I9
248. Husa, Karel: Poème for Viola and Chamber Orchestra, mvt 1, [0, 6, 5, 7, 8, 11, 9, 10, 3, 4, 2, 1], P0-I9
249. Husa, Karel: Poème for Viola and Chamber Orchestra, mvt 3, [0, 3, 1, 2, 4, 10, 9, 11, 7, 8, 6, 5], P0-I9
250. Johnston, Ben: String Quartet, No.6, [0, 5, 10, 9, 3, 7, 11, 6, 1, 2, 8, 4], P0-I11
251. Kahn, Erich Itor: Bagatelle für Rene Leibowitz, [0, 1, 2, 4, 6, 3, 10, 11, 5, 7, 9, 8], P0-I11
252. Kalodiki, Georgia: Six Sketches for piano, [0, 7, 6, 1, 2, 9, 8, 3, 4, 11, 5, 10], P0-I5
253. Klein, Fritz Heinrich: Die Maschine. Eine extonale Selbstsatire von Heautontimorumenus., Op.1 (Das Maschinen-Thema), [0, 5, 7, 9, 3, 2, 11, 6, 8, 10, 4, 1], P0-I1
254. Klenau, Paul von: Elisabeth von England, [0, 2, 8, 11, 7, 1, 4, 10, 3, 6, 5, 9], P0-I5
255. Krenek, Ernst: Eight Piano Pieces, [0, 10, 1, 7, 6, 11, 5, 8, 3, 9, 2, 4], P0-I3
256. Krenek, Ernst: Karl V, King Francis Row, [0, 10, 5, 6, 11, 3, 9, 4, 2, 7, 1, 8], P0-I7
257. Krenek, Ernst: Kette, Kreis, und Spiegel (Circle, Chain and Mirror), Op.160, [0, 5, 6, 9, 8, 4, 10, 7, 11, 3, 1, 2], P0-I7
258. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 1, [0, 2, 4, 5, 8, 10, 6, 7, 9, 11, 1, 3], P0-I11
259. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 2, [0, 2, 3, 6, 8, 10, 5, 7, 9, 11, 1, 4], P0-I7
260. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 3, [0, 1, 4, 6, 8, 10, 5, 7, 9, 11, 2, 3], P0-I3
261. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 4, [0, 3, 5, 7, 9, 11, 6, 8, 10, 1, 2, 4], P0-I1
262. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 5, [0, 2, 4, 6, 8, 9, 5, 7, 10, 11, 1, 3], P0-I7
263. Krenek, Ernst: Lamentatio Jeremiae Prophetarum, Op.93, row 6, [0, 2, 4, 6, 7, 10, 5, 8, 9, 11, 1, 3], P0-I3
264. Krenek, Ernst: Sechs Vermessene, Op.168, [0, 3, 1, 6, 2, 4, 10, 5, 9, 7, 8, 11], P0-I11
265. Krenek, Ernst: Sestina, Op.161, [0, 8, 11, 10, 4, 6, 7, 1, 5, 3, 9, 2], P0-I1
266. Krenek, Ernst: Sonata, No.3, Op.92, No.4, [0, 10, 5, 8, 3, 2, 6, 7, 1, 9, 11, 4], P0-I9
267. Krenek, Ernst: Studies in Counterpoint, [0, 4, 3, 11, 10, 9, 1, 7, 8, 6, 2, 5], P0-I5
268. Krenek, Ernst: Studies in Counterpoint (i), [0, 4, 3, 11, 10, 9, 1, 7, 8, 6, 2, 5], P0-I5
269. Krenek, Ernst: Studies in Counterpoint (ii), [0, 3, 10, 4, 9, 11, 8, 7, 5, 1, 2, 6], P0-I5
270. Krenek, Ernst: Suite, Op.84 for solo cello, [0, 4, 3, 11, 10, 9, 1, 7, 8, 6, 2, 5], P0-I5

271. Krenek, Ernst: Symeon, der Stylit, [0, 3, 10, 4, 9, 11, 8, 7, 5, 1, 2, 6], P0-I5
272. Krenek, Ernst: concert for organ and string-orchestra, Op.230, [0, 11, 8, 4, 3, 6, 7, 5, 2, 9, 10, 1], P0-I1
273. Kukuck, Felicitas: 'Wo bist Du Trost'; motet, [0, 11, 10, 7, 6, 1, 2, 5, 4, 3, 9, 8], P0-I3
274. Lackner, Peter: 'Davongeflogene Seelen' für Singstimme, Violoncello und Klavier, [0, 10, 4, 7, 6, 1, 9, 11, 5, 2, 3, 8], P0-I3,9
275. Lackner, Peter: 'Der Winter', [0, 6, 3, 5, 9, 11, 7, 1, 4, 2, 10, 8], P0-I1,7
276. Lackner, Peter: 'INKE TAN MAGROV' für Singstimme und Klavier, [0, 6, 5, 10, 8, 3, 7, 1, 2, 9, 11, 4], P0-I7
277. Lackner, Peter: 'Ständchen' für zwei Violinen und zwei Bratschen. 1913,2013, [0, 4, 2, 8, 11, 7, 10, 5, 9, 1, 3, 6], P0-I5
278. Lackner, Peter: 'Wo ist der Freund' (erstes Lied aus dem Zyklus 'Wilde Erdbeeren' für Singstimme und Klavier), [0, 3, 6, 2, 9, 11, 7, 4, 1, 5, 10, 8], P0-I7
279. Lackner, Peter: 1. Kanonzyklus, [0, 7, 5, 9, 1, 3, 11, 8, 4, 6, 10, 2], P0-I11
280. Lackner, Peter: 3. Kanonzyklus, [0, 6, 8, 10, 1, 3, 5, 11, 9, 7, 4, 2], P0-I5
281. Lackner, Peter: 4. Kanonzyklus, [0, 5, 3, 7, 11, 1, 9, 4, 6, 2, 10, 8], P0-I9
282. Lackner, Peter: 5. Kanonzyklus, [0, 7, 11, 9, 1, 3, 5, 8, 10, 6, 2, 4], P0-I5
283. Lackner, Peter: AGNI MEI (Kanon für Klavier. 5. Juni 2015), [0, 4, 10, 11, 1, 2, 8, 7, 3, 6, 9, 5], P0-I7
284. Lackner, Peter: Florianische Reihe, [0, 3, 9, 7, 4, 11, 5, 2, 8, 6, 1, 10], P0-I5
285. Lackner, Peter: INKE TAN MAGROV für Singstimme und Klavier (zweites Lied aus dem Zyklus 'Wilde Erdbeeren'), [0, 2, 9, 5, 8, 11, 3, 1, 6, 10, 7, 4], P0-I3
286. Lackner, Peter: Kanon-Polska für zwei Bratschen. 6. Juni 1993, [0, 6, 3, 1, 10, 8, 5, 11, 2, 4, 7, 9], P0-I5
287. Lackner, Peter: Kanon für B. L., 7. Oktober 2017, [0, 9, 10, 5, 3, 7, 11, 2, 1, 6, 8, 4], P0-I11
288. Lackner, Peter: Kanon für Cello und Klavier, [0, 2, 9, 10, 6, 5, 1, 11, 4, 3, 7, 8], P0-I1
289. Lackner, Peter: Kanon für Flöte, Akkordeon, zwei Violinen, Bratsche und Klavier, [0, 5, 3, 7, 11, 1, 9, 4, 6, 2, 10, 8], P0-I9
290. Lackner, Peter: Kanon für Hammerklavier. März 2016, [0, 2, 1, 5, 7, 3, 11, 9, 10, 6, 4, 8], P0-I11
291. Lackner, Peter: Kanon für Kammerorchester, [0, 9, 11, 6, 2, 4, 7, 10, 8, 1, 5, 3], P0-I7
292. Lackner, Peter: Kanon für Klavier, [0, 6, 8, 10, 1, 3, 5, 11, 9, 7, 4, 2], P0-I5
293. Lackner, Peter: Kanon für Klavier. 15. Juni 1992, [0, 10, 3, 8, 6, 5, 2, 1, 11, 4, 9, 7], P0-I7
294. Lackner, Peter: Kanon für Klavier. 21. Juni 1998, [0, 7, 6, 5, 1, 4, 3, 8, 9, 10, 2, 11], P0-I3
295. Lackner, Peter: Kanon für Klavier. 27. Juni, 26. September 2002, [0, 9, 4, 1, 2, 8, 7, 10, 3, 6, 5, 11], P0-I7
296. Lackner, Peter: Kanon für Klavier. 5. April 1989, [0, 2, 9, 10, 6, 5, 1, 11, 4, 3, 7, 8], P0-I1
297. Lackner, Peter: Kanon für Klavier. April 2000, [0, 5, 3, 7, 11, 1, 9, 4, 6, 2, 10, 8], P0-I9

298. Lackner, Peter: Kanon für Klavier zu vier Händen. 12. Juni 1996, [0, 4, 2, 8, 11, 10, 5, 1, 3, 9, 6, 7], P0-I5
299. Lackner, Peter: Kanon für Klavier zu vier Händen. Frühling 1984, [0, 1, 10, 7, 9, 4, 5, 11, 8, 6, 2, 3], P0-I3
300. Lackner, Peter: Kanon für Klavierquartett, [0, 8, 6, 11, 3, 9, 1, 5, 7, 2, 10, 4], P0-I1
301. Lackner, Peter: Kanon für Klavierquartett. 27. April 1991, [0, 6, 3, 5, 9, 11, 7, 1, 4, 2, 10, 8], P0-I1,7
302. Lackner, Peter: Kanon für Klavierquartett. 27. Juni 1991, [0, 2, 6, 9, 11, 3, 7, 5, 1, 10, 8, 4], P0-I7
303. Lackner, Peter: Kanon für Schwegelpfeife in A und Geige, [0, 9, 7, 2, 10, 4, 3, 6, 8, 1, 5, 11], P0-I3
304. Lackner, Peter: Kanon für Streichquartett, [0, 9, 3, 5, 1, 11, 7, 10, 4, 2, 6, 8], P0-I7
305. Lackner, Peter: Kanon für Streichquartett. 3. Jänner 1990, [0, 6, 4, 8, 11, 3, 1, 7, 9, 5, 2, 10], P0-I1
306. Lackner, Peter: Kanon für Streichquartett und Orgel. 21. November 1993, [0, 10, 2, 5, 4, 7, 1, 11, 3, 9, 8, 6], P0-I1
307. Lackner, Peter: Kanon für Tenor-Hackbrett. 19. März 2014, [0, 8, 4, 6, 9, 1, 11, 3, 7, 5, 2, 10], P0-I11
308. Lackner, Peter: Kanon für Violine, Bratsche und Klavier, [0, 4, 2, 8, 11, 7, 10, 5, 9, 1, 3, 6], P0-I5
309. Lackner, Peter: Kanon für Violine und Violoncello, [0, 2, 9, 10, 6, 5, 1, 11, 4, 3, 7, 8], P0-I1
310. Lackner, Peter: Kanon für acht Instrumente. Dezember 1991, März 2007, [0, 11, 3, 10, 6, 2, 7, 8, 4, 9, 1, 5], P0-I7
311. Lackner, Peter: Kanon für drei Bratschen, [0, 11, 3, 10, 6, 2, 7, 8, 4, 9, 1, 5], P0-I7
312. Lackner, Peter: Kanon für sechs Instrumente. 16. März 2009, [0, 7, 6, 3, 2, 10, 1, 8, 11, 5, 4, 9], P0-I11
313. Lackner, Peter: Kanon für sechs Posaunen. Herbst 1996, [0, 9, 1, 6, 4, 8, 11, 2, 10, 7, 5, 3], P0-I11
314. Lackner, Peter: Kanon für zwei Gitarren. September 2001, [0, 5, 3, 9, 11, 6, 7, 2, 4, 10, 8, 1], P0-I1,7
315. Lackner, Peter: Kanon für zwei Violinen und Klavier. Frühjahr 1984, [0, 1, 10, 7, 9, 4, 5, 11, 8, 6, 2, 3], P0-I3
316. Lackner, Peter: Kanon à 3, [0, 11, 6, 10, 2, 7, 3, 4, 9, 5, 1, 8], P0-I3
317. Lackner, Peter: Kanon à 4 – ‘Für Harald Fripertinger zum 50. Geburtstag’, [0, 10, 3, 6, 5, 8, 1, 11, 9, 4, 7, 2], P0-I7
318. Lackner, Peter: Kanon á 4, [0, 4, 2, 8, 11, 7, 10, 5, 9, 1, 3, 6], P0-I5
319. Lackner, Peter: Kanon á 5 für Klaus Chudoba, [0, 2, 10, 8, 6, 11, 3, 1, 5, 7, 9, 4], P0-I3
320. Lackner, Peter: Moebius-Band für Flöte, Violine, Violoncello und Klavier, [0, 3, 6, 2, 9, 11, 7, 4, 1, 5, 10, 8], P0-I7
321. Lackner, Peter: Moebius-Band für sechs Violinen, [0, 3, 6, 2, 9, 11, 7, 4, 1, 5, 10, 8], P0-I7
322. Lackner, Peter: Moebiusband für Violine und Klavier (Chinesenfolter I), [0, 2, 4, 6, 10, 5, 1, 11, 9, 7, 3, 8], P0-I1

323. Lackner, Peter: Reihenspiel für Orgel, [0, 9, 6, 11, 5, 4, 10, 7, 2, 1, 8, 3], P0-I7
324. Lackner, Peter: Salambo-Kanon (à 4); Bad Aussee, 2. Februar 2008, [0, 6, 9, 2, 8, 10, 4, 7, 1, 11, 3, 5], P0-I1
325. Lackner, Peter: Sponsions-Kanon, [0, 4, 1, 10, 3, 7, 9, 5, 8, 11, 6, 2], P0-I9
326. Lackner, Peter: TACET (drittes Lied aus dem Zyklus 'Wilde Erdbeeren'), [0, 2, 9, 5, 8, 11, 4, 7, 10, 6, 1, 3], P0-I3
327. Leibowitz, René: String Quartet, No.3, Op.26, [0, 8, 9, 7, 6, 1, 2, 5, 4, 10, 11, 3], P0-I11
328. Lewin, David: Just a Minute, Roger, [0, 11, 4, 5, 7, 3, 2, 6, 8, 1, 10, 9], P0-I1
329. Lu, Shi-Lin: A Family of Red-Crowned Cranes, [0, 2, 9, 7, 4, 6, 11, 8, 1, 3, 10, 5], P0-I5
330. Lu, Yen: A Bird Flying By, [0, 6, 3, 4, 8, 7, 11, 5, 10, 2, 9, 1], P0-I5
331. Luo, Zhong-Rong: Dusk, row 1, [0, 2, 7, 5, 10, 8, 6, 3, 1, 11, 9, 4], P0-I11
332. Luo, Zhong-Rong: Evening, [0, 2, 7, 5, 10, 8, 6, 3, 1, 11, 9, 4], P0-I11
333. Luo, Zhong-Rong: Sonatina, mvt 3, [0, 2, 7, 4, 11, 8, 5, 9, 10, 1, 3, 6], P0-I5
334. Luo, Zhong-Rong: String Quartet, No.2, [0, 3, 5, 10, 6, 8, 11, 1, 9, 2, 4, 7], P0-I7
335. Luo, Zhong-Rong: String Quartet, No.3, row 1, [0, 2, 4, 7, 5, 10, 8, 1, 6, 3, 9, 11], P0-I1
336. Luo, Zhong-Rong: String Quartet, No.3, row 3, [0, 2, 7, 9, 11, 1, 3, 6, 10, 4, 5, 8], P0-I5
337. Luo, Zhong-Rong: Three Piano Pieces, "Arabeque", row 1, [0, 2, 5, 10, 6, 1, 3, 8, 11, 9, 7, 4], P0-I9
338. Lutyens, Elisabeth: Five Little Pieces for Clarinet and Piano, [0, 8, 4, 1, 10, 2, 9, 3, 5, 6, 11, 7], P0-I7
339. Lutyens, Elisabeth: Présages, Op.53, [0, 1, 11, 2, 10, 8, 5, 3, 4, 7, 9, 6], P0-I5
340. Lutyens, Elisabeth: Quincunx, Op.44, [0, 6, 11, 1, 5, 2, 7, 3, 4, 9, 10, 8], P0-I9
341. Maderna, Bruno: Improvvisazione N. 1, [0, 11, 4, 8, 3, 2, 7, 6, 1, 5, 10, 9], P0-I9
342. Maderna, Bruno: Musica su due dimensioni, [0, 2, 9, 4, 6, 11, 8, 10, 1, 3, 5, 7], P0-I7
343. Martin, Frank: Petite complainte, [0, 11, 10, 6, 2, 4, 5, 9, 8, 7, 3, 1], P0-I7
344. Martino, Donald: Fantasy Variations, [0, 3, 1, 10, 2, 8, 11, 5, 6, 9, 7, 4], P0-I7
345. Matthias, Josef: Salambo, Op.60, [0, 6, 9, 2, 8, 10, 4, 7, 1, 11, 3, 5], P0-I1
346. Messiaen, Olivier: Mode de valeurs et d'intensités, Series 1, [0, 11, 6, 5, 4, 3, 1, 10, 9, 7, 2, 8], P0-I1
347. Morris, Robert: Entanglements, [0, 3, 10, 5, 11, 6, 1, 7, 9, 2, 8, 4], P0-I7
348. Morris, Robert: Exchanges, [0, 4, 3, 1, 9, 5, 8, 6, 2, 10, 11, 7], P0-I11
349. Morris, Robert: Pari Passu, row 1, [0, 6, 10, 11, 2, 3, 9, 1, 7, 8, 4, 5], P0-I7
350. Morris, Robert: Refrains, [0, 3, 4, 2, 6, 10, 1, 8, 11, 7, 5, 9], P0-I11
351. Morris, Robert: Roundelay, row 3, [0, 10, 9, 3, 4, 6, 8, 11, 2, 7, 1, 5], P0-I5,11
352. Morris, Robert: Terrane, [0, 11, 1, 3, 2, 5, 6, 4, 9, 7, 8, 10], P0-I9
353. Morris, Robert: Three Musicians, [0, 9, 7, 6, 8, 1, 11, 2, 4, 5, 3, 10], P0-I11
354. Morris, Robert: Tournament for 12 trombones, [0, 7, 6, 4, 11, 8, 5, 9, 1, 3, 2, 10], P0-I9
355. Nichols, Jeff: ...its darkening opposite, or Set Portrait in a Convex Mirror, [0, 4, 8, 7, 11, 2, 3, 6, 1, 9, 10, 5], P0-I5

356. Nono, Luigi: Incontri, [0, 2, 3, 8, 9, 6, 4, 5, 7, 11, 1, 10], P0-I1,7
357. Nono, Luigi: Intolleranza, Baritone, [0, 2, 7, 9, 4, 6, 11, 1, 8, 10, 3, 5], P0-I5
358. Nono, Luigi: La terra e la compagna (sketch), Series 3, [0, 9, 6, 3, 1, 4, 7, 10, 11, 8, 5, 2], P0-I11
359. Nono, Luigi: La terra e la compagna (sketch), Series 5, [0, 7, 2, 4, 9, 10, 5, 1, 6, 11, 8, 3], P0-I3
360. Nono, Luigi: La terra e la compagna (sketch), Series 7, [0, 5, 3, 10, 7, 1, 8, 9, 2, 6, 11, 4], P0-I9
361. Nono, Luigi: La terra e la compagna (sketch), Series 8, [0, 4, 5, 11, 3, 6, 10, 2, 7, 9, 1, 8], P0-I1
362. Nono, Luigi: Sarà dolce tacere, [0, 10, 5, 3, 8, 6, 1, 11, 4, 2, 9, 7], P0-I7
363. Panufnik, Andrzej: Sinfonia di Sfere (Symphony, No.5), Chord 2, [0, 3, 6, 9, 11, 2, 5, 8, 10, 1, 4, 7], P0-I7
364. Papaioannou, Yannis: Songs of the Lake, No.1, [0, 8, 5, 7, 6, 11, 2, 10, 1, 3, 9, 4], P0-I9
365. Papaioannou, Yannis: Songs of the Lake, No.2, [0, 7, 4, 6, 5, 1, 9, 2, 8, 10, 3, 11], P0-I3
366. Papaioannou, Yannis: Songs of the Lake, No.4, [0, 5, 11, 9, 6, 10, 7, 2, 3, 1, 4, 8], P0-I1
367. Papaioannou, Yannis: Suite, "XP", [0, 4, 2, 1, 6, 8, 3, 9, 7, 10, 5, 11], P0-I11
368. Papaioannou, Yannis: Suite, "YP", [0, 10, 9, 8, 1, 4, 5, 7, 3, 6, 2, 11], P0-I3
369. Pentland, Barbara: String Quartet, No.3, [0, 11, 3, 6, 5, 9, 10, 8, 1, 2, 7, 4], P0-I1,7
370. Perle, George: First string quartet, [0, 1, 3, 6, 10, 9, 8, 7, 4, 5, 11, 2], P0-I5
371. Pousseur, Henri: Trois Chants Sacrés, [0, 10, 11, 4, 1, 5, 9, 6, 3, 7, 2, 8], P0-I7
372. Preßl, Hermann Markus: 'A 5' für Bassklarinette, Vibraphon und drei Bratschen, [0, 6, 5, 8, 10, 7, 3, 2, 4, 9, 1, 11], P0-I9
373. Preßl, Hermann Markus: Finstersonnen, [0, 3, 9, 6, 11, 5, 1, 2, 7, 8, 10, 4], P0-I1,7
374. Pärt, Arvo: Perpetuum Mobile, [0, 11, 10, 5, 6, 9, 7, 1, 2, 8, 3, 4], P0-I1
375. Pärt, Arvo: Symphony, No.1, [0, 1, 2, 7, 6, 3, 5, 11, 10, 4, 9, 8], P0-I11
376. Reynolds, Roger: Ambages, [0, 1, 4, 5, 7, 6, 8, 9, 10, 11, 2, 3], P0-I3
377. Rochberg, George: String Quartet, No.2 with soprano solo, [0, 11, 6, 5, 1, 2, 8, 7, 3, 4, 9, 10], P0-I9
378. Santoro, Claudio: Peças para Piano, [0, 11, 4, 5, 1, 9, 2, 3, 7, 8, 6, 10], P0-I7
379. Santoro, Claudio: Preludes 18-20, [0, 9, 1, 3, 2, 8, 10, 4, 6, 5, 7, 11], P0-I7
380. Santoro, Claudio: Six Piano Pieces, [0, 10, 4, 1, 11, 2, 5, 6, 3, 9, 7, 8], P0-I7
381. Schnittke, Alfred: Concerto Grosso, No.1, mvt 2, [0, 11, 2, 1, 8, 7, 10, 9, 6, 5, 4, 3], P0-I5
382. Schnittke, Alfred: Concerto Grosso, No.3, (mvt 3, 4), row 7, [0, 3, 11, 9, 10, 1, 4, 2, 7, 8, 5, 6], P0-I5
383. Schnittke, Alfred: Concerto Grosso, No.3, monogram 1, [0, 5, 1, 4, 10, 8, 11, 9, 3, 6, 2, 7], P0-I7
384. Schnittke, Alfred: Concerto Grosso, No.3, [0, 5, 1, 4, 10, 8, 11, 9, 3, 6, 2, 7], P0-I7
385. Schnittke, Alfred: Sonata, No.1 for Violin and Piano, mvt 1, [0, 3, 6, 10, 2, 11, 8, 5, 9, 1, 4, 7], P0-I7
386. Schnittke, Alfred: Sonata, No.2 for Cello and Piano, mvt 2, new row, [0, 3, 6, 9, 10, 1, 4, 7, 8, 11, 2, 5], P0-I5
387. Schnittke, Alfred: Viola Concerto, [0, 11, 5, 2, 1, 6, 3, 8, 7, 4, 10, 9], P0-I9

388. Schnittke, Alfred: Violin Sonata 2, [0, 10, 11, 9, 6, 8, 7, 5, 4, 1, 2, 3], P0-I1
389. Schoenberg, Arnold: A Survivor From Warsaw, Op.46, [0, 1, 6, 2, 10, 9, 5, 4, 11, 3, 7, 8], P0-I5
390. Schoenberg, Arnold: A Survivor From Warsaw, Op.46 (alternative), [0, 1, 6, 2, 10, 9, 4, 7, 3, 8, 11, 5], P0-I5
391. Schoenberg, Arnold: Accompaniment to a Film Scene, Op.34, [0, 3, 11, 1, 10, 9, 6, 8, 7, 5, 2, 4], P0-I5
392. Schoenberg, Arnold: Fantasy for Piano Four Hands, II (fragment), [0, 3, 6, 1, 7, 8, 2, 5, 11, 4, 10, 9], P0-I5
393. Schoenberg, Arnold: Fantasy for Violin and Piano, Op.47, [0, 11, 3, 1, 7, 9, 5, 6, 2, 4, 10, 8], P0-I5
394. Schoenberg, Arnold: Five Piano Pieces, Op.23, No.5, [0, 8, 10, 6, 7, 5, 9, 1, 3, 2, 11, 4], P0-I9
395. Schoenberg, Arnold: Four Pieces for Mixed Chorus, No.1, Op.27, No.1, [0, 11, 8, 2, 1, 7, 9, 10, 4, 3, 5, 6], P0-I5
396. Schoenberg, Arnold: Four Pieces for Mixed Chorus, No.2, Op.27, No.2, [0, 11, 4, 10, 2, 8, 3, 7, 6, 5, 9, 1], P0-I5
397. Schoenberg, Arnold: Four Pieces for Mixed Chorus, No.4, Op.27, No.4, [0, 2, 9, 5, 7, 3, 10, 11, 1, 8, 4, 6], P0-I1
398. Schoenberg, Arnold: Moses und Aron, [0, 1, 7, 5, 6, 4, 10, 8, 9, 11, 2, 3], P0-I3
399. Schoenberg, Arnold: Piano Concerto, Op.42, [0, 7, 11, 2, 1, 9, 3, 5, 10, 6, 8, 4], P0-I5
400. Schoenberg, Arnold: Prelude To A Suite From "Genesis", Op.44, [0, 8, 4, 7, 6, 2, 1, 10, 3, 5, 11, 9], P0-I5
401. Schoenberg, Arnold: Serenade, mvt 5, "Tanzscene", Op.24, [0, 1, 3, 6, 7, 9, 8, 10, 11, 2, 4, 5], P0-I5,11
402. Schoenberg, Arnold: Six Pieces for Male Chorus, No.1, Op.35, [0, 9, 1, 3, 2, 11, 6, 8, 7, 4, 10, 5], P0-I7
403. Schoenberg, Arnold: Six Pieces for Male Chorus, No.2, Op.35, [0, 3, 1, 7, 6, 8, 11, 5, 4, 9, 10, 2], P0-I5
404. Schoenberg, Arnold: Six Pieces for Male Chorus, No.5, Op.35, [0, 6, 9, 1, 2, 10, 7, 3, 11, 5, 4, 8], P0-I5
405. Schoenberg, Arnold: Sonata For Organ, [0, 6, 10, 2, 8, 1, 7, 5, 9, 4, 11, 3], P0-I5
406. Schoenberg, Arnold: String Quartet, No.4, Op.37, [0, 11, 7, 8, 3, 1, 2, 10, 6, 5, 4, 9], P0-I5
407. Schoenberg, Arnold: String Trio, Op.45, [0, 8, 1, 7, 2, 11, 9, 6, 4, 5, 3, 10], P0-I5
408. Schoenberg, Arnold: Suite for Piano, Op.25, [0, 1, 3, 9, 2, 11, 4, 10, 7, 8, 5, 6], P0-I7
409. Schoenberg, Arnold: Three Satires for Mixed Chorus, No.3, Op.28, No.3, [0, 1, 11, 3, 9, 5, 2, 4, 10, 6, 8, 7], P0-I7
410. Schoenberg, Arnold: Three Songs, No.2, "Tot", Op.48, [0, 1, 7, 11, 8, 2, 6, 5, 10, 9, 3, 4], P0-I5
411. Schoenberg, Arnold: Three Times a Thousand Years, Op.50a, [0, 2, 11, 9, 10, 4, 3, 7, 5, 6, 8, 1], P0-I5

412. Schoenberg, Arnold: Two Piano Pieces, No.1, Op.33a, [0, 7, 2, 1, 11, 8, 3, 5, 9, 10, 4, 6], P0-I5
413. Schoenberg, Arnold: Two Piano Pieces, No.2, Op.33b, [0, 2, 6, 4, 10, 9, 7, 11, 8, 5, 1, 3], P0-I5
414. Schoenberg, Arnold: Variations for Orchestra, Op.31, [0, 6, 8, 5, 7, 11, 4, 3, 9, 10, 1, 2], P0-I9
415. Schoenberg, Arnold: Violin Concerto, Op.36, [0, 1, 6, 2, 7, 9, 3, 4, 10, 11, 5, 8], P0-I5
416. Schoenberg, Arnold: Violin Phantasy, Op.47, [0, 11, 3, 1, 7, 9, 6, 2, 10, 5, 8, 4], P0-I5
417. Schoenberg, Arnold: Von Heute Auf Morgen, Op.32, [0, 1, 7, 11, 9, 3, 6, 5, 2, 10, 8, 4], P0-I5
418. Schoenberg, Arnold: Wind Quintet, Op.26, [0, 4, 6, 8, 10, 9, 7, 11, 1, 3, 5, 2], P0-I11
419. Schuller, Gunther: Transformation, [0, 2, 4, 3, 8, 11, 9, 6, 5, 10, 7, 1], P0-I9
420. Schwantner, Joseph: Modus Caelestis (m. 39), [0, 6, 11, 10, 5, 9, 4, 8, 3, 2, 7, 1], P0-I1
421. Schwantner, Joseph: Wild Angels of the Open Hills, 2, “Angels of the Shadowed Ancient Land,” m. 21, [0, 8, 9, 11, 3, 7, 6, 5, 2, 4, 10, 1], P0-I1
422. Searle, Humphrey: Toccata alla Passacaglia, Op.31, [0, 5, 6, 1, 10, 7, 9, 8, 3, 2, 4, 11], P0-I9
423. Seiber, Mátyás: Concert Piece for Violin and Piano, [0, 1, 7, 6, 11, 10, 4, 5, 9, 8, 2, 3], P0-I3
424. Seiber, Mátyás: Sonata for Violin and Piano, [0, 1, 11, 10, 7, 6, 8, 9, 4, 3, 5, 2], P0-I3
425. Sengstschmid, Johann: Meditation für Orgel, Op.43a, [0, 6, 3, 1, 10, 8, 5, 2, 11, 9, 7, 4], P0-I5
426. Sessions, Roger: Piano Sonata, No.3, mvt 2, [0, 1, 5, 4, 8, 2, 11, 10, 6, 7, 3, 9], P0-I11
427. Sessions, Roger: When Lilacs Last in the Dooryard Bloom’d, [0, 2, 4, 10, 5, 8, 9, 1, 11, 7, 6, 3], P0-I11
428. Shapey, Ralph: String Quartet, No.9, [0, 8, 9, 3, 5, 1, 2, 6, 4, 10, 11, 7], P0-I7
429. Shostakovich, Dmitri: Symphony, No.14, mov. I, [0, 11, 9, 4, 3, 10, 8, 7, 5, 6, 1, 2], P0-I5
430. Slonimsky, Nicholas: No. 1217a Fourths (Twelve-Tone Patterns), [0, 5, 10, 3, 11, 6, 1, 8, 4, 9, 2, 7], P0-I7
431. Slonimsky, Nicholas: No. 1224a Sixths (Twelve-Tone Patterns), [0, 9, 6, 3, 7, 10, 1, 4, 8, 5, 2, 11], P0-I11
432. Slonimsky, Nicholas: No. 1238a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals), [0, 9, 7, 5, 3, 2, 4, 6, 8, 1, 10, 11], P0-I1
433. Slonimsky, Nicholas: No. 1241a Mutually Exclusive Diminished-Seventh Chords (Twelve-Tone Spirals), [0, 9, 6, 3, 11, 5, 2, 8, 7, 10, 1, 4], P0-I1,7
434. Slonimsky, Nicholas: No. 1252a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 5, 9, 2, 6, 8, 11, 4], P0-I9
435. Slonimsky, Nicholas: No. 1252b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 5, 3, 10, 6, 2, 11, 7, 4, 1, 9], P0-I7
436. Slonimsky, Nicholas: No. 1254a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 5, 8, 11, 3, 6, 9, 1], P0-I1
437. Slonimsky, Nicholas: No. 1254b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 3, 1, 10, 6, 4, 11, 7, 5, 2, 9], P0-I5
438. Slonimsky, Nicholas: No. 1255a [Slonimsky: Moto Perpetuo] Quadrtonal Arpeggios (Division of

- Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 6, 9, 2, 5, 8, 11, 3], P0-I3,9
439. Slonimsky, Nicholas: No. 1255b [Slonimsky: Moto Perpetuo] Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 3, 2, 9, 6, 5, 1, 10, 7, 4, 11], P0-I1,7
440. Slonimsky, Nicholas: No. 1258a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 6, 9, 1, 5, 8, 11, 4], P0-I11
441. Slonimsky, Nicholas: No. 1258b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 5, 3, 11, 7, 2, 10, 6, 4, 1, 9], P0-I9
442. Slonimsky, Nicholas: No. 1259a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 2, 6, 9, 1, 5, 7, 10, 3], P0-I9
443. Slonimsky, Nicholas: No. 1259b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 2, 10, 7, 5, 1, 9, 6, 3, 11], P0-I1
444. Slonimsky, Nicholas: No. 1260a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 6, 9, 1, 5, 8, 11, 3], P0-I3
445. Slonimsky, Nicholas: No. 1260b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 3, 2, 10, 6, 5, 1, 9, 7, 4, 11], P0-I7
446. Slonimsky, Nicholas: No. 1263a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 6, 9, 1, 4, 8, 11, 5], P0-I11
447. Slonimsky, Nicholas: No. 1263b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 5, 3, 11, 7, 6, 2, 9, 4, 1, 10], P0-I9
448. Slonimsky, Nicholas: No. 1265 Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 4, 7, 10, 2, 5, 8, 11], P0-I11
449. Slonimsky, Nicholas: No. 1265a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 4, 7, 10, 2, 5, 8, 11], P0-I11
450. Slonimsky, Nicholas: No. 1265b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 9, 3, 1, 10, 6, 4, 11, 7, 5, 2, 8], P0-I5
451. Slonimsky, Nicholas: No. 1266a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 2, 5, 8, 11, 4, 7, 10, 1], P0-I1
452. Slonimsky, Nicholas: No. 1266b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 9, 3, 2, 11, 6, 5, 1, 8, 7, 4, 10], P0-I7
453. Slonimsky, Nicholas: No. 1267a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 4, 8, 11, 5, 6, 9, 2], P0-I9
454. Slonimsky, Nicholas: No. 1267b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 9, 4, 1, 10, 7, 5, 2, 8, 6, 3, 11], P0-I3
455. Slonimsky, Nicholas: No. 1273a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 5, 9, 6, 2, 11, 8, 4], P0-I9
456. Slonimsky, Nicholas: No. 1273b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 5, 1, 2, 6, 9, 8, 4, 11], P0-I9

457. Slonimsky, Nicholas: No. 1275a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 5, 9, 6, 1, 11, 8, 3], P0-I1
458. Slonimsky, Nicholas: No. 1275b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 5, 2, 1, 6, 9, 8, 3, 11], P0-I1
459. Slonimsky, Nicholas: No. 1276a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 6, 9, 5, 2, 11, 8, 3], P0-I3,9
460. Slonimsky, Nicholas: No. 1276b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 6, 1, 2, 5, 9, 8, 3, 11], P0-I3,9
461. Slonimsky, Nicholas: No. 1279a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 6, 9, 5, 1, 11, 8, 4], P0-I11
462. Slonimsky, Nicholas: No. 1279b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 6, 2, 1, 5, 9, 8, 4, 11], P0-I11
463. Slonimsky, Nicholas: No. 1280a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 2, 6, 9, 5, 1, 10, 7, 3], P0-I9
464. Slonimsky, Nicholas: No. 1280b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 6, 2, 5, 9, 1, 10, 7, 3], P0-I9
465. Slonimsky, Nicholas: No. 1281a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 2, 6, 9, 5, 1, 11, 8, 3], P0-I3
466. Slonimsky, Nicholas: No. 1281b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 6, 2, 1, 5, 9, 8, 3, 11], P0-I3
467. Slonimsky, Nicholas: No. 1284a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 6, 9, 4, 1, 11, 8, 5], P0-I11
468. Slonimsky, Nicholas: No. 1284b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 6, 2, 1, 4, 9, 8, 5, 11], P0-I11
469. Slonimsky, Nicholas: No. 1286a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 4, 7, 2, 10, 8, 5, 11], P0-I11
470. Slonimsky, Nicholas: No. 1286b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 4, 1, 10, 2, 7, 8, 5, 11], P0-I11
471. Slonimsky, Nicholas: No. 1287a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 2, 5, 8, 4, 11, 10, 7, 1], P0-I1
472. Slonimsky, Nicholas: No. 1287b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 5, 2, 11, 4, 8, 7, 1, 10], P0-I1
473. Slonimsky, Nicholas: No. 1288a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 4, 8, 5, 11, 9, 6, 2], P0-I9
474. Slonimsky, Nicholas: No. 1288b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 4, 1, 11, 5, 8, 6, 2, 9], P0-I9
475. Slonimsky, Nicholas: No. 258 Infrapolation of Three Notes (Ditone Progression; Equal Division of

- One Octave into Three Parts), [0, 11, 10, 9, 4, 3, 2, 1, 8, 7, 6, 5], P0-I5
476. Slonimsky, Nicholas: No. 270 Infrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 10, 9, 7, 4, 2, 1, 11, 8, 6, 5, 3], P0-I3
477. Slonimsky, Nicholas: No. 277 Infrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 10, 7, 5, 4, 2, 11, 9, 8, 6, 3, 1], P0-I1
478. Slonimsky, Nicholas: No. 370 Infra-Inter-Ultrapolation (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 7, 1, 6, 4, 11, 5, 10, 8, 3, 9, 2], P0-I9
479. Slonimsky, Nicholas: No. 388 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 3, 9, 6, 4, 7, 1, 10, 8, 11, 5, 2], P0-I5
480. Slonimsky, Nicholas: No. 389 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 9, 3, 6, 4, 1, 7, 10, 8, 5, 11, 2], P0-I11
481. Slonimsky, Nicholas: No. 390 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 3, 9, 6, 4, 7, 1, 10, 8, 11, 5, 2], P0-I5
482. Slonimsky, Nicholas: No. 391 Miscellaneous Patterns [Diminished Seventh Chords] (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 9, 3, 6, 4, 1, 7, 10, 8, 5, 11, 2], P0-I11
483. Slonimsky, Nicholas: No. 638 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 11, 9, 10, 4, 3, 1, 2, 8, 7, 5, 6], P0-I5
484. Slonimsky, Nicholas: No. 641 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 7, 6, 5, 4, 8, 9, 10, 11], P0-I11
485. Slonimsky, Nicholas: No. 643 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 6, 7, 8, 9, 10, 11, 5, 4, 3, 2, 1], P0-I11
486. Slonimsky, Nicholas: No. 644 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 6, 7, 8, 9, 10, 11, 5, 4, 3, 2, 1], P0-I11
487. Slonimsky, Nicholas: No. 692 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 3, 5, 8, 10, 11, 1, 4, 6, 7, 9], P0-I9
488. Slonimsky, Nicholas: No. 698 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 5, 7, 8, 10, 1, 3, 4, 6, 9, 11], P0-I11
489. Slonimsky, Nicholas: No. 736 Inter-Infra-Ultrapolation (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 2, 7, 9, 8, 10, 3, 5, 4, 6, 11, 1], P0-I1
490. Slonimsky, Nicholas: No. 813 Interpolation of Three Notes (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 3, 6, 9, 10, 1, 4, 7, 8, 11, 2, 5], P0-I5
491. Slonimsky, Nicholas: No. 909 Infra-Inter-Ultrapolation (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 9, 3, 6, 5, 2, 8, 11, 10, 7, 1, 4], P0-I1

492. Spinner, Leopold: Concert for Piano and Orchestra, Op.4, [0, 2, 1, 9, 11, 3, 4, 7, 5, 6, 10, 8], P0-I7
493. Spinner, Leopold: Ouverture for Orchestra, Op.5, [0, 11, 2, 10, 8, 1, 7, 5, 6, 9, 3, 4], P0-I5
494. Spinner, Leopold: Quintet, Op.14, [0, 6, 4, 2, 8, 5, 1, 9, 10, 11, 7, 3], P0-I3
495. Spinner, Leopold: Ricercata, Op.21, [0, 11, 8, 10, 2, 1, 4, 3, 7, 9, 6, 5], P0-I5
496. Spinner, Leopold: Sonata for Piano, Op.3, [0, 9, 8, 6, 7, 10, 1, 4, 5, 3, 2, 11], P0-I11
497. Spinner, Leopold: Sonata for Violin and Piano, Op.1, [0, 7, 6, 1, 3, 8, 5, 10, 2, 9, 4, 11], P0-I5
498. Spinner, Leopold: String Quartet, Op.2, [0, 1, 7, 6, 11, 10, 4, 5, 8, 9, 3, 2], P0-I3
499. Spinner, Leopold: Trio for Violin, Cello, and Piano, Op.6, [0, 1, 7, 4, 10, 9, 6, 5, 11, 8, 2, 3], P0-I3
500. Spinner, Leopold: Variations for Violin and Piano, Op.19, [0, 8, 9, 1, 2, 4, 3, 5, 6, 10, 11, 7], P0-I7
501. Spinner, Leopold: Zwei Lieder, Op.24, [0, 11, 1, 4, 3, 7, 5, 6, 9, 8, 10, 2], P0-I9
502. Stockhausen, Karlheinz: Choral, [0, 1, 10, 6, 8, 3, 5, 2, 4, 11, 9, 7], P0-I5
503. Stockhausen, Karlheinz: Klavierstück IV row 3, [0, 7, 1, 10, 11, 9, 5, 8, 4, 3, 2, 6], P0-I3
504. Stockhausen, Karlheinz: Licht, Eve formula, [0, 4, 3, 2, 5, 6, 10, 11, 9, 1, 7, 8], P0-I1
505. Stockhausen, Karlheinz: Plus-Minus, [0, 1, 7, 9, 8, 6, 3, 10, 2, 5, 11, 4], P0-I11
506. Stockhausen, Karlheinz: Tierkreis, Aries, [0, 3, 2, 9, 7, 8, 11, 6, 1, 5, 4, 10], P0-I1
507. Stockhausen, Karlheinz: Tierkreis, Sagittarius, [0, 6, 5, 2, 3, 4, 7, 8, 9, 10, 11, 1], P0-I1
508. Stravinsky, Igor: A Sermon, a Narrative and a Prayer, [0, 1, 9, 11, 10, 7, 8, 3, 4, 6, 5, 2], P0-I3
509. Stravinsky, Igor: Canticum Sacrum, II, [0, 11, 9, 6, 10, 8, 7, 5, 2, 4, 3, 1], P0-I1
510. Stravinsky, Igor: Elegy for J.F.K., [0, 6, 4, 2, 8, 9, 3, 1, 11, 10, 7, 5], P0-I7
511. Stravinsky, Igor: Introitus "T. S. Eliot in Memoriam", [0, 5, 6, 4, 8, 9, 3, 2, 1, 10, 11, 7], P0-I7
512. Stravinsky, Igor: Requiem Canticles, 1st series, [0, 2, 10, 11, 1, 8, 6, 7, 9, 4, 3, 5], P0-I5
513. Stravinsky, Igor: Variations "Aldous Huxley in Memoriam", [0, 10, 7, 9, 2, 8, 6, 11, 1, 5, 4, 3], P0-I1
514. Talma, Louise: Piano Sonata 2, mvt 4, first row, [0, 4, 8, 2, 5, 10, 1, 11, 6, 9, 7, 3], P0-I11
515. Talma, Louise: Six Etudes, Etude 1, [0, 3, 6, 8, 10, 2, 5, 7, 9, 1, 11, 4], P0-I7
516. Talma, Louise: Six Etudes, Etude 5, [0, 4, 6, 11, 8, 3, 9, 1, 5, 7, 2, 10], P0-I1
517. Talma, Louise: Six Etudes, Etude 6, [0, 8, 6, 9, 4, 5, 2, 1, 3, 10, 7, 11], P0-I7
518. Toufektsis, Orestis: MIKRO-ALLAXI (EpiEnteka II), für 15 Musiker, [0, 8, 3, 7, 2, 4, 10, 11, 1, 6, 9, 5], P0-I1
519. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 1A, [0, 10, 9, 1, 4, 8, 7, 2, 5, 11, 3, 6], P0-I3
520. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 3, [0, 10, 8, 4, 3, 6, 5, 11, 9, 1, 2, 7], P0-I5
521. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 5, [0, 4, 3, 10, 6, 9, 1, 5, 2, 8, 11, 7], P0-I5,11
522. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 7, [0, 2, 11, 8, 5, 3, 10, 9, 1, 7, 6, 4], P0-I9

523. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 8, [0, 4, 3, 11, 6, 8, 2, 9, 10, 7, 1, 5], P0-I1
524. Tranchell, Peter: Septet : [for] 2 violins, oboe, clarinet, horn, bassoon, cello : fifth dodecaфония, [0, 2, 1, 10, 3, 4, 11, 6, 5, 9, 8, 7], P0-I9
525. Tranchell, Peter: Twice a Kiss sketch 1, [0, 9, 1, 2, 4, 8, 5, 7, 10, 6, 3, 11], P0-I7
526. Tranchell, Peter: Twice a Kiss sketch 2, [0, 9, 1, 2, 4, 8, 3, 11, 5, 6, 7, 10], P0-I7
527. Tranchell, Peter: Twice a Kiss sketch 3, [0, 1, 2, 4, 8, 9, 7, 5, 3, 6, 10, 11], P0-I7
528. Urbanner, Erich: Adagio, [0, 3, 1, 11, 10, 9, 8, 7, 6, 4, 2, 5], P0-I5
529. Volkonsky, Andrei: Musica Stricta, mvt 2, row A, [0, 6, 8, 9, 11, 10, 1, 7, 2, 3, 5, 4], P0-I1
530. Volkonsky, Andrei: Musica Stricta, mvt 2, row D, [0, 4, 9, 2, 8, 10, 11, 1, 3, 7, 5, 6], P0-I3
531. Volkonsky, Andrei: Musica Stricta, mvt 4, row G, [0, 6, 5, 4, 3, 2, 1, 11, 9, 10, 8, 7], P0-I1
532. Volkonsky, Andrei: Musica Stricta, mvt 4, row H, [0, 6, 4, 9, 8, 2, 7, 1, 11, 5, 10, 3], P0-I7
533. Wang, Xi-Lin: A Dilapidated Tombstone, [0, 4, 6, 3, 2, 10, 11, 5, 8, 9, 7, 1], P0-I11
534. Weber, Ben: Five Bagatelles for Piano, Op.2, mvt ii, [0, 1, 2, 9, 6, 7, 4, 8, 5, 11, 10, 3], P0-I5
535. Weber, Ben: Humoreske, Op.49, [0, 2, 4, 5, 7, 10, 1, 11, 9, 8, 6, 3], P0-I1
536. Webern, Anton: Op.32 (un-finished), initial sketch, [0, 1, 9, 11, 3, 2, 7, 6, 10, 8, 4, 5], P0-I7
537. Webern, Anton: 3 Volkstexte, "Liebste Jungfrau", Op.17, No.2, [0, 11, 10, 6, 7, 1, 2, 5, 4, 3, 8, 9], P0-I3
538. Webern, Anton: Cantata I, Op.29, [0, 8, 11, 10, 2, 1, 4, 3, 7, 6, 9, 5], P0-I5
539. Webern, Anton: Klavierstück, [0, 1, 2, 11, 10, 4, 5, 6, 9, 8, 7, 3], P0-I7
540. Webern, Anton: Quartet for Violin, Clarinet, Tenor Sax, And Piano, Op.22, [0, 9, 8, 11, 10, 2, 3, 4, 5, 7, 1, 6], P0-I3
541. Webern, Anton: String Quartet, Op.28, [0, 11, 2, 1, 5, 6, 3, 4, 8, 7, 10, 9], P0-I9
542. Webern, Anton: String Trio, Op.20, [0, 11, 6, 5, 10, 9, 1, 2, 7, 8, 4, 3], P0-I1
543. Webern, Anton: Three Songs on Texts by Hildegard Jone, Op.25, [0, 9, 8, 11, 6, 10, 7, 4, 3, 5, 2, 1], P0-I1
544. Wilson, Olly: Piece for Four', [0, 8, 9, 4, 2, 6, 7, 11, 10, 3, 5, 1], P0-I7
545. Wolpe, Stefan: Four Studies on Basic Rows, No.4, "Basic Row" 10, [0, 10, 1, 11, 4, 2, 5, 3, 8, 6, 9, 7], P0-I7
546. Wuorinen, Charles: Piano Concerto, No.3, [0, 5, 2, 1, 11, 3, 10, 9, 4, 6, 8, 7], P0-I9
547. Wuorinen, Charles: Reliquary for Igor Stravinsky, [0, 11, 7, 5, 6, 8, 2, 4, 9, 3, 1, 10], P0-I9
548. Yun, Isang: Funf Stücke für Klavier, Stück 1, Row 1, [0, 4, 2, 6, 5, 8, 7, 9, 3, 1, 10, 11], P0-I3
549. Yun, Isang: Funf Stücke für Klavier, Stück 1, Row 2, [0, 11, 10, 4, 2, 1, 3, 6, 5, 9, 7, 8], P0-I7
550. Yun, Isang: Funf Stücke für Klavier, Stück 3, Row 1, [0, 11, 1, 9, 10, 7, 5, 6, 8, 2, 3, 4], P0-I3
551. Yun, Isang: Funf Stücke für Klavier, Stück 3, Row 2, [0, 4, 2, 8, 5, 6, 7, 9, 3, 11, 10, 1], P0-I3
552. Yun, Isang: Funf Stücke für Klavier, Stück 4, [0, 1, 7, 8, 11, 3, 4, 9, 5, 2, 6, 10], P0-I5
553. Yun, Isang: Funf Stücke für Klavier, Stück 5, [0, 11, 6, 3, 2, 10, 9, 1, 5, 4, 8, 7], P0-I7

- 554. Yun, Isang: Gasa, [0, 11, 7, 8, 6, 5, 2, 9, 10, 1, 3, 4], P0-I9
- 555. Yun, Isang: Riul für Klarinette und Klavier, [0, 5, 6, 9, 8, 4, 3, 7, 1, 2, 11, 10], P0-I7
- 556. Zappa, Frank: Brown Shoes Don't Make It, [0, 11, 3, 2, 9, 1, 7, 8, 4, 10, 5, 6], P0-I7
- 557. Zappa, Frank: Waltz, [0, 11, 3, 2, 9, 1, 7, 8, 4, 10, 5, 6], P0-I7
- 558. Zenk, Ludwig: An einen Springbrunnen, Op.6, No.1, [0, 2, 3, 7, 6, 10, 9, 1, 5, 11, 4, 8], P0-I11
- 559. Zenk, Ludwig: Piano Sonata, Op.1, [0, 1, 8, 4, 6, 5, 2, 10, 9, 3, 11, 7], P0-I3
- 560. hauer, Josef Matthias: Zwölftonspiel für Oechester. 28. 9. 1954, [0, 5, 7, 4, 6, 1, 9, 3, 8, 11, 10, 2], P0-I3

Retrograde Inversion Combinatorial

These rows are combinatorial by retrograde inversion.

- 1. Argento, Dominick: Evensong: Of Love and Angels, [0, 11, 9, 8, 5, 3, 4, 1, 2, 7, 10, 6], P0-RI8
- 2. Bennett, Richard Rodney: Symphony, [0, 2, 9, 8, 3, 5, 6, 1, 7, 11, 10, 4], P0-RI5
- 3. Berg, Alban: Chamber Concerto, mvts 2, 3, [0, 11, 10, 4, 5, 9, 7, 1, 2, 6, 8, 3], P0-RI9
- 4. Berg, Alban: Lyric Suite, mvt I, m.7-9, [0, 3, 7, 8, 2, 1, 9, 6, 4, 11, 5, 10], P0-RI3
- 5. Carter, Elliott: String Quartet, No.3, [0, 11, 2, 9, 5, 3, 4, 8, 10, 7, 1, 6], P0-RI2
- 6. Copland, Aaron: Connotations, row 1, [0, 1, 3, 6, 2, 9, 8, 5, 10, 4, 11, 7], P0-RI3
- 7. Copland, Aaron: Connotations, row 2, [0, 7, 9, 6, 2, 3, 8, 11, 10, 4, 5, 1], P0-RI9
- 8. Copland, Aaron: Piano Fantasy, [0, 7, 2, 10, 8, 3, 6, 4, 11, 9, 1, 5], P0-RI10
- 9. Cordero, Roque: Concerto for Violin, mvt 2B, [0, 5, 3, 11, 6, 8, 7, 2, 1, 4, 9, 10], P0-RI11
- 10. Cordero, Roque: Sonata breve, [0, 1, 4, 11, 10, 7, 5, 8, 9, 6, 3, 2], P0-RI11
- 11. Dallapiccola, Luigi: Due studi, 'Fanfare', [0, 1, 7, 9, 10, 3, 4, 2, 8, 11, 6, 5], P0-RI10
- 12. Dallapiccola, Luigi: Preghiere, [0, 11, 2, 3, 8, 9, 7, 6, 1, 5, 4, 10], P0-RI11
- 13. Dallapiccola, Luigi: Quattro liriche di Antonio Machado, ii, [0, 1, 4, 6, 7, 9, 10, 11, 2, 3, 5, 8], P0-RI1
- 14. Dallapiccola, Luigi: Tre poemi, [0, 8, 9, 6, 3, 1, 2, 11, 7, 5, 4, 10], P0-RI9
- 15. David, Johann Nepomuk: Symphony, No.8, Op.59, [0, 5, 9, 2, 6, 11, 3, 4, 7, 8, 10, 1], P0-RI11
- 16. Denisov, Edison: Five Etudes for Solo Bassoon, row G, [0, 11, 5, 10, 4, 3, 9, 8, 2, 1, 6, 7], P0-RI3
- 17. Dobbins, Bill: Concerto for Jazz Orchestra, [0, 9, 7, 4, 3, 1, 10, 11, 8, 6, 5, 2], P0-RI4
- 18. Eisler, Hanns: >Spruch< for voice and piano, [0, 3, 11, 9, 5, 8, 4, 1, 2, 10, 7, 6], P0-RI8
- 19. Eisler, Hanns: An den Schlaf, [0, 8, 2, 10, 11, 5, 6, 1, 9, 3, 7, 4], P0-RI10
- 20. Eisler, Hanns: Chamber Symphony / Film music for "White Flood", row 1, [0, 1, 2, 3, 11, 7, 6, 5, 9, 8, 10, 4], P0-RI2
- 21. Eisler, Hanns: Chamber Symphony / Film music for "White Flood", row 2, [0, 8, 2, 10, 11, 5, 6, 1, 4, 9, 7, 3], P0-RI10

22. Eisler, Hanns: Deutsche Symphonie, mvt 4, [0, 10, 5, 6, 11, 7, 1, 4, 2, 8, 9, 3], P0-RI5
23. Eisler, Hanns: Deutsche Symphonie, mvt 7, [0, 11, 8, 5, 2, 1, 4, 3, 10, 7, 6, 9], P0-RI1
24. Eisler, Hanns: Deutsche Symphonie, mvts 2, 6, [0, 3, 11, 9, 5, 8, 4, 7, 6, 2, 1, 10], P0-RI8
25. Eisler, Hanns: Five Pieces for Orchestra, mvt 1, [0, 6, 2, 3, 10, 9, 11, 5, 8, 7, 1, 4], P0-RI12
26. Eisler, Hanns: Five Pieces for Orchestra, mvt 2, [0, 2, 3, 1, 11, 7, 5, 4, 8, 10, 9, 6], P0-RI2
27. Eisler, Hanns: Palmström, Op.5, No.4, [0, 11, 2, 8, 3, 9, 6, 7, 10, 1, 4, 5], P0-RI11
28. Eisler, Hanns: Sonata for Piano, No.2 ("in Form von Variationen"), Op.6, row variant 4, [0, 4, 3, 2, 9, 6, 10, 1, 7, 5, 8, 11], P0-RI6
29. Eröd, Ivan: Die Seidenraupen, [0, 4, 6, 3, 1, 10, 8, 11, 9, 5, 2, 7], P0-RI4
30. Florey, Hans: 'Die Blume der Blumen' für Gesang und Viola, [0, 3, 4, 8, 9, 6, 1, 7, 10, 11, 2, 5], P0-RI12
31. Florey, Hans: 'Fort, fort sind meine Rosen' für Gesang und Instrument, [0, 7, 6, 3, 5, 9, 2, 10, 8, 4, 1, 11], P0-RI12
32. Florey, Hans: Grabgesang, [0, 2, 8, 5, 10, 11, 4, 1, 6, 3, 9, 7], P0-RI10
33. Florey, Hans: Griechisch-lateinisches Quadrat der Ordnung 4 mit Fuge in Klangnotation, [0, 9, 3, 7, 4, 10, 2, 6, 1, 8, 11, 5], P0-RI7
34. Florey, Hans: Kleiner Doppelkanon, [0, 4, 6, 3, 8, 9, 7, 2, 1, 5, 11, 10], P0-RI12
35. Florey, Hans: Magisches Quadrat der Ordnung 3, [0, 4, 6, 3, 8, 9, 7, 2, 1, 5, 11, 10], P0-RI12
36. Frankel, Benjamin: The Curse of the Werewolf, [0, 3, 2, 1, 4, 8, 11, 5, 10, 7, 6, 9], P0-RI4
37. Gerhard, Roberto: Concerto for Harpsichord, String Orchestra, and Percussion, [0, 2, 8, 7, 11, 5, 1, 4, 3, 6, 9, 10], P0-RI7
38. Gerhard, Roberto: Gemini, [0, 11, 3, 1, 5, 4, 8, 6, 7, 2, 9, 10], P0-RI4
39. Gerhard, Roberto: Leo, [0, 2, 1, 6, 5, 7, 3, 8, 9, 10, 4, 11], P0-RI7
40. Gerhard, Roberto: Nonet, [0, 11, 1, 3, 5, 4, 10, 8, 2, 7, 9, 6], P0-RI4
41. Gerhard, Roberto: Symphony, No.2, [0, 8, 1, 7, 5, 6, 10, 11, 2, 3, 9, 4], P0-RI1
42. Ginastera, Alberto: Cantata para América Mágica, Op.27, [0, 7, 6, 5, 10, 11, 8, 1, 2, 9, 4, 3], P0-RI5
43. Ginastera, Alberto: Piano Concerto, No.1, Op.28, [0, 11, 5, 1, 8, 2, 7, 6, 10, 4, 9, 3], P0-RI1
44. Ginastera, Alberto: String Quartet, No.2, Op.26, [0, 5, 11, 2, 8, 1, 9, 10, 7, 4, 3, 6], P0-RI1
45. Goehr, Alexander: Little Symphony, Op.15, [0, 3, 7, 10, 6, 4, 5, 2, 9, 8, 11, 1], P0-RI10
46. Goehr, Alexander: Sonata in One Movement, Op.2, [0, 2, 7, 1, 4, 10, 6, 9, 11, 8, 5, 3], P0-RI2
47. Harrison, Lou: Suite for Piano, [0, 1, 6, 2, 5, 7, 11, 4, 9, 8, 10, 3], P0-RI7
48. Harrison, Lou: Untitled Piano Piece, [0, 10, 4, 3, 9, 7, 2, 8, 6, 1, 11, 5], P0-RI7
49. Hauer, Josef Matthias: 'Kaleidoskop' für Orchester, [0, 9, 6, 7, 3, 8, 2, 4, 11, 1, 5, 10], P0-RI3
50. Hauer, Josef Matthias: 'Musik für Schule und Haus II' 22. September 1956. für Violine, Bratsche und Klavier, [0, 7, 8, 1, 6, 5, 10, 2, 11, 9, 3, 4], P0-RI1
51. Hauer, Josef Matthias: Labyrinthischer Tanz [Zwölftonspiel] für Klavier zu vier Händen. 16.

- November 1952, [0, 3, 8, 7, 2, 10, 6, 1, 11, 9, 4, 5], P0-RI10
52. Hauer, Josef Matthias: Nomos, [0, 5, 7, 3, 9, 6, 11, 2, 8, 4, 1, 10], P0-RI12
 53. Hauer, Josef Matthias: Nomos, Op.19 (bb.1-36), [0, 5, 7, 3, 9, 6, 11, 2, 8, 4, 1, 10], P0-RI12
 54. Hauer, Josef Matthias: Nomos, Op.19 (bb.101-102), [0, 7, 4, 2, 1, 10, 9, 11, 8, 6, 3, 5], P0-RI2
 55. Hauer, Josef Matthias: Nomos, Op.19 (bb.129-130), [0, 9, 10, 4, 3, 7, 6, 2, 1, 8, 11, 5], P0-RI7
 56. Hauer, Josef Matthias: Nomos, Op.19 (bb.131-132), [0, 9, 8, 2, 11, 3, 6, 5, 10, 7, 4, 1], P0-RI11
 57. Hauer, Josef Matthias: Nomos, Op.19 (bb.133-134), [0, 8, 5, 11, 2, 7, 4, 6, 3, 1, 10, 9], P0-RI7
 58. Hauer, Josef Matthias: Nomos, Op.19 (bb.141-142), [0, 5, 3, 4, 1, 11, 2, 6, 8, 9, 10, 7], P0-RI4
 59. Hauer, Josef Matthias: Nomos, Op.19 (bb.194-195), [0, 4, 2, 3, 6, 9, 5, 1, 8, 7, 11, 10], P0-RI6
 60. Hauer, Josef Matthias: Nomos, Op.19 (bb.198-201), [0, 8, 9, 11, 3, 5, 6, 1, 2, 7, 10, 4], P0-RI8
 61. Hauer, Josef Matthias: Nomos, Op.19 (bb.202-203), [0, 1, 3, 10, 7, 9, 2, 11, 4, 6, 8, 5], P0-RI10
 62. Hauer, Josef Matthias: Nomos, Op.19 (bb.208-212), [0, 9, 7, 2, 5, 1, 10, 6, 11, 4, 3, 8], P0-RI2
 63. Hauer, Josef Matthias: Nomos, Op.19 (bb.215-219), [0, 3, 8, 2, 6, 5, 4, 1, 10, 11, 9, 7], P0-RI8
 64. Hauer, Josef Matthias: Nomos, Op.19 (bb.255-257), [0, 7, 2, 6, 5, 10, 3, 4, 11, 8, 1, 9], P0-RI12
 65. Hauer, Josef Matthias: Nomos, Op.19 (bb.301-305), [0, 10, 2, 9, 8, 1, 5, 6, 11, 3, 7, 4], P0-RI10
 66. Hauer, Josef Matthias: Nomos, Op.19 (bb.337-338), [0, 1, 11, 5, 4, 3, 8, 9, 2, 10, 6, 7], P0-RI4
 67. Hauer, Josef Matthias: Nomos, Op.19 (bb.348-353), [0, 11, 9, 5, 10, 4, 6, 8, 3, 2, 1, 7], P0-RI9
 68. Hauer, Josef Matthias: Nomos, Op.19 (bb.395-402), [0, 2, 7, 10, 6, 5, 8, 9, 11, 3, 1, 4], P0-RI12
 69. Hauer, Josef Matthias: Nomos, Op.19 (bb.411-414), [0, 2, 8, 3, 5, 6, 7, 4, 9, 10, 1, 11], P0-RI8
 70. Hauer, Josef Matthias: Nomos, Op.19 (bb.467-471), [0, 5, 9, 1, 7, 2, 10, 4, 11, 8, 3, 6], P0-RI2
 71. Hauer, Josef Matthias: Nomos, Op.19 (bb.471-472), [0, 3, 11, 1, 6, 9, 2, 8, 5, 7, 10, 4], P0-RI12
 72. Hauer, Josef Matthias: Nomos, Op.19 (bb.473-474), [0, 6, 9, 1, 3, 11, 8, 4, 5, 7, 10, 2], P0-RI12
 73. Hauer, Josef Matthias: Nomos, Op.19 (bb.490-494), [0, 5, 11, 6, 9, 2, 8, 7, 10, 4, 1, 3], P0-RI11
 74. Hauer, Josef Matthias: Nomos, Op.19 (bb.496-498), [0, 10, 9, 4, 3, 7, 5, 8, 1, 2, 6, 11], P0-RI7
 75. Hauer, Josef Matthias: Nomos, Op.19 (bb.498-501), [0, 3, 1, 10, 7, 6, 2, 11, 8, 5, 4, 9], P0-RI1
 76. Hauer, Josef Matthias: Nomos, Op.19 (bb.525-527), [0, 10, 3, 9, 7, 1, 11, 2, 6, 4, 8, 5], P0-RI10
 77. Hauer, Josef Matthias: Nomos, Op.19 (bb.64-67), [0, 6, 9, 11, 8, 5, 4, 3, 1, 2, 7, 10], P0-RI5
 78. Hauer, Josef Matthias: Nomos, Op.19 (bb.82-83), [0, 2, 11, 8, 5, 10, 9, 1, 7, 3, 4, 6], P0-RI10
 79. Hauer, Josef Matthias: Nomos, Op.19 (bb.87-90), [0, 1, 11, 9, 8, 7, 10, 6, 4, 3, 5, 2], P0-RI8
 80. Hauer, Josef Matthias: Nomos, Op.19 (bb.91-92), [0, 4, 10, 1, 2, 7, 6, 8, 5, 9, 11, 3], P0-RI2
 81. Hauer, Josef Matthias: Tanz [Zwölftonspiel] im langsamen 3/4 Takt für zwei Violinen, zwei Bratschen und Klavier zu zwei Händen, [0, 9, 3, 7, 4, 10, 2, 6, 1, 8, 11, 5], P0-RI7
 82. Hauer, Josef Matthias: Tanz für Violine allein, [0, 7, 3, 4, 10, 9, 2, 8, 11, 1, 6, 5], P0-RI7
 83. Hauer, Josef Matthias: Zwölftonmusik [Zwölftonspiel] für Klavier zu vier Händen. Februar 1959 (Fragment), [0, 9, 3, 7, 4, 10, 2, 6, 1, 8, 11, 5], P0-RI7
 84. Hauer, Josef Matthias: Zwölftonmusik für Orchester, Op.86, [0, 2, 6, 3, 11, 8, 10, 9, 5, 7, 1, 4], P0-RI2

85. Hauer, Josef Matthias: Zwölftonspiel 15. Juni 1957; für Flöte, Oboe, Bassklarinette, Fagott, 2 Violinen, Viola, Violoncello & Klavier vierhändig, [0, 8, 11, 6, 9, 5, 7, 1, 3, 2, 4, 10], P0-RI5
86. Hauer, Josef Matthias: Zwölftonspiel 28. August 1948; für Violine und Klavier, [0, 9, 6, 2, 3, 10, 8, 5, 4, 7, 11, 1], P0-RI12
87. Hauer, Josef Matthias: Zwölftonspiel 31. August 1948; für Violine (Flöte) und Klavier, [0, 9, 6, 2, 3, 10, 8, 5, 4, 7, 11, 1], P0-RI12
88. Hauer, Josef Matthias: Zwölftonspiel 31. August 1948; für Violine und Klavier; 2. Fassung, [0, 9, 6, 2, 3, 10, 8, 5, 4, 7, 11, 1], P0-RI12
89. Hauer, Josef Matthias: Zwölftonspiel März 1958; für Kammerorchester, [0, 5, 10, 4, 1, 7, 2, 11, 8, 3, 6, 9], P0-RI5
90. Hauer, Josef Matthias: Zwölftonspiel November 1957; für zwei Violinen und Klavier, [0, 6, 3, 9, 1, 5, 11, 8, 10, 7, 2, 4], P0-RI6
91. Hauer, Josef Matthias: Zwölftonspiel für Klavier. September 1956, [0, 8, 11, 6, 3, 5, 1, 10, 7, 4, 2, 9], P0-RI11
92. Hauer, Josef Matthias: Zwölftonspiel für Klavier zu zwei Händen. Neujahr 1947 (mit einer Zwölftonreihe von Ernst Hartmann), [0, 10, 6, 3, 7, 4, 9, 2, 8, 11, 1, 5], P0-RI10
93. Hauer, Josef Matthias: Zwölftonspiel für Orchester (August 1957), [0, 9, 4, 6, 11, 3, 2, 8, 5, 1, 7, 10], P0-RI3
94. Hauer, Josef Matthias: Zwölftonspiel für Streichquartett, [0, 3, 7, 2, 9, 6, 4, 10, 1, 8, 11, 5], P0-RI9
95. Hauer, Josef Matthias: Zwölftonspiel für Violine und Cembalo [Klavier]. 27. August 1948, [0, 9, 6, 2, 3, 10, 8, 5, 4, 7, 11, 1], P0-RI12
96. Hauer, Josef Matthias: Zwölftonspiel für Violine und Klavier. 2. September 1956, [0, 6, 8, 1, 10, 5, 9, 3, 11, 4, 7, 2], P0-RI6
97. Hauer, Josef Matthias: Zwölftonspiel für zwei Violinen, Bratsche, Cello und Klavier, [0, 6, 9, 11, 4, 3, 7, 5, 2, 8, 10, 1], P0-RI3
98. Hauer, Josef Matthias: Zwölftonspiel für zwei Violinen, Bratsche und Cello. Jänner 1948, [0, 1, 7, 2, 11, 3, 8, 5, 6, 4, 9, 10], P0-RI2
99. Hauer, Josef Matthias: [Zwölftonspiel] 'Johann Sebastian Bach hat das Wohltemperierte Klavier im Himmel vollendet ...', [0, 10, 5, 4, 2, 9, 8, 1, 3, 11, 6, 7], P0-RI2
100. Hendler, Maximilian: Vier Miniaturen für Klarinette, Op.51, [0, 3, 5, 11, 8, 6, 10, 2, 4, 1, 9, 7], P0-RI11
101. Husa, Karel: Hudba pro Prahu 1968, [0, 8, 2, 1, 7, 9, 6, 10, 3, 11, 5, 4], P0-RI9
102. Husa, Karel: Mosaïques, [0, 6, 4, 3, 2, 9, 10, 5, 7, 8, 11, 1], P0-RI6
103. Ives, Charles: String Quartet, No.2, mvt 2, [0, 1, 2, 11, 3, 7, 10, 4, 6, 8, 9, 5], P0-RI2
104. Kokkonen, Joonas: Symphonic Sketches, mov. 3, row "III/A", [0, 2, 1, 3, 8, 7, 5, 6, 4, 11, 9, 10], P0-RI3
105. Kurtág, György: The Sayings of Péter Bornemisza, Op.7, [0, 11, 7, 8, 9, 1, 2, 10, 3, 4, 5, 6], P0-RI8

106. Lackner, Peter: 'Lied des Harfenmädchens' für Frauenstimme und Klavier, [0, 3, 5, 11, 7, 10, 1, 8, 4, 9, 6, 2], P0-RI10
107. Lackner, Peter: 'Lied des Harfenmädchens II' für Flöte, Klarinette, Posaune, Violine, Cello und Klavier, [0, 3, 5, 11, 7, 10, 1, 8, 4, 9, 6, 2], P0-RI10
108. Lackner, Peter: 'So lebe wohl' für Singstimme und Klavier, [0, 2, 3, 8, 10, 7, 6, 5, 1, 11, 9, 4], P0-RI10
109. Lackner, Peter: Kanon 'kgV(3,5,7)', [0, 3, 10, 9, 6, 5, 2, 11, 4, 8, 1, 7], P0-RI3
110. Lackner, Peter: Kanon für Bläsersextett. Mai 1995, 1996, [0, 9, 7, 3, 10, 1, 6, 8, 2, 11, 5, 4], P0-RI10
111. Lackner, Peter: Kanon für Schrammel-Quartett. November 2002, [0, 4, 6, 3, 11, 9, 1, 5, 8, 2, 10, 7], P0-RI3
112. Lackner, Peter: Kanon für Streichquartett. 18. Mai 1993, [0, 11, 4, 7, 1, 10, 5, 6, 2, 3, 9, 8], P0-RI11
113. Lackner, Peter: Kanon für Violine, Violoncello und Akkordeon (Harmonium). 25. Oktober 1995, [0, 2, 1, 7, 6, 5, 3, 4, 10, 9, 11, 8], P0-RI7
114. Lang, Bernhard: 'Küstenlinien'; für zwei Klaviere und doppeltes Schlagwerk, [0, 9, 7, 4, 5, 11, 2, 1, 8, 10, 3, 6], P0-RI4
115. Lutyens, Elisabeth: O Seasons, O Châteaux!, [0, 11, 10, 4, 8, 9, 3, 7, 6, 5, 2, 1], P0-RI8
116. Lutyens, Elisabeth: The Valley of Hatsu'se, [0, 6, 11, 10, 8, 7, 9, 1, 3, 2, 4, 5], P0-RI6
117. Lutyens, Elisabeth: Three Improvisations for Piano Solo, [0, 6, 9, 7, 8, 3, 4, 1, 10, 5, 11, 2], P0-RI3
118. Maderna, Bruno: Quartetto, [0, 7, 2, 3, 6, 9, 10, 1, 4, 5, 8, 11], P0-RI9
119. Maderna, Bruno: Streichquartett (Basisreihe 1), [0, 7, 2, 3, 6, 9, 10, 1, 4, 5, 8, 11], P0-RI9
120. Maderna, Bruno: Streichquartett (Basisreihe 2), [0, 7, 10, 1, 6, 3, 11, 4, 9, 2, 5, 8], P0-RI1
121. Mamlok, Ursula: Five Intermezzi for guitar solo, [0, 3, 6, 11, 2, 5, 1, 10, 7, 4, 8, 9], P0-RI5
122. Mamlok, Ursula: Variations for Solo Flute, theme, [0, 2, 1, 11, 7, 3, 5, 6, 4, 10, 8, 9], P0-RI2
123. Martino, Donald: Notturmo (Row A), [0, 11, 10, 2, 6, 1, 5, 9, 4, 8, 3, 7], P0-RI12
124. Messiaen, Olivier: Mode de valeurs et d'intensités, Series 3, [0, 11, 6, 4, 3, 9, 5, 2, 8, 1, 7, 10], P0-RI3
125. Morris, Robert: 14 Little Piano Pieces, [0, 5, 1, 9, 10, 11, 2, 7, 3, 4, 6, 8], P0-RI10
126. Morris, Robert: Arabesque, [0, 6, 7, 1, 3, 10, 8, 9, 4, 5, 11, 2], P0-RI1
127. Morris, Robert: Arc, [0, 1, 8, 2, 4, 3, 11, 10, 6, 7, 5, 9], P0-RI4
128. Morris, Robert: Broken Consort in Three Parts, Row 3, [0, 11, 3, 9, 7, 6, 10, 5, 1, 2, 4, 8], P0-RI6
129. Morris, Robert: Brush, [0, 11, 6, 10, 7, 8, 3, 2, 5, 4, 9, 1], P0-RI6
130. Morris, Robert: Concerto for Piano and Winds, [0, 1, 4, 7, 8, 10, 11, 2, 5, 6, 9, 3], P0-RI8
131. Morris, Robert: Four Fold Heart Sutra, [0, 6, 7, 2, 11, 1, 10, 4, 9, 5, 8, 3], P0-RI1
132. Morris, Robert: Four Play Nine, [0, 3, 2, 1, 8, 7, 10, 5, 4, 11, 6, 9], P0-RI3
133. Morris, Robert: Four or Five Mirrors, [0, 11, 2, 3, 7, 1, 6, 5, 9, 8, 10, 4], P0-RI2

134. Morris, Robert: In Variations, [0, 2, 9, 11, 5, 3, 4, 6, 10, 8, 7, 1], P0-RI2
135. Morris, Robert: Inter Alia, [0, 1, 11, 5, 3, 4, 9, 10, 8, 2, 7, 6], P0-RI4
136. Morris, Robert: MA, [0, 1, 5, 6, 4, 11, 8, 7, 9, 2, 10, 3], P0-RI5
137. Morris, Robert: On the Go, [0, 9, 2, 3, 5, 8, 10, 11, 1, 4, 7, 6], P0-RI5
138. Morris, Robert: Out and Out, [0, 11, 6, 3, 7, 9, 5, 8, 1, 2, 10, 4], P0-RI6
139. Morris, Robert: Sung Song, [0, 3, 7, 6, 9, 2, 10, 5, 1, 8, 4, 11], P0-RI9
140. Morris, Robert: Zoe, [0, 8, 6, 3, 1, 9, 7, 10, 4, 2, 5, 11], P0-RI9
141. Musgrave, Thea: Triptych, Song 1, [0, 11, 9, 6, 5, 2, 10, 1, 8, 7, 3, 4], P0-RI11
142. Nierhaus, Gerhard: 'Polg' – für Orchester, [0, 3, 1, 7, 11, 2, 10, 4, 8, 5, 9, 6], P0-RI2
143. Nono, Luigi: Intolleranza, Soprano 2, [0, 1, 2, 7, 6, 11, 10, 5, 4, 9, 8, 3], P0-RI1
144. Nono, Luigi: La terra e la compagna (sketch), Series 4, [0, 2, 9, 5, 6, 8, 3, 11, 1, 10, 4, 7], P0-RI2
145. Papageorgiou, Dimitri: 'Jarra Jarra' for six block flutes, [0, 5, 3, 2, 6, 8, 7, 11, 1, 10, 9, 4], P0-RI8
146. Papaioannou, Yannis: Pygmalion, [0, 2, 7, 5, 8, 11, 9, 6, 10, 3, 1, 4], P0-RI7
147. Papaioannou, Yannis: Songs of the Lake, No.3, [0, 11, 8, 1, 6, 7, 2, 10, 3, 4, 9, 5], P0-RI7
148. Papaioannou, Yannis: Suite, Basic row, [0, 1, 3, 10, 4, 6, 9, 5, 2, 8, 7, 11], P0-RI4
149. Payne, Antony: Miniature Variations on a Theme of E.L., [0, 6, 11, 10, 8, 7, 9, 1, 3, 2, 4, 5], P0-RI6
150. Preßl, Hermann Markus: 'Sonnenuntergänge nach meinem Tode'; Fünf Haikus nach Günther Klinge für Sprechgesang, Alt-Saxophon und Crotales, [0, 4, 7, 9, 8, 2, 6, 10, 5, 11, 1, 3], P0-RI4
151. Preßl, Hermann Markus: 6. Symphonie aus Es, [0, 6, 1, 7, 5, 8, 9, 11, 3, 2, 4, 10], P0-RI1
152. Preßl, Hermann Markus: Ithaka, [0, 9, 7, 10, 6, 4, 2, 5, 8, 3, 1, 11], P0-RI4
153. Ruggles, Carl: Evocations II (Series X), [0, 1, 7, 2, 8, 9, 11, 10, 5, 6, 4, 3], P0-RI9
154. Santoro, Claudio: A Menina Boba, "A Menina Exausta", [0, 5, 10, 7, 3, 11, 1, 8, 2, 9, 6, 4], P0-RI10
155. Schiske, Karl: Symphony, No.4, [0, 8, 11, 3, 2, 6, 1, 9, 4, 5, 7, 10], P0-RI2
156. Schmid, Erich: Bagatellen for Piano, Op.14, [0, 1, 5, 2, 6, 7, 4, 8, 10, 3, 9, 11], P0-RI7
157. Schmid, Erich: Notturmo, Op.10, mvt 1, [0, 4, 6, 3, 9, 8, 5, 11, 1, 2, 10, 7], P0-RI12
158. Schnittke, Alfred: Concerto Grosso, No.3, monogram 5, [0, 1, 7, 10, 4, 11, 5, 6, 9, 8, 2, 3], P0-RI11
159. Schnittke, Alfred: Improvisation and Fugue for piano, [0, 8, 11, 3, 9, 2, 5, 7, 6, 10, 1, 4], P0-RI11
160. Schnittke, Alfred: Serenade, [0, 1, 7, 3, 10, 9, 8, 6, 5, 11, 4, 2], P0-RI10
161. Schnittke, Alfred: Sonata, No.1 for Violin and Piano, mvt 3, [0, 4, 7, 11, 2, 6, 9, 10, 1, 5, 8, 3], P0-RI6
162. Schnittke, Alfred: Sonata, No.1 for Violin and Piano, mvt 4, [0, 4, 7, 3, 6, 10, 9, 5, 1, 2, 8, 11], P0-RI10
163. Schoenberg, Arnold: Die Jakobsleiter, [0, 1, 4, 3, 7, 6, 11, 2, 10, 9, 5, 8], P0-RI7
164. Schreiner, Thomas: Stück für drei Violinen, [0, 2, 1, 7, 4, 10, 9, 6, 8, 5, 3, 11], P0-RI2
165. Sengstschmid, Johann: Scherzo für Blockflötenquartett, Op.28, [0, 7, 9, 4, 6, 1, 8, 2, 11, 5, 3, 10], P0-RI1
166. Slonimsky, Nicholas: No. 1243a Crossing Sixths (Crossing Intervals), [0, 1, 9, 4, 6, 7, 3, 10, 11, 2,

- 8, 5], P0-RI1
167. Slonimsky, Nicholas: No. 1249a Crossing Thirds (Crossing Intervals), [0, 11, 3, 8, 6, 5, 9, 2, 1, 10, 4, 7], P0-RI11
 168. Slonimsky, Nicholas: No. 1251a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 6, 9, 2, 5, 8, 11, 4], P0-RI1
 169. Slonimsky, Nicholas: No. 1251b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 5, 3, 11, 6, 2, 10, 7, 4, 1, 9], P0-RI11
 170. Slonimsky, Nicholas: No. 1253a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 5, 8, 11, 3, 6, 9, 2], P0-RI5
 171. Slonimsky, Nicholas: No. 1253b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 3, 1, 9, 6, 4, 11, 7, 5, 2, 10], P0-RI9
 172. Slonimsky, Nicholas: No. 1261a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 2, 5, 9, 1, 6, 7, 10, 3], P0-RI4
 173. Slonimsky, Nicholas: No. 1261b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 1, 10, 7, 5, 2, 9, 6, 3, 11], P0-RI8
 174. Slonimsky, Nicholas: No. 1262a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 3, 6, 11, 2, 8, 9, 1, 5], P0-RI10
 175. Slonimsky, Nicholas: No. 1262b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 9, 5, 3, 11, 8, 4, 1, 7, 6, 2, 10], P0-RI8
 176. Slonimsky, Nicholas: No. 1264a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 5, 8, 11, 4, 7, 10, 2], P0-RI6
 177. Slonimsky, Nicholas: No. 1264b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 9, 3, 2, 10, 6, 5, 1, 8, 7, 4, 11], P0-RI12
 178. Slonimsky, Nicholas: No. 1268a Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 5, 8, 11, 2, 6, 9, 3], P0-RI5
 179. Slonimsky, Nicholas: No. 1268b Quadrtonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 3, 1, 9, 6, 4, 10, 7, 5, 2, 11], P0-RI9
 180. Slonimsky, Nicholas: No. 1272a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 1, 6, 9, 5, 2, 11, 8, 4], P0-RI1
 181. Slonimsky, Nicholas: No. 1272b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 6, 1, 2, 5, 9, 8, 4, 11], P0-RI1
 182. Slonimsky, Nicholas: No. 1274a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 5, 9, 6, 2, 11, 8, 3], P0-RI5
 183. Slonimsky, Nicholas: No. 1274b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 5, 1, 2, 6, 9, 8, 3, 11], P0-RI5
 184. Slonimsky, Nicholas: No. 1282a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 2, 5, 9, 6, 1, 10, 7, 3], P0-RI4

185. Slonimsky, Nicholas: No. 1282b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 5, 2, 6, 9, 1, 10, 7, 3], P0-RI4
186. Slonimsky, Nicholas: No. 1283a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 3, 6, 8, 2, 11, 9, 5, 1], P0-RI10
187. Slonimsky, Nicholas: No. 1283b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 6, 3, 11, 2, 8, 5, 1, 9], P0-RI10
188. Slonimsky, Nicholas: No. 1285a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 1, 5, 8, 4, 11, 10, 7, 2], P0-RI6
189. Slonimsky, Nicholas: No. 1285b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 6, 9, 5, 1, 11, 4, 8, 7, 2, 10], P0-RI6
190. Slonimsky, Nicholas: No. 1289a Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 1, 5, 8, 2, 11, 9, 6, 3], P0-RI5
191. Slonimsky, Nicholas: No. 1289b Quadritonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 7, 10, 5, 1, 11, 2, 8, 9, 6, 3], P0-RI5
192. Slonimsky, Nicholas: No. 262 Infrapolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 11, 10, 5, 4, 3, 2, 9, 8, 7, 6, 1], P0-RI3
193. Slonimsky, Nicholas: No. 348 Infra-Inter-Ultrapolation (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 10, 1, 7, 4, 2, 5, 11, 8, 6, 9, 3], P0-RI2
194. Slonimsky, Nicholas: No. 647 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 2, 11, 5, 8, 10, 7, 1, 4, 6, 3, 9], P0-RI10
195. Slonimsky, Nicholas: No. 685 Interpolation of Three Notes (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 1, 3, 6, 8, 9, 11, 2, 4, 5, 7, 10], P0-RI9
196. Slonimsky, Nicholas: No. 735 Inter-Infra-Ultrapolation (Quadritone Progression; Equal Division of Two Octaves into Three Parts), [0, 6, 9, 11, 8, 2, 5, 7, 4, 10, 1, 3], P0-RI8
197. Smith, Hale: Evocation, [0, 1, 7, 2, 9, 5, 8, 3, 10, 11, 4, 6], P0-RI2
198. Spinner, Leopold: Die Nacht, Op.29, [0, 4, 1, 2, 5, 6, 7, 10, 8, 9, 11, 3], P0-RI6
199. Spinner, Leopold: Drei Lieder, Op.15, [0, 2, 3, 9, 6, 10, 8, 4, 7, 5, 1, 11], P0-RI12
200. Spinner, Leopold: Lieder for Voice, Clarinet, Violin, and Cello, [0, 7, 6, 3, 11, 9, 2, 1, 4, 8, 10, 5], P0-RI6
201. Spinner, Leopold: Suite for Clarinet and Piano, Op.10, [0, 4, 1, 6, 5, 2, 8, 10, 7, 9, 11, 3], P0-RI6
202. Stockhausen, Karlheinz: 'Mantra', [0, 2, 11, 7, 8, 5, 10, 6, 4, 3, 1, 9], P0-RI7
203. Stockhausen, Karlheinz: Klavierstück IV, row 1, [0, 11, 4, 10, 9, 5, 8, 6, 2, 1, 7, 3], P0-RI9
204. Stockhausen, Karlheinz: Tierkreis, Aquarius, [0, 3, 5, 4, 11, 10, 9, 8, 7, 6, 2, 1], P0-RI3
205. Stockhausen, Karlheinz: Tierkreis, Leo, [0, 5, 11, 6, 3, 2, 8, 7, 9, 10, 4, 1], P0-RI5
206. Stravinsky, Igor: The Owl and the Pussy Cat, [0, 2, 9, 11, 8, 6, 5, 7, 10, 1, 4, 3], P0-RI8
207. Talma, Louise: Seven Episodes for flute, viola and piano, [0, 9, 11, 4, 6, 3, 8, 1, 10, 2, 5, 7], P0-RI3
208. Talma, Louise: Six Etudes, Etude 2, [0, 3, 9, 5, 11, 2, 8, 4, 10, 6, 1, 7], P0-RI2

209. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 4, [0, 7, 6, 1, 3, 4, 2, 11, 9, 5, 10, 8], P0-RI7
210. Tranchell, Peter: Piano piece for Carl Dawson (unfinished), 6, [0, 8, 3, 6, 4, 9, 10, 5, 7, 1, 11, 2], P0-RI12
211. Volkonsky, Andrei: Musica Stricta, mvt 2, row C, [0, 10, 11, 9, 4, 5, 7, 2, 1, 3, 6, 8], P0-RI9
212. Volkonsky, Andrei: Musica Stricta, mvt 3, row F, [0, 1, 9, 3, 5, 6, 7, 11, 10, 8, 4, 2], P0-RI6
213. Walker, George: Spatial, [0, 3, 9, 11, 2, 8, 7, 5, 4, 1, 10, 6], P0-RI11
214. Weber, Ben: Five Bagatelles for Piano, Op.2, mvt v, [0, 9, 1, 8, 2, 7, 3, 5, 6, 4, 11, 10], P0-RI9
215. Webern, Anton: 3 Lieder, “Ave, Regina Coelorum”, Op.18, No.3, [0, 11, 3, 2, 1, 7, 6, 10, 9, 8, 5, 4], P0-RI2
216. Webern, Anton: 3 Volkstexte, “Armer Sunder, Du”, Op.17, No.1, [0, 11, 6, 7, 4, 5, 8, 9, 10, 1, 2, 3], P0-RI11
217. Yi, Chen: Near Distance, [0, 1, 10, 3, 4, 6, 8, 9, 11, 5, 7, 2], P0-RI4
218. Yi, Chen: Symphony, No.2, [0, 6, 2, 3, 7, 9, 10, 4, 5, 11, 8, 1], P0-RI9
219. Yi, Chen: Woodwind Quintet, [0, 11, 1, 7, 9, 8, 10, 4, 6, 5, 2, 3], P0-RI8
220. Zenk, Ludwig: Abend in Lans, Op.3, No.2, [0, 1, 6, 4, 5, 2, 7, 8, 3, 10, 11, 9], P0-RI6
221. Zenk, Ludwig: Adagio for Orchestra, [0, 3, 11, 8, 6, 2, 7, 5, 9, 4, 1, 10], P0-RI2
222. Zenk, Ludwig: Piano Sonata, No.2, Op.4, [0, 11, 6, 8, 7, 10, 5, 4, 9, 2, 1, 3], P0-RI6

All-Combinatorial

Finally, rows are all-combinatorial when the combinatorial property holds for all transformations in at least one transposition. Notice how the whole-tone hexachord [0,2,4,6,8,10] (in any ordering) stands out for its highly combinatorial properties.

1. Apostel, Hans Erich: Fischerhaus-Serenade, Op.45, [0, 4, 8, 3, 11, 7, 1, 9, 5, 2, 10, 6], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
2. Babbitt, Milton: All Set, [0, 4, 5, 11, 6, 10, 7, 3, 1, 2, 9, 8], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
3. Babbitt, Milton: Arie da Capo, [0, 7, 8, 6, 2, 1, 10, 5, 11, 9, 4, 3], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
4. Babbitt, Milton: Composition for Four Instruments, [0, 3, 11, 2, 10, 1, 7, 4, 8, 5, 9, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
5. Babbitt, Milton: Composition for Four Instruments, row i, [0, 10, 9, 8, 7, 5, 11, 1, 2, 3, 4, 6], T6; I11; RI5, (0, 2, 3, 4, 5, 7)
6. Babbitt, Milton: Composition for Four Instruments, row ii, [0, 9, 11, 2, 4, 1, 7, 10, 8, 5, 3, 6], T6; I7; RI1, (0, 2, 3, 4, 5, 7)
7. Babbitt, Milton: Composition for Four Instruments, row iii, [0, 4, 3, 8, 7, 11, 5, 1, 2, 9, 10, 6],

- T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
8. Babbitt, Milton: Composition for Four Instruments, row iv, [0, 4, 1, 8, 5, 9, 3, 11, 2, 7, 10, 6], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
 9. Babbitt, Milton: Composition for Synthesizer, [0, 9, 1, 8, 4, 5, 7, 2, 3, 6, 10, 11], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
 10. Babbitt, Milton: Composition for Tenor and Six Instruments, [0, 11, 7, 5, 6, 1, 4, 3, 10, 8, 2, 9], T3,9; I3,9; RI6,12, (0, 1, 2, 6, 7, 8)
 11. Babbitt, Milton: Composition for Twelve Instruments, [0, 1, 4, 9, 5, 8, 3, 10, 2, 11, 6, 7], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
 12. Babbitt, Milton: Composition for Viola and Piano, [0, 3, 4, 8, 11, 7, 9, 2, 1, 5, 10, 6], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
 13. Babbitt, Milton: Du, row i, [0, 9, 2, 10, 11, 1, 7, 5, 4, 8, 3, 6], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
 14. Babbitt, Milton: Du, row ii, [0, 5, 2, 10, 9, 7, 1, 3, 4, 8, 11, 6], T6; I1; RI7, (0, 2, 4, 5, 7, 9)
 15. Babbitt, Milton: Groupwise, [0, 5, 4, 6, 10, 11, 2, 9, 3, 1, 8, 7], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
 16. Babbitt, Milton: My Complements to Roger, [0, 3, 7, 8, 11, 4, 2, 6, 1, 9, 10, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
 17. Babbitt, Milton: My Ends Are My Beginnings, [0, 11, 4, 8, 7, 3, 5, 6, 9, 2, 10, 1], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
 18. Babbitt, Milton: Paraphrases, [0, 11, 3, 10, 8, 1, 7, 5, 4, 6, 2, 9], T6; I5; RI11, (0, 2, 3, 4, 5, 7)
 19. Babbitt, Milton: Partitions, [0, 7, 9, 10, 2, 11, 5, 8, 4, 3, 1, 6], T6; I3; RI9, (0, 2, 3, 4, 5, 7)
 20. Babbitt, Milton: Relata I, [0, 1, 11, 2, 10, 3, 9, 8, 4, 6, 7, 5], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
 21. Babbitt, Milton: Relata II, [0, 1, 11, 2, 10, 3, 9, 8, 4, 6, 7, 5], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
 22. Babbitt, Milton: Semi-simple variations, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6], T6; I3; RI9, (0, 1, 2, 3, 4, 5)
 23. Babbitt, Milton: String Quartet, No.2, [0, 3, 11, 4, 1, 2, 8, 10, 5, 9, 7, 6], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
 24. Babbitt, Milton: String Quartet, No.3, [0, 11, 6, 7, 5, 1, 10, 2, 9, 3, 4, 8], T3,9; I3,9; RI6,12, (0, 1, 2, 6, 7, 8)
 25. Babbitt, Milton: String Quartet, No.4, [0, 2, 9, 7, 11, 10, 1, 8, 4, 3, 5, 6], T6; I3; RI9, (0, 2, 3, 4, 5, 7)
 26. Babbitt, Milton: Tableaux, [0, 11, 4, 6, 10, 5, 2, 1, 7, 9, 8, 3], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
 27. Babbitt, Milton: The Widow's Lament in Springtime, [0, 11, 9, 2, 10, 7, 1, 4, 8, 3, 5, 6], T6; I3; RI9, (0, 2, 3, 4, 5, 7)
 28. Babbitt, Milton: Three Compositions for Piano, No.1, [0, 5, 7, 4, 2, 3, 9, 1, 8, 11, 10, 6], T6; I1; RI7, (0, 2, 3, 4, 5, 7)
 29. Babbitt, Milton: Two Sonnets of Gerard Manley Hopkins, [0, 2, 3, 4, 7, 5, 11, 6, 10, 9, 8, 1], T6; I1; RI7, (0, 2, 3, 4, 5, 7)

30. Babbitt, Milton: Vision and Prayer, [0, 11, 8, 3, 7, 4, 10, 9, 2, 6, 1, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
31. Babbitt, Milton: Woodwind Quartet, [0, 3, 1, 2, 11, 10, 8, 9, 5, 7, 6, 4], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
32. Baker, David: "Status Symbol" from "The Black Experience", [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
33. Barber, Samuel: Piano Sonata, Op.26, [0, 8, 4, 11, 3, 7, 1, 9, 5, 10, 2, 6], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
34. Berg, Alban: Altenberg Lieder, [0, 1, 11, 10, 2, 9, 3, 8, 7, 6, 5, 4], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
35. Berg, Alban: Lulu, Primary / Main / Basic Row, [0, 4, 5, 2, 7, 9, 6, 8, 11, 10, 3, 1], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
36. Berg, Alban: Lulu, Schigolch, [0, 2, 3, 1, 4, 5, 6, 7, 8, 9, 11, 10], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
37. Berg, Alban: Lulu, whole-tone row, [0, 2, 4, 6, 10, 8, 11, 7, 9, 1, 3, 5], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
38. Berg, Alban: Lyric Suite, Primary Row / mvt I, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
39. Berg, Alban: Lyric Suite, mvt I, [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
40. Berg, Alban: Lyric Suite, mvt VI, [0, 2, 4, 7, 9, 11, 6, 8, 10, 1, 3, 5], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
41. Berg, Alban: Schliesse mir die Augen Beide, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
42. Berio, Luciano: Cinque Variazioni, [0, 2, 4, 1, 3, 5, 8, 10, 6, 7, 9, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
43. Berio, Luciano: Sequenza I, [0, 11, 10, 9, 8, 7, 4, 6, 5, 3, 1, 2], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
44. Boulez, Pierre: Le Marteau sans Maître, cycle of Bourreaux de solitude, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
45. Boulez, Pierre: Notations, [0, 2, 7, 6, 1, 8, 4, 9, 5, 11, 10, 3], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
46. Britten, Benjamin: The Turn of the Screw, [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
47. Carter, Elliott: String Quartet, No.2 (sketch) 1, [0, 4, 8, 3, 7, 11, 6, 10, 2, 9, 1, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
48. Carter, Elliott: String Quartet, No.2 (sketch) 2, [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
49. Carter, Elliott: String Quartet, No.2 (sketch) 3, [0, 2, 4, 6, 8, 10, 1, 3, 5, 7, 9, 11], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
50. Denisov, Edison: Concerto for Guitar and Orchestra, Row 1, [0, 6, 10, 4, 8, 2, 3, 9, 1, 7, 11, 5], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
51. Denisov, Edison: Five Etudes for Solo Bassoon, row B, [0, 11, 6, 5, 4, 10, 9, 3, 2, 7, 1, 8], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
52. Denisov, Edison: Five Etudes for Solo Bassoon, row C, [0, 6, 11, 5, 4, 10, 9, 3, 2, 7, 1, 8], T3,9;

- I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
53. Denisov, Edison: Five Etudes for Solo Bassoon, row E, [0, 1, 7, 6, 5, 11, 10, 4, 3, 8, 2, 9], T3,9; I3,9; RI6,12, (0, 1, 2, 6, 7, 8)
54. Denisov, Edison: Five Etudes for Solo Bassoon, row I, [0, 6, 1, 7, 2, 8, 3, 10, 5, 11, 9, 4], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
55. Denisov, Edison: Five Etudes for Solo Bassoon, row J, [0, 6, 5, 11, 4, 10, 9, 3, 2, 7, 1, 8], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
56. Denisov, Edison: Octet for Winds, mvt 2, row A, [0, 1, 3, 2, 4, 5, 8, 7, 6, 11, 9, 10], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
57. Denisov, Edison: Octet for Winds, mvt 2, row B, [0, 6, 11, 5, 4, 10, 9, 3, 2, 8, 1, 7], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
58. Eisler, Hanns: Der Zweck der Musik, [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
59. Eisler, Hanns: Deutsche Symphonie, mvt 8, [0, 3, 1, 11, 2, 10, 8, 9, 6, 7, 5, 4], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
60. Eisler, Hanns: Five Pieces for Orchestra, mvt 3, [0, 3, 2, 1, 5, 4, 6, 9, 8, 11, 10, 7], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
61. Eisler, Hanns: Gegen den Krieg, Op.55, [0, 3, 2, 5, 4, 7, 6, 8, 9, 10, 1, 11], T6; I1; RI7, (0, 2, 3, 4, 5, 7)
62. Eisler, Hanns: Man lebt von einem Tage zu dem andern ("Kantate im Exil"), [0, 10, 11, 3, 1, 8, 7, 4, 2, 6, 9, 5], T6; I5; RI11, (0, 2, 3, 4, 5, 7)
63. Eisler, Hanns: Palmström, Op.5, No.5, [0, 10, 11, 9, 8, 1, 7, 6, 5, 3, 4, 2], T6; I3; RI9, (0, 1, 2, 3, 4, 5)
64. Eisler, Hanns: Praeludium und Fuge über B-A-C-H for String Trio, Op.46, [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
65. Eisler, Hanns: Suite for Orchestra, No.1, mvt 4, [0, 4, 2, 3, 1, 11, 7, 10, 9, 8, 6, 5], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
66. Evans, Bill: Twelve Tone Tune, [0, 10, 2, 3, 1, 11, 4, 6, 9, 8, 5, 7], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
67. Fine, Vivian: Chaconne for piano, [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
68. Finney, Ross Lee: Fantasy in Two Movements for solo violin, [0, 1, 3, 5, 4, 2, 11, 10, 8, 6, 7, 9], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
69. Finney, Ross Lee: Sonata Quasi una Fantasia, [0, 1, 3, 2, 4, 5, 6, 7, 9, 8, 10, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
70. Gerhard, Roberto: Chaconne for Unaccompanied Violin, [0, 11, 4, 2, 1, 3, 9, 10, 8, 6, 5, 7], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
71. Gerhard, Roberto: Libra, [0, 6, 1, 7, 2, 8, 4, 9, 5, 10, 11, 3], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
72. Gerhard, Roberto: The Plague, [0, 1, 9, 11, 8, 10, 4, 5, 6, 2, 3, 7], T6; I3; RI9, (0, 1, 2, 3, 4, 5)

73. Gielen, Michael: Six Songs, for bass, violin, viola, clarinet, bass clarinet, and piano, [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
74. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 1, [0, 1, 6, 7, 8, 2, 10, 11, 5, 4, 9, 3], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
75. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 2, [0, 11, 2, 3, 4, 1, 6, 5, 8, 9, 10, 7], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
76. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 5, [0, 1, 7, 6, 5, 11, 2, 8, 9, 10, 4, 3], T3,9; I3,9; RI6,12, (0, 1, 2, 6, 7, 8)
77. Ginastera, Alberto: Don Rodrigo, Op.31, Row Class 7, [0, 1, 8, 2, 7, 6, 5, 11, 9, 10, 4, 3], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
78. Ginastera, Alberto: Quintet, Op.29, Row Class V, [0, 5, 4, 7, 3, 2, 6, 9, 8, 1, 10, 11], T6; I1; RI7, (0, 2, 3, 4, 5, 7)
79. Ginastera, Alberto: Quintet, Op.29, Row Class VII S, [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
80. Ginastera, Alberto: Sonata for Cello and Piano, Op.49, [0, 3, 2, 1, 10, 11, 8, 9, 5, 4, 7, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
81. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class III, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
82. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 1, [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
83. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 4, [0, 2, 1, 5, 3, 4, 7, 8, 6, 10, 9, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
84. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 6, [0, 11, 4, 3, 8, 7, 1, 2, 9, 10, 5, 6], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
85. Ginastera, Alberto: Sonata for Guitar, Op.47, mvts II and III, Row Class II 7, [0, 9, 10, 11, 8, 7, 6, 3, 4, 5, 2, 1], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
86. Ginastera, Alberto: Turbae ad Passionem Gregorianam, Op.43, mvt II, [0, 5, 1, 7, 6, 11, 8, 2, 3, 4, 9, 10], T3,9; I3,9; RI6,12, (0, 1, 2, 6, 7, 8)
87. Ginastera, Alberto: Violin Concerto, Op.30, [0, 11, 2, 3, 4, 1, 6, 5, 8, 9, 10, 7], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
88. Hartmann, Karl Amadeus: Symphony, No.4, [0, 1, 3, 2, 11, 4, 5, 10, 7, 6, 8, 9], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
89. Hauer, Josef Matthias: Nomos, Op.19 (bb.139-141), [0, 2, 10, 1, 11, 9, 8, 5, 6, 4, 7, 3], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
90. Hauer, Josef Matthias: Nomos, Op.19 (bb.143-145), [0, 9, 10, 2, 1, 11, 4, 6, 7, 5, 8, 3], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
91. Hauer, Josef Matthias: Nomos, Op.19 (bb.331-334), [0, 4, 3, 2, 1, 11, 7, 10, 5, 6, 8, 9], T6; I9; RI3,

- (0, 1, 2, 3, 4, 5)
92. Hauer, Josef Matthias: Nomos, Op.19 (bb.362-365), [0, 7, 5, 3, 10, 8, 4, 2, 9, 6, 11, 1], T6; I9; RI3, (0, 2, 4, 5, 7, 9)
 93. Hauer, Josef Matthias: Nomos, Op.19 (bb.503-507), [0, 10, 1, 2, 3, 5, 7, 11, 4, 8, 9, 6], T6; I9; RI3, (0, 2, 3, 4, 5, 7)
 94. Hauer, Josef Matthias: XXIX. Zwölftonspiel für Cembalo; mit der Sokolowski-Reihe zu Bachs Geburtstag, [0, 11, 2, 1, 4, 3, 10, 5, 8, 9, 6, 7], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
 95. Hauer, Josef Matthias: Zwölftonspiel für zwei Violinen, [0, 2, 3, 11, 1, 10, 8, 6, 4, 9, 7, 5], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
 96. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.13, [0, 3, 5, 7, 8, 10, 9, 6, 4, 2, 1, 11], T6; I9; RI3, (0, 2, 4, 5, 7, 9)
 97. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.19, [0, 1, 4, 5, 8, 9, 11, 10, 7, 6, 3, 2], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
 98. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.28, [0, 5, 7, 8, 9, 10, 11, 6, 4, 3, 2, 1], T6; I11; RI5, (0, 2, 3, 4, 5, 7)
 99. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.30, [0, 1, 2, 6, 7, 8, 11, 10, 9, 5, 4, 3], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
 100. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.6, [0, 2, 4, 6, 8, 10, 9, 7, 5, 3, 1, 11], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
 101. Hendler, Maximilian: 'Die vollständige Ordnung der symmetrischen zwölftönigen Modi', No.1, [0, 1, 2, 3, 4, 5, 11, 10, 9, 8, 7, 6], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
 102. Hendler, Maximilian: aus den fünf Liedern nach Texten von Karl Hans Haysen für Singstimme und Klavier : 'Erkenntnis', Op.45-2, [0, 9, 2, 4, 7, 11, 8, 10, 5, 1, 6, 3], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
 103. Huber, Klaus: Zwei Sätze, [0, 3, 1, 10, 11, 8, 6, 9, 7, 2, 4, 5], T6; I5; RI11, (0, 2, 3, 4, 5, 7)
 104. Ives, Charles: On the Antipodes, [0, 3, 11, 8, 4, 7, 10, 9, 6, 2, 5, 1], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
 105. Ives, Charles: Tone Roads, No.3, [0, 11, 1, 3, 2, 10, 5, 8, 4, 7, 6, 9], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
 106. Jung, Joachim: , [0, 11, 3, 10, 2, 1, 7, 8, 4, 9, 5, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
 107. Klein, Fritz: Die Maschine: Eine extonale Selbstsatire, Op.1, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
 108. Klein, Fritz Heinrich: Variationen, Op.14, [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
 109. Kokkonen, Joonas: Cello Concerto, mov. 2, row "II/A", [0, 2, 7, 4, 3, 5, 6, 1, 11, 8, 10, 9], T6; I1; RI7, (0, 2, 3, 4, 5, 7)
 110. Kokkonen, Joonas: Cello Concerto, mov. 2, row "II/B", [0, 2, 3, 1, 4, 5, 7, 8, 6, 9, 10, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
 111. Kokkonen, Joonas: Cello Concerto, mov. 2, row "II/C", [0, 9, 11, 10, 7, 2, 6, 3, 5, 4, 1, 8], T6; I3;

- RI9, (0, 2, 3, 4, 5, 7)
112. Kokkonen, Joonas: Woodwind Quintet, mov. 1, rows “I/A” and “I/B”, [0, 2, 11, 9, 10, 1, 3, 6, 4, 5, 7, 8], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
 113. Krenek, Ernst: Quaestio temporis, Op.170, [0, 3, 11, 4, 2, 1, 7, 8, 10, 5, 9, 6], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
 114. Krenek, Ernst: String Quartet, No.6, Op.78, [0, 10, 11, 8, 1, 9, 3, 7, 2, 4, 6, 5], T6; I3; RI9, (0, 1, 2, 3, 4, 5)
 115. Krenek, Ernst: Symphonic Elegy for String Orchestra, Op.105, [0, 1, 9, 11, 10, 2, 3, 7, 6, 8, 4, 5], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
 116. Krenek, Ernst: Zwölf Variationen in Drei Sätzen, [0, 1, 3, 10, 2, 5, 11, 7, 4, 9, 6, 8], T6; I9; RI3, (0, 2, 3, 4, 5, 7)
 117. Krenek, Ernst: Zwölf Variationen in Drei Sätzen, Op.79, [0, 1, 3, 10, 2, 5, 11, 7, 4, 9, 8, 6], T6; I9; RI3, (0, 2, 3, 4, 5, 7)
 118. Kukuck, Felicitas: ‘Der Gottesknecht’: 6. Kantate, [0, 11, 10, 1, 2, 3, 8, 9, 6, 5, 7, 4], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
 119. Lackner, Peter: ‘An alle Außerirdischen’. Kanon für drei Singstimmen, Kontrabaß und Klavier, [0, 4, 9, 7, 11, 2, 5, 1, 8, 10, 6, 3], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
 120. Lackner, Peter: ‘Es fiel ein Reif in der Frühlingsnacht’ für Singstimme und ein Melodie-Instrument, [0, 9, 4, 7, 2, 5, 1, 8, 10, 11, 3, 6], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
 121. Lackner, Peter: ‘Euphorbia obesa’. Kanon für Oboe, Englischhorn und Fagott., [0, 10, 2, 6, 8, 4, 1, 9, 11, 3, 7, 5], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
 122. Lackner, Peter: ‘Flügelaltar’ für Klavier, [0, 9, 11, 10, 2, 7, 1, 8, 4, 5, 3, 6], T6; I3; RI9, (0, 2, 3, 4, 5, 7)
 123. Lackner, Peter: ‘Venus-Quadrat’ für Violine und Klavier, [0, 7, 2, 5, 9, 10, 11, 6, 8, 4, 3, 1], T6; I1; RI7, (0, 2, 4, 5, 7, 9)
 124. Lackner, Peter: 2. Kanonzyklus, [0, 10, 2, 7, 9, 5, 11, 3, 1, 8, 4, 6], T6; I1; RI7, (0, 2, 4, 5, 7, 9)
 125. Lackner, Peter: Das Buch der Wandlungen I für Frauenstimmen und,oder Klavier, [0, 8, 3, 5, 1, 10, 7, 11, 4, 2, 6, 9], T6; I7; RI1, (0, 2, 4, 5, 7, 9)
 126. Lackner, Peter: INITIUM TRIPLEX. 28. Juni 2016; für drei Tasteninstrumente, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
 127. Lackner, Peter: KANON für A, O & Gsellmanns Weltmaschine. 8. Oktober 1958,2008, [0, 8, 10, 4, 2, 6, 9, 1, 11, 5, 7, 3], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
 128. Lackner, Peter: Kanon T2 à 6, [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
 129. Lackner, Peter: Kanon T3 à 4, [0, 2, 7, 3, 5, 10, 6, 8, 1, 9, 11, 4], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
 130. Lackner, Peter: Kanon T4 á 3, [0, 5, 7, 2, 4, 9, 11, 6, 8, 1, 3, 10], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
 131. Lackner, Peter: Kanon T6 á 2, [0, 10, 8, 3, 1, 5, 6, 4, 2, 9, 7, 11], T6; I7; RI1, (0, 2, 4, 5, 7, 9)
 132. Lackner, Peter: Kanon für Blockflötenquartett. April 2005, [0, 10, 11, 3, 1, 2, 8, 7, 9, 5, 4, 6], T6;

- I7; RI1, (0, 1, 2, 3, 4, 5)
133. Lackner, Peter: Kanon für Flöte solo und N. N., [0, 3, 7, 10, 2, 5, 11, 8, 4, 1, 9, 6], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
 134. Lackner, Peter: Kanon für Flöte und Elektronik. Februar 1999, [0, 10, 2, 7, 9, 5, 11, 3, 1, 8, 4, 6], T6; I1; RI7, (0, 2, 4, 5, 7, 9)
 135. Lackner, Peter: Kanon für Klavier zu vier Händen, [0, 10, 5, 3, 7, 8, 6, 4, 11, 9, 1, 2], T6; I9; RI3, (0, 2, 4, 5, 7, 9)
 136. Lackner, Peter: Kanon für Klaviertrio, [0, 2, 4, 9, 5, 7, 3, 1, 11, 6, 10, 8], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
 137. Lackner, Peter: Kanon für Orgel, zweimanualiges Cembalo oder Klavier, [0, 7, 2, 11, 4, 9, 6, 8, 1, 5, 3, 10], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
 138. Lackner, Peter: Kanon für Orgel. 21. November 1994, 4. Februar 1995, [0, 8, 5, 1, 4, 9, 2, 11, 7, 3, 10, 6], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
 139. Lackner, Peter: Kanon für Schwegel, diatonisches Hackbrett und Violine, [0, 8, 4, 10, 6, 2, 5, 1, 9, 3, 11, 7], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
 140. Lackner, Peter: Kanon für Schwegel und zwei Geigen, [0, 6, 4, 2, 10, 8, 9, 3, 5, 7, 11, 1], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
 141. Lackner, Peter: Kanon für Streichquartett. 22. September 2003, [0, 8, 10, 4, 2, 6, 9, 1, 11, 5, 7, 3], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
 142. Lackner, Peter: Kanon für Violine, Viola und Akkordeon. 11. Juni 2007, [0, 11, 1, 2, 3, 10, 4, 9, 8, 7, 5, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
 143. Lackner, Peter: Kanon für Violine solo, [0, 11, 2, 7, 10, 9, 3, 4, 1, 8, 5, 6], T6; I3; RI9, (0, 2, 3, 4, 5, 7)
 144. Lackner, Peter: Kanon für drei Klaviere. 28. 6. 2016, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
 145. Lackner, Peter: Kanon für drei Violinen I, II August 1998, [0, 2, 10, 4, 8, 6, 1, 9, 11, 5, 3, 7], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
 146. Lackner, Peter: Kanon für zwei Singstimmen und Ensemble zur Skulpturengruppe LEM von Axel Kirchmayr und einem Text von Hannes Walzl. September 2004, [0, 2, 9, 10, 5, 7, 1, 11, 4, 3, 8, 6], T6; I1; RI7, (0, 2, 4, 5, 7, 9)
 147. Lackner, Peter: Kanon für zwei Trompeten, Horn, Posaune und Tuba. 1. Mai 1993, [0, 1, 2, 10, 3, 5, 11, 9, 4, 8, 7, 6], T6; I9; RI3, (0, 2, 3, 4, 5, 7)
 148. Lackner, Peter: Kanon für zwei Violinen, [0, 7, 4, 5, 9, 2, 3, 8, 11, 10, 6, 1], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
 149. Lackner, Peter: Kanon für zwei Violinen. Frühjahr 1992, [0, 2, 4, 7, 9, 11, 5, 3, 1, 10, 8, 6], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
 150. Lackner, Peter: Kanon für zwei Violinen und Klavier. 1. Dezember 2004, [0, 10, 2, 6, 8, 4, 1, 9, 11,

- 3, 7, 5], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
151. Lackner, Peter: Moebiusband I für zwei Melodieinstrumente, [0, 6, 8, 2, 7, 1, 11, 5, 3, 9, 4, 10], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
152. Lackner, Peter: Trauermusik für Fagott, Kontrafagott und Pauke, [0, 6, 2, 8, 10, 4, 11, 5, 9, 3, 1, 7], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
153. Lackner, Peter: kgV (3,4) [zweistimmiger Kanon für Klavier], [0, 10, 2, 3, 5, 7, 1, 11, 9, 8, 4, 6], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
154. Lang, Bernhard: 'Der Golem' nach Gustav Meyrinck, [0, 4, 7, 8, 11, 3, 5, 2, 9, 1, 10, 6], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
155. Lang, Bernhard: Der Reigen, [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
156. Lang, Bernhard: Hemma (Music Theatre Hemma Klagenfurt 2015), [0, 5, 10, 2, 3, 1, 7, 9, 8, 4, 11, 6], T6; I9; RI3, (0, 2, 3, 4, 5, 7)
157. Lang, Klaus: 'Von der Ligurischen Küste zum Trasimenischen See'; Trauermusik für Violine und Klavier, [0, 5, 9, 8, 10, 7, 1, 4, 2, 3, 11, 6], T6; I11; RI5, (0, 2, 3, 4, 5, 7)
158. Leibowitz, René: Trois pièces pour piano, Op.19, [0, 4, 3, 1, 2, 5, 6, 9, 10, 8, 7, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
159. Ligeti, György: Le Grand Macabre, [0, 6, 5, 11, 10, 4, 9, 3, 2, 8, 7, 1], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
160. Liszt, Franz: Eine Faust Symphonie, [0, 4, 8, 11, 3, 7, 10, 2, 6, 9, 1, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
161. Luo, Zhong-Rong: Chang'e, [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6], T6; I1; RI7, (0, 2, 4, 5, 7, 9)
162. Luo, Zhong-Rong: Dusk, row 2, [0, 3, 7, 5, 8, 10, 1, 11, 6, 2, 4, 9], T6; I9; RI3, (0, 2, 4, 5, 7, 9)
163. Luo, Zhong-Rong: Morning Glory, [0, 2, 5, 9, 7, 10, 3, 11, 1, 4, 6, 8], T6; I1; RI7, (0, 2, 4, 5, 7, 9)
164. Luo, Zhong-Rong: Picking lotus flowers at the riverside, [0, 2, 5, 7, 10, 3, 1, 4, 6, 9, 11, 8], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
165. Luo, Zhong-Rong: Three Piano Pieces, "Arabeque", row 2, [0, 2, 7, 9, 11, 4, 6, 8, 1, 3, 10, 5], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
166. Lutosławski, Witold: Musique Funébre (Funeral Music), [0, 6, 5, 11, 10, 4, 3, 9, 8, 2, 1, 7], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
167. Lutyens, Elisabeth: Essence Of Our Happinesses, Op.69, mvt II, Part I, [0, 11, 1, 10, 2, 3, 8, 9, 5, 6, 4, 7], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
168. Lutyens, Elisabeth: Motet (Excerpta Tractati Logico-Philosophici), Op.27, [0, 11, 3, 7, 8, 4, 2, 6, 5, 1, 9, 10], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
169. Lutyens, Elisabeth: The Numbered, Altered Primary Row (swap pitches 2 and 3), [0, 11, 10, 1, 2, 9, 3, 4, 8, 5, 7, 6], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
170. Lutyens, Elisabeth: The Numbered, Primary Row, [0, 10, 11, 1, 2, 9, 3, 4, 8, 5, 7, 6], T6; I5; RI11, (0, 1, 2, 3, 4, 5)

171. Mamlok, Ursula: Haiku Settings, No.5, [0, 11, 8, 7, 4, 3, 5, 6, 9, 10, 1, 2], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
172. Mamlok, Ursula: Panta Rhei, [0, 7, 4, 11, 8, 3, 10, 9, 6, 2, 5, 1], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
173. Mamlok, Ursula: Panta Rhei, secondary row (mvt 4, Piano), [0, 11, 8, 3, 4, 7, 2, 1, 6, 9, 10, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
174. Martino, Donald: Notturmo (Row B), [0, 7, 11, 10, 9, 8, 2, 1, 6, 3, 4, 5], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
175. Matthias, Hauer Josef: Zwölftonspiel für Holzbläser, Streicher und Klavier. April 1951, [0, 4, 9, 11, 7, 2, 3, 6, 8, 10, 5, 1], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
176. Messiaen, Olivier: Livre d'orgue, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
177. Mittendorfer, Josef: aleatoric row, [0, 2, 7, 1, 8, 6, 10, 5, 4, 11, 3, 9], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
178. Moevs, Robert: Musica da Camera, [0, 1, 11, 3, 4, 2, 9, 10, 8, 7, 5, 6], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
179. Morris, Robert: By Far, [0, 1, 4, 11, 3, 2, 6, 7, 5, 10, 8, 9], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
180. Morris, Robert: Clash, [0, 3, 11, 10, 8, 1, 7, 9, 2, 6, 4, 5], T6; I5; RI11, (0, 2, 3, 4, 5, 7)
181. Morris, Robert: Concerto for Piano and Strings, [0, 1, 6, 11, 7, 5, 10, 8, 4, 3, 2, 9], T3,9; I3,9; RI6,12, (0, 1, 2, 6, 7, 8)
182. Morris, Robert: Roundelay, row 1, [0, 7, 4, 11, 9, 2, 6, 3, 10, 5, 8, 1], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
183. Morris, Robert: Roundelay, row 2, [0, 5, 9, 7, 8, 10, 4, 11, 1, 6, 2, 3], T6; I11; RI5, (0, 2, 3, 4, 5, 7)
184. Morris, Robert: Roundelay, row 5, [0, 3, 11, 4, 1, 2, 8, 10, 5, 9, 7, 6], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
185. Morris, Robert: Roundelay, row 6, [0, 10, 5, 11, 4, 6, 8, 7, 2, 3, 9, 1], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
186. Morris, Robert: Tête-à-Tête, [0, 3, 11, 10, 1, 8, 2, 6, 9, 5, 4, 7], T6; I5; RI11, (0, 2, 3, 4, 5, 7)
187. Nono, Luigi: Canti per tredici, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
188. Nono, Luigi: Composizione per orchestra, No.1, [0, 1, 7, 6, 2, 8, 4, 3, 5, 10, 11, 9], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
189. Nono, Luigi: Cori di Didone, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
190. Nono, Luigi: Ha venido, [0, 6, 1, 7, 2, 8, 3, 9, 4, 10, 5, 11], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
191. Nono, Luigi: Il canto sospeso, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
192. Nono, Luigi: Intolleranza, Alto, [0, 6, 7, 1, 2, 8, 9, 3, 4, 10, 11, 5], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
193. Nono, Luigi: Intolleranza, Tenor 1, [0, 6, 11, 5, 10, 4, 9, 3, 8, 2, 7, 1], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
194. Nono, Luigi: Intolleranza, Tenor 2, [0, 1, 3, 2, 4, 5, 7, 6, 8, 9, 11, 10], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
195. Nono, Luigi: La terra e la compagna (sketch), Series 1, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
196. Nono, Luigi: La terra e la compagna (sketch), Series 2, [0, 6, 1, 7, 11, 5, 2, 8, 10, 4, 3, 9], T3,9;

- I3,9; RI6,12, (0, 1, 2, 6, 7, 8)
197. Nono, Luigi: Variazioni canoniche sulla serie dell'Op.41 di Arnold Schönberg, [0, 1, 9, 8, 4, 5, 7, 6, 10, 11, 3, 2], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
 198. Panufnik, Andrzej: Sinfonia di Sfere (Symphony, No.5), Chord 1, [0, 4, 8, 11, 3, 7, 10, 2, 6, 9, 1, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
 199. Preßl, Hermann Markus: N. N. 50; 'Die Zeremonie des Abschieds', [0, 9, 4, 2, 7, 5, 8, 1, 6, 3, 11, 10], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
 200. Pärt, Arvo: Diagrams, [0, 11, 2, 1, 3, 4, 9, 10, 7, 8, 6, 5], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
 201. Riegebauer, Sigrid: Toccata, [0, 3, 1, 2, 11, 10, 4, 5, 8, 7, 9, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
 202. Rochberg, George: Sonata-Fantasia, [0, 11, 10, 4, 5, 6, 9, 8, 7, 1, 2, 3], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
 203. Rochberg, George: Symphony, No.2, [0, 8, 1, 4, 9, 5, 6, 2, 3, 10, 11, 7], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
 204. Sande, Henrik: 'Volkslied' für zwei Singstimmen und Klavier. 24. 12. 2015, [0, 2, 4, 5, 7, 9, 10, 8, 6, 3, 1, 11], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
 205. Sande, Henrik: 4032 Töne für Klavier sechshändig, [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
 206. Santoro, Claudio: Sonata, No.1, [0, 10, 3, 8, 11, 1, 2, 9, 7, 4, 5, 6], T6; I5; RI11, (0, 2, 3, 4, 5, 7)
 207. Schnittke, Alfred: Concerto, No.2 for Violin and Chamber Orchestra, [0, 11, 1, 2, 10, 3, 4, 9, 5, 6, 8, 7], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
 208. Schnittke, Alfred: Concerto Grosso, No.3, (mvt 3, 4), row 6, [0, 11, 2, 1, 9, 10, 7, 8, 4, 3, 6, 5], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
 209. Schnittke, Alfred: Concerto Grosso, No.3, (mvt 3, 4), row 8, [0, 11, 7, 9, 10, 8, 6, 5, 3, 4, 1, 2], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
 210. Schnittke, Alfred: Concerto Grosso, No.3, monogram 3, [0, 11, 2, 1, 3, 4, 10, 9, 7, 8, 5, 6], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
 211. Schnittke, Alfred: Piano Sonata, No.1, mvt 2, mm. 72-76, [0, 6, 5, 11, 10, 4, 3, 9, 8, 2, 1, 7], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
 212. Schnittke, Alfred: Sonata, No.2 for Cello and Piano, mvt 2, [0, 2, 3, 1, 4, 5, 11, 10, 7, 9, 8, 6], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
 213. Schnittke, Alfred: String Quartet, No.1, [0, 2, 1, 10, 3, 11, 5, 9, 4, 7, 8, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
 214. Schnittke, Alfred: String Quartet, No.4, [0, 11, 10, 1, 3, 2, 4, 9, 8, 6, 5, 7], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
 215. Schnittke, Alfred: String Quartet, No.4, mvt 2, m.40, [0, 5, 10, 3, 2, 7, 8, 1, 6, 11, 4, 9], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
 216. Schnittke, Alfred: String Quartet, No.4, mvt 4, m.122, [0, 1, 11, 2, 10, 3, 4, 9, 8, 7, 6, 5], T6; I7;

- RI1, (0, 1, 2, 3, 4, 5)
217. Schnittke, Alfred: String Quartet, No.4, mvt 4, m.31, [0, 11, 9, 10, 8, 7, 6, 5, 3, 4, 2, 1], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
218. Schnittke, Alfred: Symphony, No.7, mvt 3, row X, [0, 1, 10, 11, 2, 3, 9, 4, 5, 8, 7, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
219. Schnittke, Alfred: Symphony, No.7, mvt 3, row y, [0, 1, 11, 10, 8, 9, 7, 6, 5, 4, 3, 2], T6; I3; RI9, (0, 1, 2, 3, 4, 5)
220. Schoenberg, Arnold: Fantasy for Piano Four Hands, I, [0, 4, 2, 5, 3, 7, 11, 10, 1, 8, 9, 6], T6; I1; RI7, (0, 2, 3, 4, 5, 7)
221. Schoenberg, Arnold: Four Pieces for Mixed Chorus, No.3, Op.27, No.3, [0, 11, 7, 9, 10, 8, 4, 5, 1, 3, 2, 6], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
222. Schoenberg, Arnold: Modern Psalms, The First Psalm, Op.50c, [0, 11, 8, 4, 7, 3, 1, 5, 2, 6, 9, 10], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
223. Schoenberg, Arnold: Ode To Napoleon Buonaparte, Op.41 (view 1), [0, 11, 3, 4, 8, 7, 2, 1, 5, 6, 10, 9], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
224. Schoenberg, Arnold: Ode To Napoleon Buonaparte, Op.41 (view 2), [0, 1, 9, 8, 4, 5, 7, 6, 10, 11, 3, 2], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
225. Schoenberg, Arnold: Psalm 130, De Profundis (unfinished), Op.50B, [0, 6, 5, 1, 11, 7, 4, 8, 9, 3, 2, 10], T3,9; I3,9; RI6,12, (0, 1, 2, 6, 7, 8)
226. Schoenberg, Arnold: Serenade, mvt 4, "Sonett", Op.24, [0, 10, 11, 7, 8, 9, 4, 2, 5, 1, 3, 6], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
227. Schoenberg, Arnold: Suite, Op.29, [0, 4, 3, 7, 11, 8, 9, 6, 5, 1, 2, 10], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
228. Schoenberg, Arnold: Three Songs, No.3, "Madchenlied", Op.48, [0, 6, 8, 10, 2, 4, 9, 5, 3, 11, 7, 1], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
229. Schwantner, Joseph: ...and the mountains rising nowhere, [0, 11, 8, 7, 4, 3, 2, 1, 10, 9, 6, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
230. Schwantner, Joseph: Elixir (Consortium VIII), [0, 8, 4, 3, 7, 11, 10, 6, 9, 5, 1, 2], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
231. Schwantner, Joseph: Elixir (Consortium VIII), m.22, [0, 1, 4, 5, 8, 9, 6, 7, 10, 11, 2, 3], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
232. Schwantner, Joseph: In Aeternum (Derived Row), [0, 3, 11, 2, 10, 1, 7, 4, 8, 5, 9, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
233. Schwantner, Joseph: In Aeternum (Principal Row), [0, 4, 11, 6, 10, 5, 1, 9, 2, 7, 3, 8], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
234. Schwantner, Joseph: Modus Caelestis (A), [0, 6, 7, 1, 11, 5, 4, 10, 8, 2, 3, 9], T3,9; I3,9; RI6,12, (0, 1, 2, 6, 7, 8)

235. Seiber, Mátyás: String Quartet, No.2, [0, 2, 3, 1, 4, 11, 5, 10, 7, 9, 8, 6], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
236. Seiber, Mátyás: Ulysses, [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
237. Slonimsky, Nicholas: No. 1214a Thirds (Twelve-Tone Patterns), [0, 4, 8, 11, 3, 7, 6, 10, 2, 5, 9, 1], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
238. Slonimsky, Nicholas: No. 1215a Fourths (Twelve-Tone Patterns), [0, 5, 10, 3, 8, 1, 7, 2, 9, 4, 11, 6], T6; I7; RI1, (0, 2, 4, 5, 7, 9)
239. Slonimsky, Nicholas: No. 1216a Foutths (Twelve-Tone Patterns), [0, 5, 10, 3, 7, 2, 9, 4, 8, 1, 6, 11], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
240. Slonimsky, Nicholas: No. 1218a Fourths (Twelve-Tone Patterns), [0, 5, 10, 3, 8, 1, 6, 11, 4, 9, 2, 7], T6; I7; RI1, (0, 2, 4, 5, 7, 9)
241. Slonimsky, Nicholas: No. 1219a Fourths (Twelve-Tone Patterns), [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
242. Slonimsky, Nicholas: No. 1220a Fifths (Twelve-Tone Patterns), [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
243. Slonimsky, Nicholas: No. 1221a Fifths (Twelve-Tone Patterns), [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
244. Slonimsky, Nicholas: No. 1222aFifths (Twelve-Tone Patterns), [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
245. Slonimsky, Nicholas: No. 1223a Sixths (Twelve-Tone Patterns), [0, 8, 4, 1, 5, 9, 6, 2, 10, 7, 11, 3], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
246. Slonimsky, Nicholas: No. 1225a Sixths (Twelve-Tone Patterns), [0, 8, 4, 7, 11, 3, 6, 2, 10, 1, 5, 9], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
247. Slonimsky, Nicholas: No. 1226a Minor Sevenths (Twelve-Tone Patterns), [0, 10, 8, 2, 4, 6, 1, 11, 9, 3, 5, 7], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
248. Slonimsky, Nicholas: No. 1227a Minor Sevenths (Twelve-Tone Patterns), [0, 10, 4, 2, 8, 6, 1, 11, 9, 7, 5, 3], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
249. Slonimsky, Nicholas: No. 1228a Minor Sevenths (Twelve-Tone Patterns), [0, 10, 2, 4, 8, 6, 11, 1, 5, 3, 7, 9], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
250. Slonimsky, Nicholas: No. 1229a Major Sevenths (Twelve-Tone Patterns), [0, 11, 10, 9, 8, 7, 1, 2, 3, 4, 5, 6], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
251. Slonimsky, Nicholas: No. 1230a Major Sevenths (Twelve-Tone Patterns), [0, 11, 3, 4, 8, 7, 1, 2, 6, 5, 9, 10], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
252. Slonimsky, Nicholas: No. 1231a Major Sevenths (Twelve-Tone Patterns), [0, 11, 4, 3, 8, 7, 1, 2, 9, 10, 5, 6], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
253. Slonimsky, Nicholas: No. 1232a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], T6; I5;

- RI11, (0, 1, 2, 3, 4, 5)
254. Slonimsky, Nicholas: No. 1233a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
255. Slonimsky, Nicholas: No. 1234a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
256. Slonimsky, Nicholas: No. 1235a (Twelve-Tone Spirals), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
257. Slonimsky, Nicholas: No. 1236a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals), [0, 11, 9, 2, 4, 7, 5, 6, 8, 3, 1, 10], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
258. Slonimsky, Nicholas: No. 1237a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals), [0, 11, 9, 7, 2, 4, 6, 5, 3, 1, 8, 10], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
259. Slonimsky, Nicholas: No. 1239a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals), [0, 11, 2, 9, 4, 7, 6, 5, 8, 3, 10, 1], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
260. Slonimsky, Nicholas: No. 1240a Converging and Diverging Whole-Tone Scales (Twelve-Tone Spirals), [0, 11, 9, 2, 4, 7, 5, 3, 6, 8, 1, 10], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
261. Slonimsky, Nicholas: No. 1242a Mutually Exclusive Diminished-Seventh Chords (Twelve-Tone Spirals), [0, 8, 4, 11, 3, 7, 1, 9, 5, 10, 2, 6], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
262. Slonimsky, Nicholas: No. 1244a Crossing Sixths (Crossing Intervals), [0, 3, 8, 7, 4, 11, 1, 2, 10, 5, 6, 9], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
263. Slonimsky, Nicholas: No. 1245a Crossing Fifths (Crossing Intervals), [0, 5, 7, 10, 2, 3, 9, 8, 4, 1, 11, 6], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
264. Slonimsky, Nicholas: No. 1246a Crossing Fourths (Crossing Intervals), [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6], T6; I1; RI7, (0, 2, 4, 5, 7, 9)
265. Slonimsky, Nicholas: No. 1247a Crossing Thirds (Crossing Intervals), [0, 3, 4, 11, 7, 8, 10, 5, 2, 1, 6, 9], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
266. Slonimsky, Nicholas: No. 1248a Crossing Thirds (Crossing Intervals), [0, 5, 4, 1, 8, 9, 11, 6, 3, 2, 7, 10], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
267. Slonimsky, Nicholas: No. 1250a Crossing Seconds (Crossing Intervals), [0, 11, 2, 9, 4, 7, 6, 5, 8, 3, 10, 1], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
268. Slonimsky, Nicholas: No. 1256a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 5, 8, 11, 4, 6, 9, 1], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
269. Slonimsky, Nicholas: No. 1256b Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 9, 4, 2, 11, 7, 5, 1, 8, 6, 3, 10], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
270. Slonimsky, Nicholas: No. 1257a Quadritonal Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 3, 7, 10, 1, 6, 9, 2, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
271. Slonimsky, Nicholas: No. 1257b Quadritonal Arpeggios (Division of Twelve Tones into Four

- Mutually Exclusive Triads), [0, 8, 4, 3, 11, 7, 5, 2, 10, 6, 1, 9], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
272. Slonimsky, Nicholas: No. 1269a Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 9, 1, 5, 6, 10, 2, 3, 7, 11], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
273. Slonimsky, Nicholas: No. 1269b Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
274. Slonimsky, Nicholas: No. 1270a Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 10, 2, 6, 7, 11, 3, 5, 9, 1], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
275. Slonimsky, Nicholas: No. 1270b Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 2, 10, 6, 3, 11, 7, 5, 1, 9], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
276. Slonimsky, Nicholas: No. 1271a Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 3, 7, 10, 2, 6, 9, 1, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
277. Slonimsky, Nicholas: No. 1271b Quadrilateral Arpeggios (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 8, 4, 1, 9, 5, 2, 10, 6, 3, 11, 7], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
278. Slonimsky, Nicholas: No. 1277a Quadrilateral Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 2, 5, 8, 4, 11, 9, 6, 1], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
279. Slonimsky, Nicholas: No. 1277b Quadrilateral Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 3, 7, 10, 5, 2, 4, 8, 11, 9, 6, 1], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
280. Slonimsky, Nicholas: No. 1278a Quadrilateral Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 3, 7, 10, 6, 1, 9, 5, 2], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
281. Slonimsky, Nicholas: No. 1278b Quadrilateral Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 7, 3, 6, 10, 1, 9, 5, 2], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
282. Slonimsky, Nicholas: No. 1290a Quadrilateral Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 9, 1, 5, 6, 2, 10, 7, 3, 11], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
283. Slonimsky, Nicholas: No. 1290b Quadrilateral Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 9, 5, 1, 10, 2, 6, 7, 3, 11], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
284. Slonimsky, Nicholas: No. 1291a Quadrilateral Arpeggios; Inversions (Division of Twelve Tones into

- Four Mutually Exclusive Triads), [0, 4, 8, 10, 2, 6, 7, 3, 11, 9, 5, 1], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
285. Slonimsky, Nicholas: No. 1291b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 10, 6, 2, 11, 3, 7, 9, 5, 1], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
286. Slonimsky, Nicholas: No. 1292a Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 3, 7, 10, 6, 2, 1, 9, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
287. Slonimsky, Nicholas: No. 1292b Quadrtonal Arpeggios; Inversions (Division of Twelve Tones into Four Mutually Exclusive Triads), [0, 4, 8, 11, 7, 3, 2, 6, 10, 9, 5, 1], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
288. Slonimsky, Nicholas: No. 1293a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 2, 4, 5, 7, 9, 6, 8, 10, 11, 1, 3], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
289. Slonimsky, Nicholas: No. 1293b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 3, 1, 11, 10, 8, 6, 9, 7, 5, 4, 2], T6; I5; RI11, (0, 2, 3, 4, 5, 7)
290. Slonimsky, Nicholas: No. 1294a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 9, 4, 7, 5, 2, 6, 3, 10, 1, 11, 8], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
291. Slonimsky, Nicholas: No. 1294b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 8, 11, 1, 10, 3, 6, 2, 5, 7, 4, 9], T6; I5; RI11, (0, 2, 3, 4, 5, 7)
292. Slonimsky, Nicholas: No. 1295a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 2, 5, 4, 3, 1, 6, 8, 11, 10, 9, 7], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
293. Slonimsky, Nicholas: No. 1295b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 7, 9, 10, 11, 8, 6, 1, 3, 4, 5, 2], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
294. Slonimsky, Nicholas: No. 1296a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 7, 8, 3, 4, 11, 6, 1, 2, 9, 10, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
295. Slonimsky, Nicholas: No. 1297a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 11, 9, 7, 2, 4, 6, 5, 3, 1, 8, 10], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
296. Slonimsky, Nicholas: No. 1297b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 10, 8, 1, 3, 5, 6, 4, 2, 7, 9, 11], T6; I7; RI1, (0, 2, 4, 5, 7, 9)
297. Slonimsky, Nicholas: No. 1298a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 11, 1, 10, 2, 9, 6, 5, 7, 4, 8, 3], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
298. Slonimsky, Nicholas: No. 1299a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 9, 2, 7, 4, 5, 6, 3, 8, 1, 10, 11], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
299. Slonimsky, Nicholas: No. 1299b Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 11, 10, 1, 8, 3, 6, 5, 4, 7, 2, 9], T6; I5; RI11, (0, 2, 3, 4, 5, 7)
300. Slonimsky, Nicholas: No. 1300a Two Major Hexachords (Miscellaneous Dodecaphonic Patterns), [0, 11, 1, 10, 2, 9, 6, 5, 7, 4, 8, 3], T6; I5; RI11, (0, 1, 2, 3, 4, 5)

301. Slonimsky, Nicholas: No. 1303 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 2, 3, 7, 10, 5, 11, 4, 1, 9, 8, 6], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
302. Slonimsky, Nicholas: No. 1304 Invertible Dodecaphonic Progressions – With all Different Intervals. (On a Minor Triad), [0, 3, 7, 8, 10, 5, 11, 4, 2, 1, 9, 6], T6; I9; RI3, (0, 2, 4, 5, 7, 9)
303. Slonimsky, Nicholas: No. 1310 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 5, 1, 4, 2, 3, 9, 8, 10, 7, 11, 6], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
304. Slonimsky, Nicholas: No. 1311 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 9, 10, 2, 5, 11, 8, 4, 3, 1, 6], T6; I1; RI7, (0, 2, 4, 5, 7, 9)
305. Slonimsky, Nicholas: No. 1312 Invertible Dodecaphonic Progressions – With all Different Intervals, [0, 7, 10, 2, 3, 5, 11, 9, 8, 4, 1, 6], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
306. Slonimsky, Nicholas: No. 1314 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 2, 7, 4, 5, 9, 3, 11, 10, 1, 8, 6], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
307. Slonimsky, Nicholas: No. 1315 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 4, 5, 2, 7, 9, 3, 1, 8, 11, 10, 6], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
308. Slonimsky, Nicholas: No. 1316 Invertible Dodecaphonic Progressions – With all Different Intervals. (White-Key Row of Six Notes), [0, 7, 4, 5, 9, 2, 8, 3, 11, 10, 1, 6], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
309. Slonimsky, Nicholas: No. 1317 Invertible Dodecaphonic Progressions – With all Different Intervals. (Mother Chord), [0, 11, 7, 4, 2, 9, 3, 8, 10, 1, 5, 6], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
310. Slonimsky, Nicholas: No. 1318 Invertible Dodecaphonic Progressions – With all Different Intervals. (Grandmother Chord), [0, 11, 1, 10, 2, 9, 3, 8, 4, 7, 5, 6], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
311. Slonimsky, Nicholas: No. 230 Ultrappolation of Three Notes (Ditone Progression; Equal Division of One Octave into Three Parts), [0, 6, 5, 11, 4, 10, 9, 3, 8, 2, 1, 7], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
312. Slonimsky, Nicholas: No. 405 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 7, 5, 3, 10, 8, 6, 1, 11, 9, 4, 2], T6; I9; RI3, (0, 2, 4, 5, 7, 9)
313. Slonimsky, Nicholas: No. 407 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
314. Slonimsky, Nicholas: No. 415 Ultrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 5, 3, 1, 8, 6, 4, 11, 9, 7, 2], T6; I7; RI1, (0, 2, 4, 5, 7, 9)
315. Slonimsky, Nicholas: No. 453 Infrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 10, 3, 2, 1, 6, 5, 4, 9, 8, 7], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
316. Slonimsky, Nicholas: No. 459 Infrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 8, 3, 1, 11, 6, 4, 2, 9, 7, 5], T6; I5; RI11, (0, 2, 3, 4, 5, 7)
317. Slonimsky, Nicholas: No. 469 Infrappolation of Two Notes (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)

318. Slonimsky, Nicholas: No. 482 Infra-Interpolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 11, 1, 3, 2, 4, 6, 5, 7, 9, 8, 10], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
319. Slonimsky, Nicholas: No. 485 Infra-Interpolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 2, 3, 1, 5, 6, 4, 8, 9, 7, 11], T6; I9; RI3, (0, 2, 3, 4, 5, 7)
320. Slonimsky, Nicholas: No. 496 [Shostakovitch: Prelude No. 2] Inter-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 2, 4, 3, 5, 7, 6, 8, 10, 9, 11, 1], T6; I1; RI7, (0, 2, 3, 4, 5, 7)
321. Slonimsky, Nicholas: No. 499 Inter-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 2, 7, 3, 5, 10, 6, 8, 1, 9, 11, 4], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
322. Slonimsky, Nicholas: No. 505 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 5, 3, 1, 8, 6, 4, 11, 9, 7, 2], T6; I7; RI1, (0, 2, 4, 5, 7, 9)
323. Slonimsky, Nicholas: No. 508 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 10, 8, 3, 1, 11, 6, 4, 2, 9, 7, 5], T6; I5; RI11, (0, 2, 3, 4, 5, 7)
324. Slonimsky, Nicholas: No. 512 Infra-Ultrapolation (Sesquitone Progression; Equal Division of One Octave into Four Parts), [0, 8, 4, 3, 11, 7, 6, 2, 10, 9, 5, 1], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
325. Slonimsky, Nicholas: No. 570 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 3, 2, 5, 4, 7, 6, 9, 8, 11, 10, 1], T6; I1; RI7, (0, 2, 3, 4, 5, 7)
326. Slonimsky, Nicholas: No. 572 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10, 3], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
327. Slonimsky, Nicholas: No. 574 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
328. Slonimsky, Nicholas: No. 576 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 9, 2, 11, 4, 1, 6, 3, 8, 5, 10, 7], T6; I7; RI1, (0, 2, 3, 4, 5, 7)
329. Slonimsky, Nicholas: No. 578 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
330. Slonimsky, Nicholas: No. 579 Ultrapolation of One Note (Whole-Tone Progression; Equal Division of One Octave into Six Parts), [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
331. Slonimsky, Nicholas: No. 637 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 3, 2, 4, 5, 7, 6, 8, 9, 11, 10], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
332. Slonimsky, Nicholas: No. 639 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 5, 4, 3, 6, 7, 8, 11, 10, 9], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
333. Slonimsky, Nicholas: No. 640 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 11, 10, 7, 8, 9, 6, 5, 4, 1, 2, 3], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
334. Slonimsky, Nicholas: No. 642 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 4, 5, 11, 10, 9, 8, 7, 6], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
335. Slonimsky, Nicholas: No. 645 Permutations (Semitone Progression; Equal Division of One Octave

- into Twelve Parts), [0, 1, 11, 10, 8, 9, 7, 6, 4, 5, 3, 2], T6; I3; RI9, (0, 1, 2, 3, 4, 5)
336. Slonimsky, Nicholas: No. 648-654 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
337. Slonimsky, Nicholas: No. 655-657 Permutations (Semitone Progression; Equal Division of One Octave into Twelve Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
338. Slonimsky, Nicholas: No. 749 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 2, 7, 9, 11, 4, 6, 8, 1, 3, 5, 10], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
339. Slonimsky, Nicholas: No. 753 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 4, 8, 9, 1, 5, 6, 10, 2, 3, 7, 11], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
340. Slonimsky, Nicholas: No. 754 Interpolation of Two Notes (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 5, 7, 9, 2, 4, 6, 11, 1, 3, 8, 10], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
341. Slonimsky, Nicholas: No. 793 Infra-Ultrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
342. Slonimsky, Nicholas: No. 794 Infra-Ultrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 10, 11, 9, 7, 8, 6, 4, 5, 3, 1, 2], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
343. Slonimsky, Nicholas: No. 799 Infra-Infrapolation (Sesquiquadritone Progression; Equal Division of Three Octaves into Four Parts), [0, 2, 7, 9, 11, 4, 6, 8, 1, 3, 5, 10], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
344. Slonimsky, Nicholas: No. 822 Ultrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
345. Slonimsky, Nicholas: No. 823 Ultrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 1, 10, 11, 8, 9, 6, 7, 4, 5, 2, 3], T6; I3; RI9, (0, 1, 2, 3, 4, 5)
346. Slonimsky, Nicholas: No. 824 Infrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
347. Slonimsky, Nicholas: No. 875 Infrapolation of One Note (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 6, 5, 11, 10, 4, 3, 9, 8, 2, 1, 7], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
348. Slonimsky, Nicholas: No. 903 Inter-Ultrapolation (Quinquetone Progression; Equal Division of Five Octaves into Six Parts), [0, 4, 8, 5, 9, 1, 10, 2, 6, 3, 7, 11], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
349. Slonimsky, Nicholas: No. 915 Miscellaneous Patterns (Diatessaron Progression; Equal Division of Five Octaves into Twelve Parts), [0, 10, 2, 8, 4, 6, 5, 3, 7, 1, 9, 11], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
350. Slonimsky, Nicholas: No. 997 Infra-Interpolation (Diapente Progression; Equal Division of Seven Octaves into Twelve Parts), [0, 8, 4, 7, 3, 11, 2, 10, 6, 9, 5, 1], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5,

- 8, 9)
351. Smith, Hale: Contours for Orchestra, [0, 5, 6, 4, 10, 11, 7, 2, 1, 3, 9, 8], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
 352. Spinner, Leopold: Chamber Symphony, Op.28, [0, 11, 10, 6, 4, 5, 2, 1, 3, 7, 8, 9], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
 353. Spinner, Leopold: Fantasy for Piano, Op.9 , [0, 1, 4, 5, 2, 3, 8, 9, 6, 7, 10, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
 354. Spinner, Leopold: Ich lieb' eine Blume for Four-part mixed Choir, [0, 11, 2, 4, 9, 7, 1, 3, 10, 8, 5, 6], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
 355. Spinner, Leopold: Sonata for Clarinet and Piano, Op.17, [0, 3, 4, 1, 2, 5, 11, 8, 7, 10, 9, 6], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
 356. Spinner, Leopold: Sonatina for Cello and Piano, Op.26, [0, 1, 11, 2, 4, 3, 9, 10, 8, 5, 7, 6], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
 357. Spinner, Leopold: String Quartet, No.2, Op.7, [0, 3, 4, 7, 8, 11, 1, 10, 9, 6, 5, 2], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
 358. Spinner, Leopold: Trio for Clarinet, Cello and Piano, [0, 1, 7, 6, 5, 11, 10, 3, 4, 2, 9, 8], T3,9; I3,9; RI6,12, (0, 1, 2, 6, 7, 8)
 359. Steinbauer, Othmar: Violinsonate, No.1, Op.15, [0, 5, 2, 10, 7, 3, 11, 8, 4, 1, 6, 9], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
 360. Stockhausen, Karlheinz: Gruppen, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6], T6; I3; RI9, (0, 1, 2, 3, 4, 5)
 361. Stockhausen, Karlheinz: Klavierstück IX, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6], T6; I3; RI9, (0, 1, 2, 3, 4, 5)
 362. Stockhausen, Karlheinz: Klavierstück VII, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6], T6; I3; RI9, (0, 1, 2, 3, 4, 5)
 363. Stockhausen, Karlheinz: Klavierstück X, [0, 8, 1, 10, 9, 11, 5, 3, 4, 7, 2, 6], T6; I3; RI9, (0, 1, 2, 3, 4, 5)
 364. Stockhausen, Karlheinz: Kreuzspiel, [0, 10, 9, 11, 7, 2, 8, 1, 4, 6, 5, 3], T6; I3; RI9, (0, 2, 3, 4, 5, 7)
 365. Stockhausen, Karlheinz: Tierkreis, Cancer, [0, 7, 11, 10, 9, 8, 3, 6, 4, 1, 5, 2], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
 366. Stockhausen, Karlheinz: Tierkreis, Scorpio, [0, 4, 3, 11, 7, 8, 10, 9, 2, 5, 1, 6], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
 367. Stravinsky, Igor: Agon, "Pas de deux", "Four trios", [0, 1, 4, 3, 2, 5, 6, 9, 8, 11, 10, 7], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
 368. Stravinsky, Igor: Canticum Sacrum, II & IV, [0, 11, 1, 3, 4, 2, 7, 6, 9, 5, 8, 10], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
 369. Stravinsky, Igor: Fanfare for a New Theater, [0, 11, 1, 3, 4, 2, 5, 7, 6, 8, 10, 9], T6; I9; RI3, (0, 1, 2, 3, 4, 5)

370. Stravinsky, Igor: Movements, [0, 1, 7, 5, 6, 11, 9, 8, 10, 3, 4, 2], T3,9; I3,9; RI6,12, (0, 1, 2, 6, 7, 8)
371. Talma, Louise: Passacaglia and Fugue, [0, 4, 2, 9, 11, 7, 8, 3, 1, 6, 5, 10], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
372. Talma, Louise: Six Etudes, Etude 4, [0, 1, 5, 9, 4, 8, 7, 6, 11, 2, 10, 3], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
373. Wang, Jian-Zhong: Five Pieces for Piano no. 1, “Pastorale” (variant), [0, 3, 5, 7, 4, 2, 11, 9, 6, 8, 10, 1], T6; I1; RI7, (0, 2, 3, 4, 5, 7)
374. Webern, Anton: Op.32 (un-finished), later sketch, [0, 1, 2, 11, 10, 9, 5, 4, 3, 6, 7, 8], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
375. Webern, Anton: 3 Lieder, “Erlösung”, Op.18, No.2, [0, 3, 11, 2, 10, 1, 9, 5, 8, 4, 7, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)
376. Webern, Anton: 3 Volkstexte, “Heiland, Unsere Missetaten...”, Op.17, No.3, [0, 9, 8, 7, 11, 10, 4, 5, 6, 3, 2, 1], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
377. Webern, Anton: Concerto for Nine Instruments (Konzert), Op.24, [0, 11, 3, 4, 8, 7, 9, 5, 6, 1, 2, 10], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
378. Webern, Anton: Symphony, Op.21, [0, 3, 2, 1, 5, 4, 10, 11, 7, 8, 9, 6], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
379. Webern, Anton: Variations for Orchestra, Op.30, [0, 1, 4, 3, 2, 5, 6, 9, 8, 7, 10, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
380. Webern, Anton: Variations for Piano, Op.27, [0, 8, 7, 11, 10, 9, 3, 1, 4, 2, 6, 5], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
381. Westergaard, Peter: Mr. and Mrs. Discobolos, [0, 2, 1, 4, 3, 5, 8, 6, 10, 7, 11, 9], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
382. Wolpe, Stefan: Four Studies on Basic Rows, No.1 – Study on Tritones, [0, 6, 7, 1, 2, 8, 11, 5, 10, 4, 9, 3], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
383. Wolpe, Stefan: Four Studies on Basic Rows, No.2 – Study on Thirds, [0, 11, 9, 8, 10, 7, 6, 5, 3, 2, 4, 1], T6; I1; RI7, (0, 1, 2, 3, 4, 5)
384. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 1, [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
385. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 11, [0, 11, 2, 1, 4, 3, 6, 5, 8, 7, 10, 9], T6; I9; RI3, (0, 1, 2, 3, 4, 5)
386. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 2, [0, 2, 4, 6, 8, 10, 11, 1, 3, 5, 7, 9], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
387. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 3, [0, 3, 1, 4, 2, 5, 6, 9, 7, 10, 8, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
388. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 4, [0, 4, 8, 2, 6, 10, 3, 7, 11, 5, 9, 1], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
389. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 5, [0, 5, 2, 7, 4, 9, 6, 11, 8, 1, 10,

- 3], T6; I3; RI9, (0, 2, 4, 5, 7, 9)
390. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 6, [0, 6, 1, 7, 2, 8, 3, 9, 4, 10, 5, 11], T3,9; I5,11; RI2,8, (0, 1, 2, 6, 7, 8)
391. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 7, [0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5], T6; I5; RI11, (0, 2, 4, 5, 7, 9)
392. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 8, [0, 8, 4, 1, 9, 5, 2, 10, 6, 3, 11, 7], T2,6,10; I3,7,11; RI1,5,9, (0, 1, 4, 5, 8, 9)
393. Wolpe, Stefan: Four Studies on Basic Rows, No.4, “Basic Row” 9, [0, 9, 1, 10, 2, 11, 6, 3, 7, 4, 8, 5], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
394. Wuorinen, Charles: Flute Variations II, [0, 1, 3, 2, 5, 4, 9, 10, 6, 8, 7, 11], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
395. Wuorinen, Charles: Second Sonata, Source set, [0, 2, 10, 3, 5, 7, 6, 4, 1, 11, 9, 8], T6; I11; RI5, (0, 2, 4, 5, 7, 9)
396. Wuorinen, Charles: Second Sonata, Voice 2, [0, 2, 10, 9, 11, 1, 6, 4, 7, 5, 3, 8], T6; I5; RI11, (0, 1, 2, 3, 4, 5)
397. Wuorinen, Charles: Second Sonata, Voice 3, [0, 2, 4, 3, 5, 1, 9, 7, 11, 10, 8, 6], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
398. Wuorinen, Charles: Sonata for Piano, [0, 3, 2, 4, 5, 1, 11, 8, 9, 7, 6, 10], T6; I11; RI5, (0, 1, 2, 3, 4, 5)
399. Wuorinen, Charles: Third Piano Sonata, [0, 7, 5, 2, 10, 9, 3, 4, 8, 11, 1, 6], T6; I1; RI7, (0, 2, 4, 5, 7, 9)
400. Zhou, Jin-Min: Piano Quintet, Scherzo, [0, 10, 5, 4, 6, 11, 7, 9, 2, 3, 1, 8], T3,9; I1,7; RI4,10, (0, 1, 2, 6, 7, 8)
401. Zillig, Wilfried: Das Opfer, [0, 11, 3, 4, 8, 7, 10, 9, 1, 2, 6, 5], T2,6,10; I1,5,9; RI3,7,11, (0, 1, 4, 5, 8, 9)
402. Zimmerman, Bernd Alois: Perspektiven, [0, 2, 10, 8, 4, 6, 3, 1, 5, 7, 11, 9], T1,3,5,7,9,11; I1,3,5,7,9,11; RI2,4,6,8,10,12, (0, 2, 4, 6, 8, 10)
403. Zimmermann, Bernd Alois: ‘Ich wandte mich um und sah alles Unrecht das geschah unter der Sonne’, [0, 1, 11, 2, 10, 3, 9, 4, 8, 5, 7, 6], T6; I7; RI1, (0, 1, 2, 3, 4, 5)

Footnotes

WORKBOOK

DIGITAL WORKBOOK

Kyle Gullings

At the end of each chapter, you may find Assignments linked for that chapter. Those same assignments are also gathered here in a single table for convenient browsing.

Use arrows in the cells on the header row to sort the table alphabetically. Use the “Search” function to filter by the words in your search.

Last updated: May 24, 2022 2:45 pm

Part	Book Order	Chapter Name	Assignments
I. Fundamentals	1	Introduction to Western Musical Notation	1. Inventing a Notation System (.pdf , .docx); Rubric (.pdf , .docx)
I. Fundamentals	2	Notation of Notes, Clefs, and Ledger Lines	1. Writing Note Heads, Clefs, and Ledger Lines (.pdf , .docx)
I. Fundamentals	3	Reading Clefs	1. Writing and Identifying Notes Assignment #1 (.pdf , .mscx) 2. Writing and Identifying Notes Assignment #2 (.pdf , .mscx)
I. Fundamentals	4	The Keyboard and the Grand Staff	1. White Keys on the Piano and the Grand Staff (.pdf , .docx) 2. The Piano Keyboard and the Grand Staff with Ledger Lines (.pdf , .docx) 3. Generic Intervals (.pdf , .docx) 4. Grand Staff Note Names with Ledger Lines (.pdf , .docx)
I. Fundamentals	5	Half- and Whole-steps and Accidentals	1. Black Keys on the Piano (.pdf , .docx) 2. Half- and Whole-steps on the Piano Keyboard (.pdf , .docx) 3. Writing Accidentals (.pdf , .docx) 4. Writing and Identifying Accidentals (.pdf , .docx) 5. Half- and Whole-steps in Staff Notation (.pdf , .docx) 6. Enharmonic Equivalence (.pdf , .docx)
I. Fundamentals	6	American Standard Pitch Notation (ASPN)	1. Writing and Identifying ASPN Labels (.pdf , .docx)
I. Fundamentals	7	Other Aspects of Notation	1. Dynamics, Articulations, Tempi, Stylistic Periods, Structural Features (.pdf , .docx)
I. Fundamentals	8	Rhythmic and Rest Values	1. Note and Rest Values (.pdf , .docx) 2. Dots and Ties (.pdf , .docx)
I. Fundamentals	9	Simple Meter and Time Signatures	1. Notes, Rests, Bar Lines (.pdf , .docx) 2. Re-beaming (.pdf , .musx)

Part	Book Order	Chapter Name	Assignments
I. Fundamentals	10	Compound Meter and Time Signatures	- Notes, Rests, Bar Lines (.pdf, .docx) - Re-beaming (.pdf, .musx)
I. Fundamentals	11	Other Rhythmic Essentials	Triplets and Duplets, Hypermeter, Syncopation (.pdf, .docx) Worksheet playlist
I. Fundamentals	12	Major Scales, Scale Degrees, and Key Signatures	- Writing Major Scales (.pdf, .mscx) - Key Signatures: Major (.pdf, .mscx)
I. Fundamentals	13	Minor Scales, Scale Degrees, and Key Signatures	- Writing Minor Scales (.pdf, .mscx) - Key Signatures: Minor (.pdf, .mscx)
I. Fundamentals	14	Introduction to Diatonic Modes and the Chromatic “Scale”	- Writing Modes Assignment #1 (.pdf, .mscx) - Writing Modes Assignment #2 (.pdf, .mscx) - Writing Chromatic “Scales” Assignment #1 (.pdf, .mscx) - Writing Chromatic “Scales” Assignment #2 (.pdf, .mscx)
I. Fundamentals	15	The Basics of Sight-singing and Dictation	- Solfège and Scale Degree Identification (.pdf, .docx) - Solfège and Scale Degree Identification in a Melodic Context (.pdf, .docx) Worksheet playlist
I. Fundamentals	16	Intervals	- Writing and Identifying Intervals Assignment #1 (.pdf, .mcsz) - Writing and Identifying Intervals Assignment #2 (.pdf, .mcsz) - Writing and Identifying Intervals Assignment #3 (.pdf, .mcsz)
I. Fundamentals	17	Triads	- Triads Assignment #1 (.pdf, .mcsz) - Triads Assignment #2 (.pdf, .mcsz) - Triads Assignment #3 (.pdf, .mcsz)

Part	Book Order	Chapter Name	Assignments
I. Fundamentals	18	Seventh Chords	1. Seventh Chords Assignment #1 (.pdf, .mcsz) 2. Seventh Chords Assignment #2 (.pdf, .mcsz) 3. Seventh Chords Assignment #3 (.pdf, .mcsz)
I. Fundamentals	19	Inversion and Figured Bass	1. Triadic Inversions (.pdf, .mcsz) 2. Seventh Chord Inversions (.pdf, .mcsz)
I. Fundamentals	20	Roman Numerals and SATB Chord Construction	
I. Fundamentals	21	Texture	1. Identifying Textures (.pdf, .docx) Worksheet playlist
II. Counterpoint and Galant Schemas	22	Introduction to Species Counterpoint	1. Cantus firmus A (.pdf, .mscx). Asks students to critique one cantus firmus and write their own. 2. Cantus firmus B (.pdf, .mscx). Asks students to critique one cantus firmus and write their own. 3. For the complete set of Fux exercises, see the Gradus ad Parnassum chapter.
II. Counterpoint and Galant Schemas	23	First-species Counterpoint	1. First Species Counterpoint A (.pdf, .mscx). Asks students to compose a first species example and do error detection. 2. For the complete set of Fux exercises, see the Gradus ad Parnassum chapter.
II. Counterpoint and Galant Schemas	24	Second-species Counterpoint	1. For the complete set of Fux exercises, see the Gradus ad Parnassum chapter.
II. Counterpoint and Galant Schemas	25	Third-species Counterpoint	1. For the complete set of Fux exercises, see the Gradus ad Parnassum chapter.
II. Counterpoint and Galant Schemas	26	Fourth-species counterpoint	1. For the complete set of Fux exercises, see the Gradus ad Parnassum chapter.

Part	Book Order	Chapter Name	Assignments
II. Counterpoint and Galant Schemas	27	Fifth-Species Counterpoint	1. For the complete set of Fux exercises, see the Gradus ad Parnassum chapter.
II. Counterpoint and Galant Schemas	28	“Gradus ad Parnassum” Exercises	
II. Counterpoint and Galant Schemas	29	Sixteenth Century Contrapuntal Style	- Imitative writing in the 16th-c. contrapuntal style. These exercises provides at least one complete part for reference, and one part with missing passages to complete in a suitable style. Original note values are used, modern time signatures for those values (4/2), some editorial accidentals (ficta), and (with apologies to the purists) only G- and F- clefs. - Lassus: Benedictus from the <i>Missa Venatorum</i>. 2 voices. .mscz, .pdf - Lassus: Bicinum IV. 2 voices. .mscz, .pdf - Palestrina: Benedictus from the <i>Missa Brevis</i>. 3 voices. .mscz, .pdf - Palestrina: <i>Surge Propera a 4</i> (excerpt). 4 voices. .mscz, .pdf
II. Counterpoint and Galant Schemas	30	High Baroque Fugal Exposition	- In the Bach C-minor fugue shown above, the answer is ‘tonal’. Given what has been said about tonal answers in this chapter, try explaining how the subject and answer differ, and why. - Pick another fugue, identify how many ‘voices’ there are, locate each voice’s entry and the end of the exposition. - Trying writing your own answers and countersubjects. The template file below provides the subjects for all 48 fugues in both books of the Well-Tempered Clavier. An empty second stave is provided for your practice. (Note that the last note in many of the fugue subjects is given without a stem to indicate the pitch without the specifying the duration rhythm). If you know some of these fugues well, you may want to work on ones you’re less familiar with. - Once you are feeling confident with writing answers and countersubjects, try writing up a full exposition. Again, you may wish to work on fugues you’re less familiar with.

Part	Book Order	Chapter Name	Assignments
II. Counterpoint and Galant Schemas	31	Ground Bass	1. A simple, predominantly diatonic harmonisation of the ground, with simple blocks chords, making sure to follow good voice-leading practice. Use this as a prototype. 2. A set of alternative harmonizations including tonicizations of other keys and re-harmonizations of the first note in particular to vary the apparent phrase length (as discussed above in reference to the ‘cheat sheet’); 3. Melodic parts that fit with the bass and create more interesting textures. Seek out ways of writing upper parts that can recur in another voice in imitation (and refer back to the Purcell analysis above for ideas!). 4. Finally, combine the best of your ideas into an overall piece that balances textural and harmonic interest and charts an overall trajectory. Why not try a piece with 6 iterations of the ground, of which the first and last are simple and alike.
II. Counterpoint and Galant Schemas	32	Galant schemas – Summary	
II. Counterpoint and Galant Schemas	33	Galant schemas – The Rule of the Octave and Harmonizing the Scale with Sequences	1. Begin by playing through these examples from the files provided, preferably in a range of different keys. (NB: As mentioned above, you can transpose scores in MuseScore with the ‘Notes’ menu: Notes/Transpose). 2. See if you can memorise the patterns. Test yourself by: ◦ Writing them out on paper (start with a blank scale) ◦ Playing them from memory. 3. Both with the music and (when you’re ready) from memory, try embellishing these basic patterns.

Part	Book Order	Chapter Name	Assignments
			1. Playing: Begin by playing through these examples from the files provided, preferably in a range of different keys. (NB: you can transpose scores in MuseScore with the 'Notes' menu: Notes/Transpose). 2. Memorization: See if you can memorise some of these patterns. Test yourself by: ◦ Writing them out on paper (start with a blank scale) ◦ Playing them from memory.
III. Form	34	Galant Schemas	3. Embellishment: schemas help to structure music, but they are not really musical pieces in themselves: it takes a lot of fleshing out to get from these skeletons to real music. That being the case, try improvising embellishments of these basic patterns. Start with simple turns, passing notes and the like, then move on to more ambitious changes. 4. Full pieces: When you're confident with individual cases. Try piecing them together, according to their usual position and ordering. Start by using templates like these: ◦ Template 1: .mscz, .mxl, .pdf ◦ Template 2: .mscz, .mxl, .pdf
III. Form	35	Foundational Concepts for Phrase-level Forms	1. Coming soon!
III. Form	36	The Phrase, Archetypes, and Unique Forms	1. Analyzing sentences (.pdf, .docx). Asks students to compare excerpts to the archetypal sentence, provide form diagrams, and optionally, provide harmonic analysis for any given excerpt. 2. Analyzing archetypes and unique forms (.pdf, .docx). Asks students to identify excerpts that are archetypes (periods, sentences, compound periods) or unique forms, and to diagram those that are archetypes. Optionally, students can harmonically analyze the excerpts. 3. Composing melody-only sentences (.pdf, .mscx). Students compose four-measure sentences from a given basic idea (melody only). 4. Composing fully realized sentences (.pdf, .mscx). Students select from a bank of basic ideas to compose an 8-measure sentence with full texture (accompaniment and melody).

Part	Book Order	Chapter Name	Assignments
III. Form	37	Hybrid Phrase-level Forms	1. Analyzing hybrid forms (.pdf, .docx). Provides excerpts and asks students to indicate which term best describes the first and second half of each. Optional harmonic analysis included. 2. Analyzing forms with multiple possibilities (.pdf, .docx). Asks students to identify preferred and plausible alternative interpretations for several excerpts. Also includes band music. 3. Composing phrase-level forms (.pdf, .docx). Asks students to compose a phrase-level form given a description. Provides a basic idea bank to give students a start.
III. Form	38	Expansion and Contraction at the Phrase Level	1. Analyzing expansion techniques (.pdf, .docx). Asks students to name, segment and label the form of excerpts and identify the location of any expansion technique(s). Optional harmonic analysis included. 2. Analyzing multiple expansion techniques (.pdf, .docx). More complicated examples than in worksheet 1. Each excerpt is significantly expanded. 3. Recomposing to remove expansions (.pdf, .docx). Asks students to recompose excerpts from worksheet 1 to remove the expanded portion of the archetypal form.
III. Form	39	Formal Sections in General	
III. Form	40	Binary Form	1. Binary Form Analysis Assignment (.pdf, .docx). ◦ Audio Example 1 – Franz Schubert, Écossaise, D. 529, No. 3 (Starts at 1:07) ◦ Audio Example 2 – Franz Joseph Haydn, Piano Sonata no. 37, III, theme ◦ Audio Example 3 – Johann Sebastian Bach, Sarabande from Violin Partita no. 1, BWV 1002 ◦ Audio Example 4 – Franz Schubert (1797-1828), Piano Sonata in E major, D. 157, II (mm. 1– 16) ◦ Audio Example 5 – Franz Schubert (1797-1828), Symphony no. 2 in B$\flat$ major, D. 125, II 2. Guided Composition (.pdf, .docx, .mscx).
III. Form	41	Ternary Form	1. Bernhard Crusell – Clarinet Quartet, Op. 7, III, Menuetto (.pdf, .docx). Access score and audio. 2. Josephine Lang – Traumbild, Op. 28, No. 1 (.pdf, .docx). Access score and audio.

Part	Book Order	Chapter Name	Assignments
III. Form	42	Sonata Form	1. Maria Hester Park, Sonata, Op. 7, I Allegro Spirito (.pdf , .docx). Access score and audio .
III. Form	43	Rondo	1. Joseph Bologne, String Quartet, Op. 1, No. 4, ii, Rondeau (.pdf , .docx). Access score and audio .
IV. Diatonic Harmony, Tonicization, and Modulation	44	Introduction to Harmony, Cadences, and Phrase Endings	1. Introduction to harmony, cadences, and phrase endings (.pdf , .docx). Asks students to write and identify cadences using only I (or i) and V chords in major and minor.
IV. Diatonic Harmony, Tonicization, and Modulation	45	Strengthening Endings with V7	1. Strengthening Endings with V ⁷ (.pdf , .docx , spotify playlist). Asks students to write and resolve V ⁷ chords and provide analysis of cadences in select passages.
IV. Diatonic Harmony, Tonicization, and Modulation	46	Strengthening Endings with Strong Predominants	1. Strengthening Endings with Strong Pre-Dominants (.pdf , .docx). Includes part writing from Roman numerals and figures, analysis of phrase endings, and a discussion question of a number from <i>Hamilton</i> .
IV. Diatonic Harmony, Tonicization, and Modulation	47	Embellishing Tones	1. Embellishing tones (.pdf , .docx). Asks students to write embellishing tones in a two-voice texture and label embellishing tones in an excerpt.
IV. Diatonic Harmony, Tonicization, and Modulation	48	Strengthening Endings with Cadential 6/4	1. Strengthening Endings with Cadential $[\text{latex}]^6_4 [/ \text{latex}]$ (.pdf , .docx , mscz of score). Includes unfigured bass exercises and analysis.
IV. Diatonic Harmony, Tonicization, and Modulation	49	Prolonging Tonic at Phrase Beginnings with V6 and Inverted V7s	1. Prolonging Tonic at Phrase Beginnings with V ⁶ and Inverted V ⁷ (.pdf , .docx , recording). Asks students to write from Roman numerals and figures and complete a guided analysis. Download score .

Part	Book Order	Chapter Name	Assignments
IV. Diatonic Harmony, Tonicization, and Modulation	50	Performing Harmonic Analysis Using the Phrase Model	1. Performing Harmonic Analysis Using the Phrase Model (.pdf , .docx). Asks students to analyze three short excerpts.
IV. Diatonic Harmony, Tonicization, and Modulation	51	Prolongation at Phrase Beginnings using the Leading-tone Chord	1. Prolongation at Phrase Beginnings using the Leading-tone Chord (.pdf , .docx). Asks students to write from Roman numerals, complete analysis, and realize figured bass.
IV. Diatonic Harmony, Tonicization, and Modulation	52	6/4 chords as forms of prolongation	1. $\text{[latex]}^6_4\text{[/latex]}$ chords as forms of prolongation (.pdf , .docx). Asks students to review previous concepts, write from Roman numerals, write from figures, and analyze excerpts.
IV. Diatonic Harmony, Tonicization, and Modulation	53	Plagal Motion as a Form of Prolongation	1. Plagal Motion as a Form of Prolongation (.pdf , .docx). Asks students to identify bass lines and analyze an excerpt. Download audio (.mscz) .
IV. Diatonic Harmony, Tonicization, and Modulation	54	La (scale degree 6) in the bass at beginnings, middles, and endings	1. $La\text{ [latex]}(\text{\hat{6}})\text{[/latex]}$ in the bass at beginnings, middles, and endings (.pdf , .docx). Asks students to analyze bass lines, write from figures and Roman numerals, harmonize an unfigured bass, and analyze an excerpt.
IV. Diatonic Harmony, Tonicization, and Modulation	55	Mi (scale degree 3) in the bass at beginnings	1. $Mi\text{ [latex]}(\text{\hat{3}})\text{[/latex]}$ in the bass at beginnings (.pdf , .docx). Asks students to realize unfigured bass, analyze, and do a transcription with analysis.
IV. Diatonic Harmony, Tonicization, and Modulation	56	Predominant Seventh Chords	1. Pre-dominant Seventh Chords (.pdf , .docx). Asks students to realize figured bass and analyze.

Part	Book Order	Chapter Name	Assignments
IV. Diatonic Harmony, Tonicization, and Modulation	57	Tonicization	1. Applied chords worksheet A (.pdf, .mscx). Asks students to identify and write applied V, V^7, vii^0, vii^{07}, and vii^{07} chords. 2. Applied chords worksheet B without ϕ7s (.pdf, .mscx). Asks students to identify and write applied V, V^7, vii^0, and vii^{07} chords. 3. All applied chords (.pdf, .docx). Asks students to write from Roman numerals and figured bass, a longer figured bass, and analyze a complete piece with discussion questions.
IV. Diatonic Harmony, Tonicization, and Modulation	58	Extended Tonicization and Modulation to Closely Related Keys	1. Extended Tonicization and Modulation to Closely Related Keys (.pdf, .docx). Asks students to review tonicization, identify closely-related keys and pivot chords, analyze, and create a modulating progression.
V. Chromaticism	59	Modal Mixture	1. Modal Mixture Assignment (.pdf, .docx). Includes spelling, figured bass realization, 4-part voice-leading with Roman numerals, and analysis of musical excerpt. Access audio.
V. Chromaticism	60	Neapolitan 6th (bII^6)	1. Neapolitan 6th (.pdf, .docx). Asks students to spell $[\text{flat } II^6]$, realize figured bass, write 4-part voice-leading with Roman numerals, and analyze a musical excerpt.
V. Chromaticism	61	Augmented Sixth Chords	1. Augmented Sixth Chords (.pdf, .docx). Asks students to spell augmented sixth chords, realize figured bass, write 4-part voice-leading with Roman numerals, and analyze a musical excerpt. Audio 1 - Frederic Chopin, Audio 2 - Scott Joplin (excerpt starts at 0:56).
V. Chromaticism	62	Common-Tone Chords (CT ⁷ & CT+6)	1. Common-Tone Chords (.pdf, .docx). Asks students to spell common tone chords, realize figured bass, complete 4-part voice leading with Roman numerals, and analyze a musical excerpt. Access audio (excerpt begins at 0:25).

Part	Book Order	Chapter Name	Assignments
V. Chromaticism	63	Harmonic Elision	1. Harmonic Elision (.pdf , .docx .) Asks students to spell chords, realize figured bass, write 4-part voice leading with Roman numerals, and analyze a musical excerpt.
V. Chromaticism	64	Reinterpreting Augmented-Sixth Chords	1. Coming soon!
V. Chromaticism	65	Reinterpreting Diminished-Seventh Chords	1. Coming soon!
V. Chromaticism	66	Augmented Options	- Head to the section on augmented chords in the Harmony Anthology chapter, and pick one (or more) of the repertoire examples listed in which an analyst has identified the use of an augmented chord. - For that passage, make a Roman numeral analysis of the measure in question and or one two on either side (enough to establish a chord progression and some context). - Create one such harmonic analysis including the augmented triad provides (figure and key are given on the table). - If you disagree with that reading (as you may well do) then provide an alternative harmonic analysis without it. - Do step 1 for several cases and identify any that seem similar to each other, and to the above. For instance, for the cases given as V+ in the anthology, are many of them similar to the chromatic passing motion in the Hensel, above? Can you find any dramatic examples like the Bach? Do you see any other recurring practices not described in this chapter?
V. Chromaticism	67	Equal Divisions of the Octave	1. Coming soon!
V. Chromaticism	68	Chromatic Sequences	1. Coming soon!
V. Chromaticism	69	Parallel Chromatic Sequences	1. Coming soon!

Part	Book Order	Chapter Name	Assignments
V. Chromaticism	70	The Omnibus Progression	1. Coming soon!
V. Chromaticism	71	Altered and Extended Dominant Chords	1. Coming soon!
V. Chromaticism	72	Neo-Riemannian Triadic Progressions	- Worksheet on Neo-Riemannian Transformations (.pdf, .mscz). Asks students to perform P, L, R, SLIDE, N, and H on individual triads, to realize chains of transformations, and find a transformation chain to connect two chords. - Composing with Neo-Riemannian Transformations (.pdf, .mscz). Asks students to use the Cube Dance and other Neo-Riemannian cycles to compose a short minimalist piano solo.
VI. Jazz	73	Swing rhythms	- Swing Rhythms video (.pdf, .mscx). Asks students to make a video with a partner performing idiomatic swing rhythms. Download backing track Jazz Rhythms by Jamey Aebersold. Make a recording in which you perform these rhythms. Pick three rhythms that create syncopation in different ways, and explain how the beat is obscured to create syncopation (through ties? rests? etc.).
VI. Jazz	74	Chord symbols	- Chord symbols basics worksheet (.pdf, .mscz). Asks students to identify and write triads and seventh chords with chord symbols. - Chord symbols with extensions (.pdf, .mscz). Asks students to identify and write extended chords with chord symbols.
VI. Jazz	75	Jazz voicings	Voicing worksheet (.pdf, .mscz). Asks students to identify common voice leading patterns in a voiced jazz texture, and asks students to write voiced chord progressions with good voice leading.
VI. Jazz	76	ii–V–I	

Part	Book Order	Chapter Name	Assignments
VI. Jazz	77	Embellishing chords	- Swing-style composition (.pdf, .docx). Asks students to build on knowledge of swing rhythms, ii–V–I, embellishing chords, and substitutions to create a composition in a bebop style. - Complete instructions + template (.pdf) - Template for lead sheet (.pdf, .mscz) - Template for voicings (.pdf, .mscz)
VI. Jazz	78	Substitutions	- Bebop composition (.pdf, .docx). Asks students to build on knowledge of swing rhythms, ii–V–I, embellishing chords, and substitutions to create a composition in a bebop style. - Complete instructions + template (.pdf) - Template for lead sheet (.pdf, .mscz) - Template for voicings (.pdf, .mscz)
VI. Jazz	79	Chord-Scale Theory	
VI. Jazz	80	Blues harmony	Worksheet on 12-bar blues (.pdf, .mscz). Asks students to write basic and jazz 12-bar blues progressions, voiced and unvoiced, and to analyze altered blues progressions. Worksheet playlist
VI. Jazz	81	Blues melodies and the blues scale	- Blues scales worksheet (.pdf, .mscz). Asks students to spell scales and transcribe a melody that uses the blues scale. Worksheet playlist - Improvising with the blues scale (.pdf, .mscz). Video assignment. Asks students to pair off and create videos with call-and-response improvisation. Backing track available here. - Blues composition (.pdf, .docx). Asks students to synthesize information about blues harmony and blues melody.
VII. Popular Music	82	Rhythm and Meter in Pop Music	Transcribing rhythms worksheet (.pdf). Asks students to transcribe and identify straight syncopations as well as tresillo rhythms in “Sorry” by Beyoncé (2016).
VII. Popular Music	83	Melody and phrasing	Worksheet on Section Structures (.pdf, .docx).

Part	Book Order	Chapter Name	Assignments
VII. Popular Music	84	Introduction to Form in Popular Music	
VII. Popular Music	85	AABA form and strophic form	1. AABA and Strophic Form (.pdf, .docx). Asks students to identify formal sections and any variations to the form. Worksheet playlist
VII. Popular Music	86	Verse-chorus form	1. Pop Music Form — The Shape of Music Around You (.pdf). Writing assignment which students to find songs on their own; identify them as strophic, AABA, or verse-chorus; name the sections of the song; and justify their analyses using form vocabulary. 2. Listening to Pop Forms (.pdf, .docx). This worksheet uses two unusual verse-chorus form songs to challenge students' analytical abilities. Uses Audacity to have students mark the form of .mp3s. Purchase "Terrified" and purchase "Broken Clocks" as .mp3s.
VII. Popular Music	87	Introduction to Harmonic Schemas in Pop Music	
VII. Popular Music	88	Blues-based schemas	1. Listening for blues-based schemas (.pdf, .docx). Asks students to identify blues-based schemas, their use, and any variations in three pop songs. Worksheet playlist
VII. Popular Music	89	4-chord schemas	1. Identifying Four-Chord Schemas (.pdf, .docx). Students must identify which schema is used in a number of songs, each of which clearly presents the schema. Worksheet playlist 2. Variations on Four-Chord Schemas (.pdf, .docx). Using songs that put slight variations on the schemas discussed in this chapter, asks students to identify schemas and variations on the schemas. Worksheet playlist
VII. Popular Music	90	Classical schemas (in a pop context)	1. Worksheet on classical schemas (.pdf, .docx). Asks students to identify the chord progressions of various songs that use classical schemas. Worksheet playlist

Part	Book Order	Chapter Name	Assignments
VII. Popular Music	91	Puff schemas	1. Puff schemas (.pdf, .docx). Asks students to identify the chord progressions of various songs that use the puff schema. Worksheet playlist
VII. Popular Music	92	Modal schemas	1. Identifying Modal Schemas (.docx, .pdf). Ask students to aurally identify various modal schemas. Worksheet playlist 2. Modal reharmonization composition project (.mscx, .musicxml, .pdf). Asks students to reharmonize Rihanna's "Desperado" (2016) with modal schemas.
VII. Popular Music	93	Pentatonic harmony	1. Coming soon!
VII. Popular Music	94	Fragile, Absent, and Emergent Tonics	1. Coming soon!
VIII. 20th- and 21st-Century Techniques	95	Pitch and pitch class	1. Pitch and pitch class (.pdf, .mscz). Asks students to translate between pitch class integers, note names, and staff notation.
VIII. 20th- and 21st-Century Techniques	96	Intervals in Integer Notation	1. Intervals (.pdf, .docx). Asks students to identify interval types (integer notation) within pieces of music. Worksheet playlist
VIII. 20th- and 21st-Century Techniques	97	Pitch Class Sets, Normal Order, and Transformations	1. Worksheet on normal form and transformations (.pdf, .docx). Asks students to calculate normal form of various sets, and to calculate T_n/I_n relationships in "Nacht" by Arnold Schoenberg. 2. Composition prep worksheet (.pdf, .docx). Prepares students for the set class composition by asking them to find sets and transformations.

Part	Book Order	Chapter Name	Assignments
VIII. 20th- and 21st-Century Techniques	98	Set Class and Prime Form	1. Set Class Composition prep worksheet (.pdf, .docx). Prepares students for the set class composition by asking them to find sets and transformations. 2. Set Class Composition (.pdf, .docx). Builds on the prep worksheet. Asks students to compose and analyze a 24-bar ABA form piece for unaccompanied solo instrument using set classes.
VIII. 20th- and 21st-Century Techniques	99	Interval Class Vectors	1. Worksheet on Interval Class Vectors (.pdf, .docx). Asks students to calculate interval class vectors for several sets.
VIII. 20th- and 21st-Century Techniques	100	Analyzing with Set Theory (or not!)	1. Guided analysis of “Wie bin ich Froh!” by Anton Webern (.pdf, .docx). Recording 2. Segmentation worksheet (.pdf, .docx). Asks students to justify the given segmentations by explaining what the grouped pitches have in common. 3. Atonal analysis using pc sets (.pdf, .mscx). Open-ended prompt asks students to use set theory to analyze an excerpt.
VIII. 20th- and 21st-Century Techniques	101	Diatonic Modes	1. Identifying modes (.pdf, .mscz). Asks students to identify 20th-c. modes versus major/minor, circle inflected pitches, and explain how a pitch center is articulated. Music examples are transcribed from the TV show <i>Great British Bake Off</i> (music by Tom Howe, © Accorder Music Publishing, used with permission). Worksheet playlist 2. Additional beginner’s worksheets can be found in Introduction to Diatonic Modes and the Chromatic “Scale.”
VIII. 20th- and 21st-Century Techniques	102	Collections	1. Worksheet on collections (.pdf, .mscz). Asks students to spell one example of each of the collections from this chapter. 2. Analyze Lili Boulanger’s resplendent <i>Hymne au Soleil</i>. Identify modes and collections used, along with related techniques. Scores can be found on IMSLP and MuseScore. Both include the original French text and an English translation in the underlay.

Part	Book Order	Chapter Name	Assignments
VIII. 20th- and 21st-Century Techniques	103	Analyzing with Modes, Scales, and Collections	1. Analyze Lili Boulanger's resplendent <i>Hymne au Soleil</i> . Identify modes and collections used, along with related techniques and materials, and linking these (where you consider it appropriate) to possible "meanings" of the work. Scores can be found on IMSLP and MuseScore . Both include the original French text and an English translation in the underlay.
IX. Twelve-Tone Music	104	Basics of Twelve-Tone Theory	1. Coming soon!
IX. Twelve-Tone Music	105	Naming Conventions for Rows	1. Coming soon!
IX. Twelve-Tone Music	106	Row Properties	1. Coming soon!
IX. Twelve-Tone Music	107	Analysis Examples – Webern op. 21 and 24	
IX. Twelve-Tone Music	108	Composing with twelve tones	1. Try your hand at something similar to the above: ◦ Pick one or more row/s that appeals to you. ◦ Compose some music with those properties in mind ◦ Think about balancing strict constraints with free writing. Don't be shy. Whether or not you think of yourself as 'a composer', it's always useful to 'learn by doing' and composition is a great case in point.
IX. Twelve-Tone Music	109	History and Context of Serialism	
X. Orchestration	110	Core Principles of Orchestration	1. Coming soon!
X. Orchestration	111	Subtle color changes	1. Coming soon!

Part	Book Order	Chapter Name	Assignments
X. Orchestration	112	Transcription from piano	1. Coming soon!

PDF WORKBOOK

Kyle Gullings

The button below is a link to download all worksheets from the textbook as a single PDF.

This file may be useful if, for example, you do not have reliable internet, or you are simply browsing the whole workbook at once. But in general, we recommend using the links at the end of each chapter *instead of* downloading this file. This is because:

- The PDF may not have the most up-to-date assignments. This is a static file, meaning that has to be manually re-uploaded to make changes—it is not automatically generated.
- The PDF has been compressed to reduce the file size. Some images or text may be compromised from this process.

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Last updated: June 30, 2021

CHAPTERS IN DEVELOPMENT

This section houses chapters that the authors are currently testing with their own students. While others are welcome to read and use these chapters, instructors are advised not to plan syllabi around the chapters in this section, as their content may change significantly over time. The authors are aware that the chapters are missing examples, assignments, etc.

TWENTIETH-CENTURY RHYTHMIC TECHNIQUES

Samuel Brady

KEY TAKEAWAYS

- Asymmetrical meters contain measures which are divided into unequal groupings of beats or divisions, creating an uneven metrical pulse.
- Ametric music may or may not have an explicit meter signature, and is not played or sung in a strict metrical style.
- In some cases, the meter written in the score may not be the meter that the listener perceives, which is an issue of perceived versus notated meter.
- Changing meter is a method of composition which incorporates any change of meter.
- Polymeter occurs when two or more meters are performed simultaneously.
- Metric modulation is a rhythmic technique that smooths out abrupt tempo changes by introducing subdivisions or groups of beats in the first tempo that match durations in the new tempo.
- Timeline notation is a contemporary metric technique that uses seconds as the measure of time, rather than traditional bar lines and meters.
- Feathered beaming is a gradual change in the speed of notes within a single beam.
- Ostinato is a repeated rhythmic or pitched musical idea.

Many composers in the twentieth century expanded the traditional rhythmic palette of music in order to explore new musical ideas. Below, nine less traditional rhythmic techniques are discussed.

Asymmetrical Meter

Music in asymmetrical meters contain measures which are divided into unequal groupings of beats or

divisions, creating an uneven metrical pulse. Listen to **Example 1**, whose meter is $\frac{5}{8}$. Notice the division of the two beats; one is grouped into three eighth notes, and the other into two eighth notes. This creates a feeling of a long pulse followed by a short pulse:



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=10495>

Example 1. “Ladies In Their Sensitivities” (1979) written by Stephen Sondheim, performed by Peter Polycarpou.

This song is found in the musical *Sweeney Todd* (1979) whose music is by Stephen Sondheim (1930–2021). The off-kilter feeling of the $\frac{5}{8}$ meter reinforces the anxious thought process of the singer; he is a servant, recommending his boss for a shave, and is hesitant to do so due to his bootlicking status.

Now listen to **Example 2**, which is also in $\frac{5}{8}$ meter. Notice how the division of the two beats is grouped in the opposite manner of the last example, with the first beat divided into two eighth notes, and the second beat into three eighth notes:



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Example 2. “Aufbruch” (2008) measures 141–149 written by Rolf Rudin (b. 1961), performed by the National Chiayi University Band.

The $\frac{5}{8}$ measures juxtapose the more metrically typical $\frac{3}{4}$ measures, creating a call and response texture between the woodwinds and brass. The character of the woodwinds is much more lively and playful as compared to the staunch and powerful brass.

There are other asymmetrical time signatures whose beat division unit is the eighth note, such as $\frac{7}{8}$, $\frac{11}{8}$, $\frac{13}{8}$, etc. Usually we can identify the groupings of the meter’s subdivisions by either how the notes are beamed, or via explicit directions written in the music (e.g. a $\frac{7}{8}$ meter signature may be written as $\frac{(2+2+3)}{8}$, $\frac{(3+2+2)}{8}$, or another way).

Now listen to **Example 3**, which is in the time signature $\frac{13}{8}$ (3+3+3+2+2), beginning at 0:17. Try counting along with the example!



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Example 3. “Skinbleshanks: The Railway Cat” performed by the Cast Of The Motion Picture “Cats” (2019).

This song is found in the musical *Cats* (1981), with music written by Andrew Lloyd Webber (b. 1948). The $\frac{13}{8}$ section could have been written in a prototypical $\frac{12}{8}$ meter; however, adding an extra eighth note reinforces the lively nature of the character by not allowing the listener to fall into a regular rhythmic pattern.

Asymmetrical meters can have other beat units, such as the sixteenth note or quarter note. Some examples you may encounter are $\frac{5}{4}$, $\frac{7}{16}$, or $\frac{5}{2}$. The beats of these time signatures are still divided or grouped unequally, though their beat unit changes. Observe **Example 4**, which is first written in $\frac{7}{4}$ and rewritten in $\frac{7}{8}$:



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Example 4. “Unsquare Dance” (1961) written by the Dave Brubeck Quartet.

This is an excerpt of the “Unsquare Dance” (1961) by the Dave Brubeck Quartet (1951–2012). A typical square dance is in a quadruple meter; however, this “unsquare dance” is in an asymmetrical meter, which diverts the listener’s expectations. Notice how the rhythm can be written in both $\frac{7}{4}$ and $\frac{7}{8}$ meters, while still sounding the same.

Ametric Music

Music written ametrically does not have any perceivable meter. Ametric music may or may not have an explicit meter signature, and is not necessarily played or sung in a strict metrical style. In other words, the

notes may still have rhythmic values, but rhythmic durations might not result in a perceivable beat pattern. This technique may allow for a performer's own improvisation and phrasing, and is employed in cadenzas, passages of free improvisation, Gregorian chant, and post-tonal music. Listen to **Example 5**, a post-tonal song that does not have a time signature:



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Example 5. “The Cage” (c. 1904) written by Charles Ives (1874–1954), performed by Corinne Curry (soprano) and Luise Vosgerchian (piano).

“The Cage” (circa 1904) is a song written by American composer Charles Ives (1874–1954). The ametric nature of the song supports the anxious behavior of the leopard who is pacing his enclosure. Without a strict metrical pulse and explicit meter signature, the rhythm of the piano is erratic, which showcases the leopard's temperament from his long-term confinement.

Perceived vs. Notated meter

In some cases, the written meter may not be the meter that the listener perceives. Musicians call this an issue of perceived versus notated meter. Sometimes, this results in a perception of ameter, or music without a perceivable beat, such as in **Example 6**:



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Example 6. Measures 1–8 of “Density 21.5” (1936) written by Edgard Varèse (1883–1965), performed by Emmanuel Pahud.

Though “Density 21.5” (1936) uses a written common time signature, the listener perceives ameter due to various syncopations, tuplet rhythms, and obscured bar lines.

However, in some cases, the notated meter is different than the aurally perceived meter, as seen in **Example 7**:



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Example 7. *Notated meter different than the aural perception of a work.*

In this excerpt, the time signature of $\frac{3}{4}$ is implied, as seen by the dotted barlines. This is not written however, as the excerpt is notated in $\frac{4}{4}$. Additionally, the pattern of accents and the harmonic resolutions of the phrase further imply a $\frac{3}{4}$ meter.

Changing Meter

Changing meter is a method of composition which incorporates any change of meter. There are no limits or rules to changing the meter, and it can happen multiple times within a piece, even measure to measure. Listen to **Example 8**, which features several metric changes from $\frac{2}{4}$ to $\frac{5}{8}$ to $\frac{6}{8}$ to $\frac{5}{8}$ to $\frac{6}{8}$ to $\frac{3}{8}$:



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Example 8. *Measures 54–60 of “Libera Me” from Requiem (1995) written by Tui St. George Tucker (1924–2004).*

This is measures 54–60 of Tui St. George Tucker’s “Libera Me” from her *Requiem* (1995). The “Libera Me” text fearfully depicts judgement day: “Deliver me, O Lord, from death eternal in that awful day,” proceeds the line of text from this excerpt “When the heavens are shaken...” Tucker paints this chaos musically in part through changing meter, showing how the “heavens are shaken” through the this metric instability.

It is also important to note that the subdivision of the meter can change from simple to compound or vice versa, as seen in **Example 9**:



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Example 9. Measures 10–19 of “Aegean Festival Overture” (1967) written by Andreas Markis (1930–2005), performed by the London Symphony Orchestra.

This is a condensed score of measures 10–19 of Andreas Markis’ *Aegean Festival Overture* (1967). It is common for Greek folk music to incorporate changing meter, and Markis evokes this folk style by including this compositional technique.

Changing meter doesn’t always include a constant subdivision. Instead, it can have a constant beat and a changing subdivision. This is explored in more detail below (see [Metric Modulation](#)).

Polymeter

Polymeter occurs when two or more meters are performed simultaneously. This technique can be heard in many modernist works—those created after ~1900—and the meters can be explicit or implicit. Explicit metrical notation means that two or more meters are actually written, while implicit polymeter is only implied. **Example 10** demonstrates this concept explicitly:



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Example 10. “Ara táskor” (Harvest Song) (1931) written by Béla Bartók (1881–1945).

Example 10 shows “Ara táskor” (“Harvest Song”) (1931) written by Béla Bartók for two violins. Notice that Bartók uses more than one meter simultaneously beginning in m. 11. Bartók was heavily inspired by folk music, and he chose to write in polymeter in order to imitate this style.

Now observe **Example 11**, which shows implicit polymeter:



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Example 11. “String Quartet in F Major,” Second Movement (1902) written by Maurice Ravel (1875–1937).

In the second movement his of “String Quartet in F Major” (1902), Ravel utilizes a $\frac{6}{8}$ time signature, while also implying a melody in $\frac{3}{4}$. In the first seven measures of this piece, the first violin and cello are implied to be in a $\frac{3}{4}$ time signature, whereas the second violin and viola switch every other measure between $\frac{6}{8}$ and an implied $\frac{3}{4}$. Beginning in m. 8, the lower two instruments play in the written time signature, whereas the upper two instruments imply $\frac{3}{4}$.

Metric Modulation

Metric modulation is a means of smoothing out abrupt tempo changes by introducing subdivisions or groups of beats in the first tempo that match durations in the new tempo.¹ In this way, the change is near indeterminable by the listener, and is only recognized in retrospect. Metric modulations are most commonly notated with a “note value = note value” (for example, $\text{♩} = \text{♩}$) indication above the music. Observe **Example 12** and the metric modulation which occurs in m. 4:



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Example 12. Metric modulation in which the division of the beat is kept the same.

Notice how the eighth note division stays the same between the $\frac{3}{4}$ and $\frac{9}{8}$ meters. Keeping the subdivision the same is one technique of metric modulation.

Now observe **Example 13**:

1. Jane Piper Clendinning and Elizabeth West Marvin, *The Musician's Guide to Theory and Analysis*, 3rd ed. (New York: W.W. Norton & Company, 2016), 834.



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Example 13. Metric modulation in which the beat is kept the same.

Notice how the quarter note beat of the first meter becomes the dotted quarter note beat of the new meter. In this case, the eighth note division becomes faster.

Now observe metric modulations in the context of the composition “Canaries” written by Elliott Carter (1908–2012) in **Example 14**:



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Example 14. Measures 1–24 of “Canaries” from “8 Pieces for 4 Timpani” (1949) written by Elliott Carter (1908–2012).

Elliott Carter is well-known for his metric modulations. In this example, six measures from the end, Carter sets up the transition to the $\frac{3}{8}$ meter by adding triplets into the prior $\frac{3}{4}$ measure. This creates the effect of having the $\frac{3}{8}$ measure seem like an extension of the previous triplet rather than a meter change. By doing this, Carter creates a seamless transition between the two meters. Carter also uses the $\frac{3}{8}$ measure as a transition to the next $\frac{3}{4}$ measure by keeping the eighth note the same, again making the transition between the two meters quite seamless.

Timeline Notation

Timeline notation is a contemporary metric technique that uses seconds as the measure of time, rather than traditional bar lines and meters. Composers indicate groups of seconds in uneven groupings or an even grid. This technique often results in a feeling of ameter. Timeline notation can also be accompanied by graphic notation, in which pitch and durations are specified by nonstandard symbols, as seen in

Example 15:



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Example 15. “*Threnody for the Victims of Hiroshima*” (1960) written by Krzysztof Penderecki (1933–2020), performed by Polish National Radio Symphony Orchestra.

Threnody for the Victims of Hiroshima (1960) was written by Krzysztof Penderecki in 1960. It was originally called “8’37””; later, it was renamed to *Threnody*, and was eventually dedicated to the victims of the bombing of Hiroshima in 1964. This composition features timeline notation, graphic notation, and extended string techniques to create a jarring chaos that evokes programmatic sounds such as sirens or screams.

Example 16 shows the timeline notation from one of the systems on the ninth page of *Threnody*:



Example 16. Timeline notation from “*Threnody for the Victims of Hiroshima*,” page 9.

Notice how the number of seconds is split unevenly on this timeline. First there is a section that is 10 seconds in length, then one that is 7 seconds, followed by two more that are 10 seconds and 5 seconds respectively.

Now observe timeline notation in an even grid, as seen in **Example 17**:



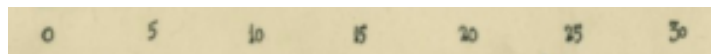
One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=10495#oembed-3>

Example 17. “*Water Walk for Solo Television Performer*” (1959) written by John Cage (1912–1992), performed by Katelyn King (b. 1992).

Water Walk for Solo Television Performer (1959) is a composition written by John Cage (1912–1992) that was premiered on the television program “*Lascia o Raddoppia*” in Milan in 1959. The composition calls for 34 different objects, as well as a prerecorded single track tape. Most of the materials relate to water in

some way; some objects include a bath tub, rubber duck, ice cubes, etc. Additionally, Cage also calls for five radios and a grand piano.

Example 18 shows the timeline notation from one of the systems on the first page of *Water Walk*:



Example 18. Timeline notation from “*Water Walk for Solo Television Performer*” (1959), page 1.

Notice how the number of seconds is evenly split on this timeline, increasing by five seconds in each interval.

Feathered Notes

Feathered beaming is a gradual change in the speed of notes within a single beam. One can distinguish deceleration from acceleration based upon whether the value of the beam’s final note is longer or shorter than the note that the beam began with. Feathered notes are shown in **Example 19**:



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Example 19. Feathered notes.

In **Example 19**, the first line shows an acceleration while the second line shows a deceleration. Feathered notes are considered to be an extended technique, most often heard in contemporary compositions, sometimes including cadenzas and ametric works. Due to the unpredictable nature of the acceleration or deceleration of the rhythm, feathered notes are not usually found in strictly metered compositions.

Ostinato

An ostinato is a repeated rhythmic or pitched musical idea. This repetition can be a single measure or multiple measures. Now listen to **Example 20**, one of the most well-known examples of an ostinato:



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Example 20. Measures 1–16 of “Mars, the Bringer of War” (1918) written by Gustav Holst (1874–1934), performed by the Chicago Symphony Orchestra.

“Mars the Bringer of War” (1918) is the fourth movement of Gustav Holst’s suite *The Planets*, a programmatic work where each movement is named for a planet. The underlying ostinato in this movement creates both a foreboding and militaristic atmosphere, supporting the war-like nature of the of the Roman god Mars for whom the planet is named.

Online Resources

- [Asymmetrical Meter \(lcsproductions.net\)](http://lcsproductions.net)
- [Introduction to Asymmetrical Meters \(Ash Stemke\)](#)
- [Compound and Asymmetric Meter \(learnmusictheory.net\)](http://learnmusictheory.net)
- [Creating Interesting Motion with Time Signature Changes \(David Bawiec\)](#)
- [Advanced Rhythm and Meter/Perceived vs. Notated Meter \(Frank Koonce\)](#)
- [Songs that use Polymeter and Polyrythm \(David Bennett\)](#)
- [Intro to Metric Modulation \(Philippe Macnab-Seguin\)](#)
- [Metric Modulation \(Beyond Music Theory\)](#)
- [Feathered Notes \(Steinberg.org\)](http://steinberg.org)
- [Ostinato \(Music Theory Academy\)](#)

Assignments from the Internet

- Advanced Rhythm and Meter Aural Skills (.pdf)

Assignments

- Coming soon!

Media Attributions

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Timeline Notation from “Water Walk for Solo Television Performer” © Samuel Brady is licensed under a [CC BY-SA \(Attribution ShareAlike\)](#) license

Footnotes

MEDIANTS

Mark Gotham

KEY TAKEAWAYS

Mediant chords are rooted a third away from the tonic. In chromatic harmony these are sometimes divided into 3 types:

1. Grade 1 (a.k.a. Diatonic): 2 common tones; mode change (one is major, the other is minor).
2. Grade 2 (a.k.a. Chromatic): 1 common tone; mode preserved (both major or both minor).
3. Grade 3 (a.k.a. Disjunct, Doubly-Chromatic): No common tones; mode change (one is major, the other is minor).

One main focus in the previous chapter on [neo-Riemannian progressions](#), is the connection between triads with roots a third apart. For instance, the L-relation connects C-major with E-minor (in either direction, i.e., both from C to E and vice versa). Another way of looking at these third-related chords is in terms of “mediants”. Recall from the [fundamentals](#) part that the third scale degree ($\hat{3}$) is sometimes called the “mediant” and the sixth ($\hat{6}$) is the “submediant”. And remember that the same goes for chords built on those scale degrees: in C-major, the pitch A is the “submediant” scale degree, and the A-minor triad is the “submediant” triad. Again, the roots are a third away from the tonic.

What does this have to do with chromatic harmony? Well, again as we saw in the neo-Riemannian progressions chapter, third relations do not have to be diatonic. For example, if we’re in C-major, then E-minor would count as a diatonic mediant as all the pitches are in C major, but E-major would not: the G $\sharp$ makes it chromatic in C-major. And it doesn’t stop there! Still taking C as our reference, the mediant-related triads include those rooted on E and A, but also those on E $\flat$ and A $\flat$: the roots are still a third away from C.

In some (both English- and German-speaking) traditions the combined collection of possible mediants is divided into three categories as shown in the embedded example score-figure and sections below.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=10686>

Mediants by FourScoreAndMore

Grade 1 (a.k.a. Diatonic)

Grade 1, (also known as Diatonic) mediants share two common tones with the tonic and involve a change of chord quality type (between major and minor). For example:

- The R-relation connects C-major and A-minor
- The L-relation connects C-major and E-minor

Please note that these terms (“L” or “Leading-Tone Exchange”, and “R” or Relative) are as typically seen in English-language music theory today. Despite that English-language tradition having its roots in German music theory (notably from Hugo Riemann from whom “Neo-Riemannian” theory takes its name), contemporary German music theory would typically discuss these relations with the terms *Gegenklang* (G) and *Parallel* (P). This gets confusing, so please see the section on “Function and Transformations” at the end of this chapter. For now, we’ll stick with the “LPR” terms used so far (in the previous chapter).

Grade 2 (a.k.a. Chromatic)

Grade 2 (a.k.a. Chromatic) mediants are a step more remote. Here there is one common tone with the tonic and major or minor chord quality is the same in both chords. Some English-language sources give extra labels of Upper Flat, Upper Sharp, Lower Flat, and Lower Sharp to these four mediant types. Upper/lower refers to the root direction, and flat/sharp clarifies whether the interval between the roots is a major or minor third. For instance, C-major connects to:

- E $\flat$ -major as the “Upper Flat mediant”.

- E-major as the “Upper Sharp mediant”.
- A $\flat$ -major as the “Lower Flat”, and
- A-major as the “Lower Sharp”.

German-speaking theory accounts for these with function-transformational terms like

Tonikavariantparallel: i.e., change the mode of the tonic chord (from major to minor or vice versa) and then take the parallel transformation from there.

Grade 3 (a.k.a. Disjunct, Doubly-Chromatic)

In the third and last type, we still have mediant relations (roots a third apart), but no common tones. The major/minor quality also changes. Given these changes (especially the lack of common tones), these are sometime called Disjunct or Doubly-Chromatic mediants.

For instance, C-major connects via Grade 3 mediant relation to:

- E $\flat$ -minor
- A $\flat$ -minor

Summary

In total, these three types or Grades cover all 8 individual mediant relations: all chords rooted a third above or below (from C to A, A $\flat$, E, and E $\flat$) and with each in major and minor (i.e., 4 root destinations x 2 qualities = 8). The following table summarises those 8 cases for the example of C major:

From C major to:	-Major	-Minor
E-	‘Upper Sharp’ mediant (Grade 2)	L-related (Grade 1)
Eb-	‘Upper Flat’ mediant (Grade 2)	Grade 3
A-	‘Lower Sharp’ mediant (Grade 2)	R-related (Grade 1)
Ab-	‘Lower Flat’ mediant (Grade 2)	Grade 3

Function and Transformations

As mentioned above, we need a bit of caution in regards to functions, terms and labels here, as there are some different conventions running in parallel (pun intended!). The main headache is the use of that term “parallel” which in English-speaking traditions connects two modes on the same root (C-major and C-minor, for instance), while the German tradition uses it to for what English-speaking theory calls “Relative” (i.e. C-major and A-minor). I know, right? Watch out, especially if you’re reading historical and/or multi-lingual sources. Here’s a bold (perhaps foolish) attempt at an overview with both functional labels (in German, taking the example of a tonic starting point) and combined neo-Riemannian transformation as discussed in the [previous chapter](#) (English). On the German side “-” indicates that there is no common, functional term.

E.g. from C major to:	Modern German (<i>Funktionstheorie</i>) (example of tonic function)	Modern English (Transformations)
C-minor	<i>Varianttonart</i> (t)	P. Parallel
A-minor	P. <i>Paralleltonart</i> (Tp)	R. Relative
E-minor	G. <i>Gegenklang</i> (Tg also sometimes Tl)	L. “Leading-note exchange”
E-major	<i>Tonikagegenparallel-Variante</i> (-)	LP. Upper Sharp mediant
E_b -major	<i>Tonikavariant-Parallele</i> (tP)	PR. Upper Flat mediant
A-major	<i>Tonikaparallel-Variante</i> (-)	RP. Lower Sharp mediant
A_b -major	<i>Tonikavariant-Gegenparallele</i> (tG)	PL. Lower Flat mediant
E_b -minor	(-)	PRP
A_b -minor	(-)	PLP

An Example

Enough theory! Let’s close with a wonderful example of mediant relation in a song by Augusta Mary Anne Holmès.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=10686>

[Les Sept Ivresses](#) by [OpenScore Lieder](#)

Assignments

1. Harmonic analysis: analyse the first 10 measures of the Holmès example above using whichever you prefer of Roman numeral and Functional labels.
2. Identify the type (including grade) of mediant that Holmès keeps using.
3. Do this step 1 analysis using the other terminological system (Roman numeral or Functional labels, which you disprefer and didn't use before).

EXAMPLES FOR SIGHT-COUNTING AND SIGHT-SINGING: LEVEL 1

Levi Langolf

KEY TAKEAWAYS

- Simple meters are meters in which the beat divides into two, and then further subdivides into four. (To review this topic see [Simple Meter and Time Signatures](#).)
- Time signatures in simple meters express two things: how many beats are contained in each measure (the top number), and the beat unit (the bottom number), which refers to the note value that is the beat.
- This chapter covers beat units of the quarter note and eighth note.
- This chapter covers singular beat divisions.
- A pickup note, also known as an anacrusis, is a note that happens before the first measure of a musical work. This chapter includes anacruses.
- This chapter covers the [major](#) and [minor](#) modes.
- Melodies within this chapter include stepwise motion.
- This chapter includes two-part rhythms and two-part melodies.

This chapter includes a series of gradated rhythms and melodies which can be used for practicing sight-counting and sight-singing. Conducting while performing these exercises is highly recommended as it can help the performer keep a steady tempo. Knowledge of simple meters, note and rest values, clefs, and key signatures is assumed from the beginning of this chapter. All examples are author-composed.

Section 1

The following eight exercises are in simple duple meter. The quarter note is the beat unit for the first four exercises and the eighth note is the beat unit for the second four exercises.

It is recommended that you use a consistent method of rhythmic solmization.

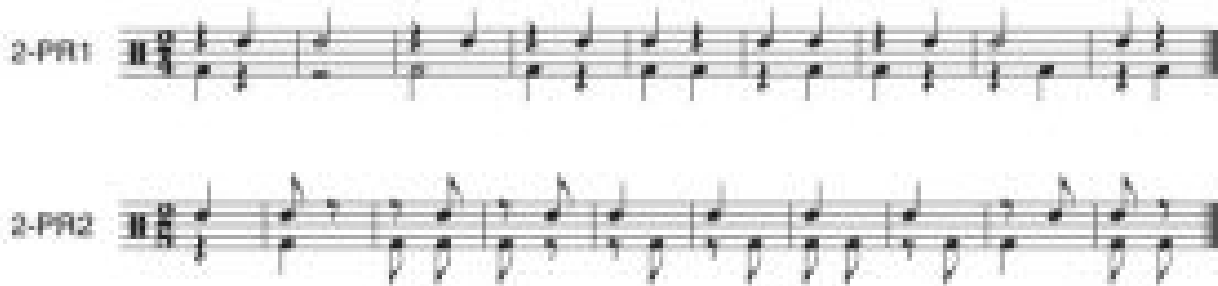
The exercises are as follows:

- R1:** Quarter notes: C4, D4, E4, F#4, G4, A4, B4, C5.
- R2:** Quarter notes: C4, D4, E4, F#4, G4, A4, B4, C5.
- R3:** Quarter notes: C4, D4, E4, F#4, G4, A4, B4, C5.
- R4:** Quarter notes: C4, D4, E4, F#4, G4, A4, B4, C5.
- R5:** Quarter notes: C4, D4, E4, F#4, G4, A4, B4, C5.
- R6:** Quarter notes: C4, D4, E4, F#4, G4, A4, B4, C5.
- R7:** Quarter notes: C4, D4, E4, F#4, G4, A4, B4, C5.
- R8:** Quarter notes: C4, D4, E4, F#4, G4, A4, B4, C5.

The following two exercises are two-part rhythms that could be performed by counting one line and clapping the other. Which line is counted and which is clapped can and should be interchanged. When clapping a sustained value, try to keep your hands together for the duration of the note and only separate them when clapping again or when performing a rest.

Practice tips:

- Use a metronome
- Slow down the tempo if needed
- Practice counting/clapping one line at a time
- Break the exercise into smaller parts

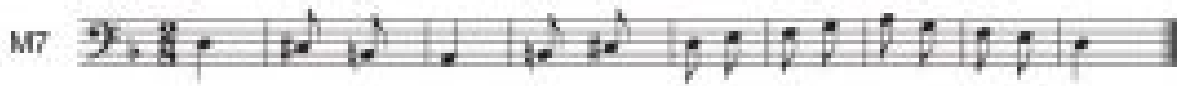


The following four exercises are in simple duple meter and the major mode. All melodic exercises in this chapter exclusively use stepwise motion in the treble or bass clef, contain no more than four sharps or flats in their key signature, and have an octave or smaller plagal range. For now, exercises will always begin on the first scale degree.

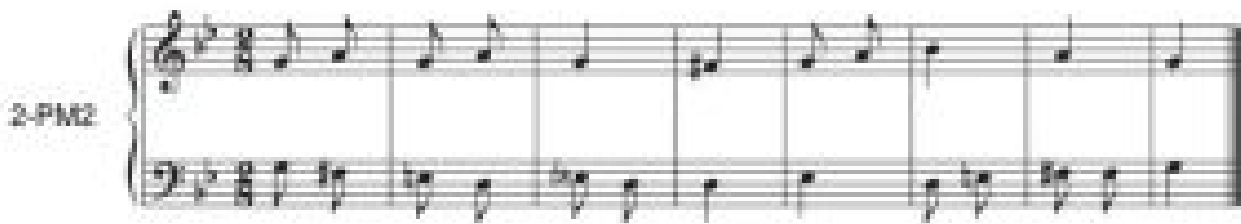
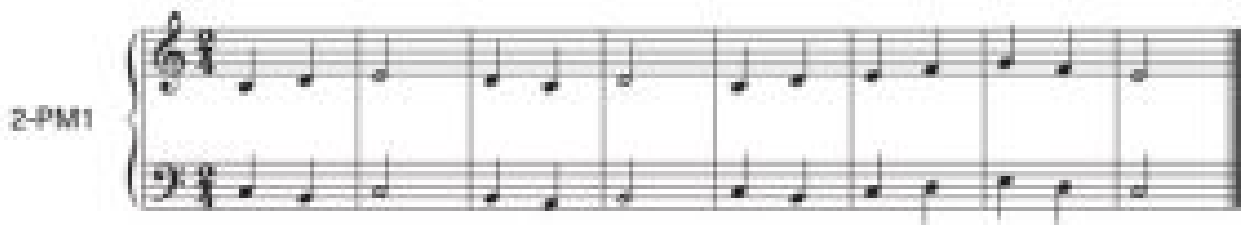
It is recommended that you use a consistent method of solmization.



The following four exercises are in simple duple meter and the minor mode. These four exercises are the same melody as M1; however, each uses a different form of the minor scale. Each form of minor contains a unique pattern of accidentals in the upper tetrachord.



The following two exercises are two-part melodies whose lines could be performed in tandem as a duet or by an individual playing one line on a non-wind instrument and singing the other. Which line is played and which is sung can and should be interchanged. Both exercises are in simple duple meter. The first exercise is in the major mode and the second is in the minor mode.



Section 2

The following eight exercises are in simple quadruple meter. Beat divisions are now included.

R9 

R10 

R11 

R12 

R13 

R14 

R15 

R16 

The following two exercises are two-part rhythms in simple quadruple meter.



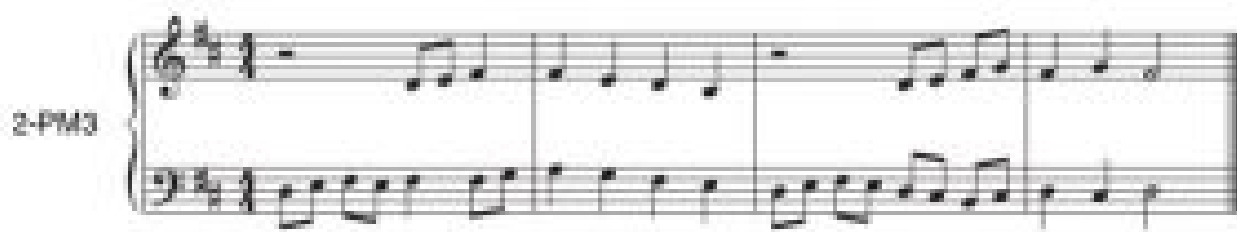
The following four exercises are in simple quadruple meter and the major mode. Common time, which is equivalent to $\frac{4}{4}$, is now included.



The following four exercises are in simple quadruple meter and the minor mode.



The following two exercises are two-part melodies in simple quadruple meter.

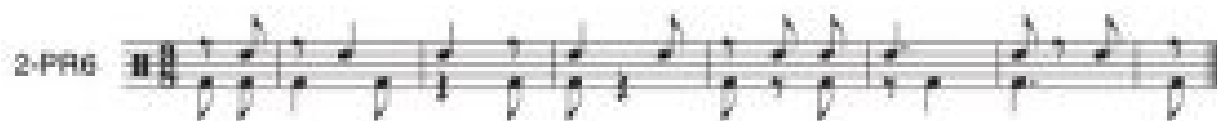


Section 3

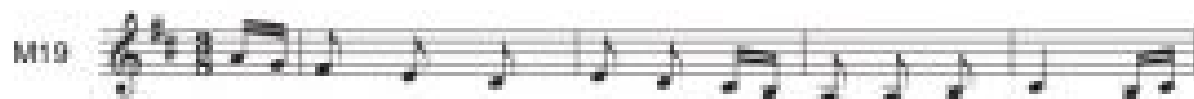
The following eight exercises are in simple triple meter. Anacruses and dotted rhythmic values that have the duration of a full measure are now included.



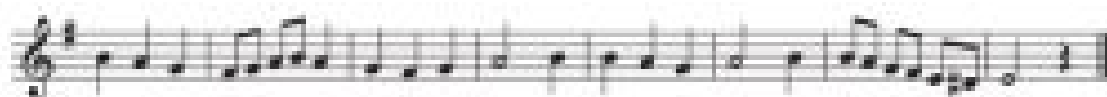
The following two exercises are two-part rhythms in simple triple meter.



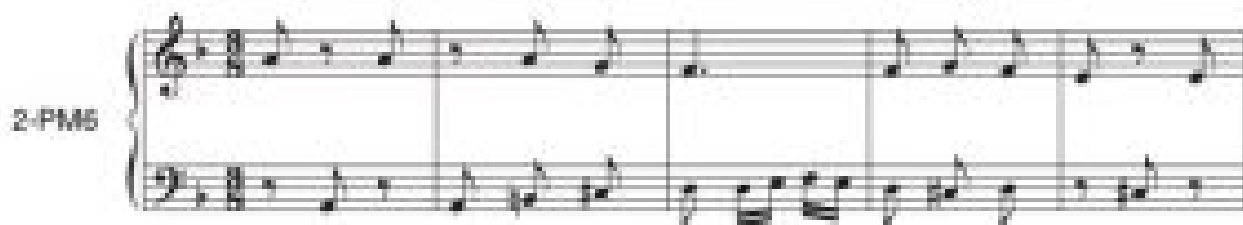
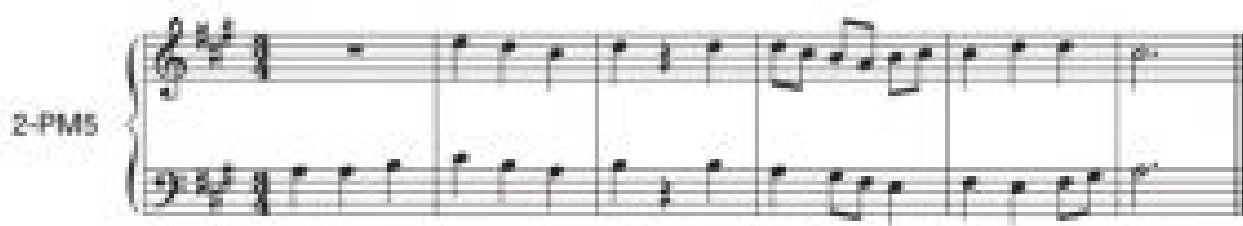
The following four exercises are in simple triple meter and the major mode. Melodies can now begin on the third or fifth scale degree of the given key.



The following four exercises are in simple triple meter and the minor mode.



The following two exercises are two-part melodies in simple triple meter.



Online Resources

- [Melodies for Sight Singing with Recordings \(How to Sing Smarter\)](#)
- [Melodies for Sight Singing \(Chorale Tech\)](#)
- [Melodies for Sight Singing \(Ronnie Sanders\)](#)
- [Rhythms for Sight Counting \(Summit Intermediate School Bands\)](#)
- [Rhythms for Sight Counting \(Blue Sky Music\)](#)
- [Sight Singing by Level \(YouTube\)](#)

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EXAMPLES FOR SIGHT-COUNTING AND SIGHT-SINGING: LEVEL 2

Levi Langolf

KEY TAKEAWAYS

- No new beat units, time signatures, or beat divisions are introduced in this chapter.
- This chapter includes dotted rhythmic values that have a duration smaller than a full measure. (To review this topic see [Rhythmic and Rest Values](#).)
- A tie is a curved line that connects two or more notes with the same pitch. Tied-to notes are not rearticulated.
- Dynamics and articulations are covered in this chapter. (To review this topic see [Other Aspects of Notation](#).)
- Melodies within this chapter include leaps of thirds, fourths, fifths, and octaves within the tonic triad.
- This chapter includes two-part rhythms and two-part melodies.

This chapter builds upon the prior gradated rhythms and melodies. Previously studied meters and key signatures are included. Knowledge of dynamics, articulations, and phrase markings is assumed from the beginning of this chapter. All exercises are author-composed.

Section 4

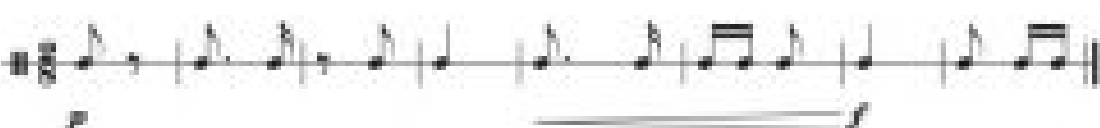
The following eight exercises contain dotted rhythmic values that do not have the duration of a full measure. Dynamic markings as well as crescendos and decrescendos are now included.

R25 

R26 

R27 

R28 

R29 

R30 

R31 

R32 

The following two exercises contain dotted rhythmic values that do not have the duration of a full measure.

2-PR7

2-PR8

The following four exercises are melodies in the major mode that contain adjacent leaps of thirds and fourths within the tonic triad.

M25

M26

M27

M28

The following four exercises are melodies in the minor mode that contain adjacent leaps of thirds and fourths within the tonic triad.



The following two exercises are two-part melodies that contain adjacent leaps of thirds and fourths within the tonic triad.

2-PM7

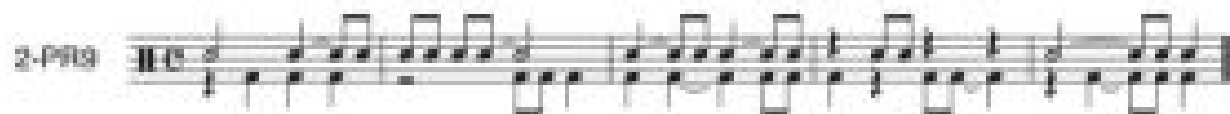
2-PM8

Section 5

The following eight exercises are rhythms that contain ties that are within measures. Articulations are now included.



The following two exercises are two-part rhythms that contain ties that are within measures.



M37 

M38 

M39 

M40 

The following two exercises are two-part melodies that contain more frequent adjacent leaps of thirds and fourths within the tonic triad.

2-PM9

2-PM10

Section 6

The following eight exercises are rhythms that contain ties that extend across bar lines.

R41

R42

R43

R44

R45

R46

R47

R48

The following two exercises are two-part rhythms that contain ties that extend across bar lines.

2-PR11

2-PR12

The following four exercises are melodies in the major mode that contain larger leaps of fifths and octaves within the tonic triad.

M41 

M42 

M43 

M44 

The following four exercises are melodies in the minor mode that contain larger leaps of fifths and octaves within the tonic triad.

M45

M46

M47

M48

The following two exercises are two-part melodies that contain larger leaps of fifths and octaves within the tonic triad.

2-PM11

2-PM12

Online Resources

- [Melodies for Sight Singing with Recordings \(How to Sing Smarter\)](#)
- [Melodies for Sight Singing \(Chorale Tech\)](#)
- [Melodies for Sight Singing \(Ronnie Sanders\)](#)
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HYPERMETER

Mark Gotham

KEY TAKEAWAYS

- Hypermeter refers to the use of strong/weak metrical accent at levels beyond the notated meter.
- Western classical music typically does this grouping by 2s (and so then 4s, 8s, etc.), just like it does with metrical grouping within the notated meter.
- Grouping in 3s is rarer, partly because ...
- Grouping in 3s at multiple metrical levels (within or beyond the meter) is rare

We first met the idea of Hypermeter briefly in the [Other Rhythmic Essentials](#) chapter. As discussed there, the strong-weak style of patterns we have seen within measures do not necessarily only operate within the measure and stop at the measure-length pulse. Especially when we have short measures and fast music (like a presto in 3/4), there can be a strong sense of such metrical relations at “higher”, multi-measure levels. In Western tonal music, just as the most common division/grouping within measures is by 2s (and thus 4s, 8s etc), so it is also with hypermeter. That said, division/grouping by 3s is also eminently possible, as are 5s and 7s, and when you look more closely, you notice that interesting composers frequently rove between these options fluidly in a way that would be extremely unusual at the counting, tactus, beat level.

Hypermeter in 3s: “ritmo de tre battute”

One of the most famous, explicit notations of hypermeter is the “ritmo de tre battute” section of Beethoven’s 9th symphony. This marking explicitly points out that the measures group in 3s. In doing so,

the instruction also makes explicit the assumption that the grouping had been in 2s and 4s up to that point. **Example 1** reproduces the 4-measure grouping seen in the [Other Rhythmic Essentials](#) chapter:



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=12374>

Example 1. 4-measure hypermeter at the start of Beethoven 9/iv from the [Other Rhythmic Essentials](#) chapter.

Now **Example 2** shows the later “ritmo de tre battute” section (from m.152) with comparable “hypermeter counts” as well as (editorial) double barlines to show each group of 3.



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[Symphony No.9, Op.125](#) by [openmusictheory](#)

Example 2. 3-measure hypermeter from measure 152: “ritmo de tre battute”.

Note that we’re talking about the “period” of the grouping here: that is, grouping in 3s or 4s. There’s plenty more to say about the phase: that is, which measure in the cycle should be counted as “1”. There’s a lot to argue for the phase shown in this movement, although the dominant-to-tonic movement in the first to second measure of the figure sure might make you wonder about starting the phase a measure later.

Finally, for the sake of comparison, let’s see that same “ritmo de tre battute” section re-notated explicitly in 9/4 to place both 3-grouping metrical levels within the notated meter.



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Symphony No.9, Op.125 – Ludwig van Beethoven by openmusictheory

Example 3. *The 3-measure hypermeter from **Example 2** re-notated in 9/4.*

Additional levels of 3s at the Fast End?

Like the common practice usage of 9-unit time signatures (“9/4”, “9/8”, ...),¹ “ritmo de tre battute” explicitly sets out two levels of 3-grouping. Arguably, it’s the two adjacent levels of 3-grouping that’s notable here – the fact that Beethoven notates it with one of those level in the hypermeter is less significant.

So, can we have more than 2 levels of 3-grouping? Well, “27/X” time signatures are not seen (at least in this style), and neither is anything like “ritmo de 9 battute”, but Beethoven does occasionally use 3 sets of 3 levels in his late style, i.e., adding another layer of 3-time at the “short” or “fast” end of the spectrum. This is always notated with triplets: another way to get 3-grouping into the metrical structure without having to include it in the time signature. Examples include:

- In movement 4 of the string quartet no.14 (Op.131), there is an “Adagio ma non troppo e semplice” section in 9/4 time (from m.186), so we already have two levels of 3s right away (3×3 quarters). Later, it briefly uses triplet eighth notes long enough to perhaps be called a metrical level (mm.223–225, or 5–7 measures before the final Allegretto reprise).
- the second movement of last piano sonata (No.32, Op.111) is an “Arietta” in compound time signatures: 9/16 at first but also 6/16, and 12/16 for some sections. Additionally, some of those sections use triplet sixteenth notes to give another 3-level. When this happens in 9/16, we have 3 levels of 3 grouping that could have been written as 27/32. See **Example 4** for an excerpt. That said, the hypermeter is regular, so 3x3x3 seems to be the limit for now. And the triplets in 6/16 and 12/16 add another 3-grouping, but with 2-grouping in the metrical levels.

1. I specify “common practice” here because of divisions like 2+2+2+3 in later styles.



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Piano Sonata No.32, Op.111 – Ludwig van Beethoven by openmusictheory

Example 4. 3 sets of 3-grouping (effectively 27) in Beethoven's Op.111.

Sensible Limits

(Where) do we stop looking for metrical levels above and below? Some accounts of hypermeter have extended the idea to entry movements, describing them, for example, as a huge upbeat-downbeat pair. The psychology literature suggests a more modest scope, with meter giving way to form not necessarily at the limit of the notated measure, but also not far beyond. The idea is that we struggle to perceive metrical cycles and patterns when the pulse is too short (about 1/10th of a second) or too long (a few seconds, depending on the internal content). So in practice, it makes sense to consider hypermeter when the measure is very short (like the 3/4 presto discussed above) but not for too many more levels beyond.

Not limited, and perhaps not so sensible either

Composers, theorists, and especially composer-theorists reading this may be reading this and wondering about the extreme cases. Notwithstanding the psychological limits to meter as distinct from form, what's the structural limit, the *ne plus ultra*? I.e., how many levels of 3-grouping can we stack on top of one another? I certainly wondered this and I couldn't resist writing a piece that groups in threes and every structural level from the individual notes right up to the highest formal units. The title "Sierpiński's Triangle" refers to [a triangle-fractal pattern that shares something of the same structure](#). It's the first movement of a set of "[Tessellations](#)": [click here for the full score on IMSLP](#).



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Sierpiński's Triangle by Mark.Gotham

Example 5. 3-grouping all the way down (in meter and in form) as a compositional plan in Sierpiński's *Triangle*.

Further Reading

- Cohn, Richard. 1992. "The Dramatization of Hypermetric Conflicts in the Scherzo of Beethoven's Ninth Symphony." *19th-Century Music* 15, no. 3: 188–206. <https://doi.org/10.2307/746424>.
- Rosen, Charles. 1992. "Ritmi de tre battute in Schubert's Sonata in C minor", *Convention in Eighteenth- and Nineteenth-Century Music: Essays in Honor of Leonard G. Ratner*, edited by Wye J. Allanbrook, Janet M. Levy, and William P. Mahrt.

Assignments

1. Coming soon!

Footnotes

METRICAL DISSONANCE

Mark Gotham

KEY TAKEAWAYS

- “Metrical dissonance” refers to the presence of two or more different ways of hearing the music’s metrical structure. This is usually divided into two types:
 - *Displacement* dissonance sees two forms of the same meter displaced against each other, so with the same period and structure but a different phase.
 - *Grouping* distance sees two different metres occur at the same time.

“Dissonance” is one of those multi-purpose terms with a range of uses both within and beyond musical analysis. Outside of music, terms such as “cultural” or “cognitive” dissonance usually have negative connotations, but music has a way of making a virtue of the “wrong” or “ill-fitting”. Musical dissonance is not “bad” in the same sense as some of these other contexts, though musical “rules” often require “proper” handling and resolution, at least in the case of tonal counterpoint.

Within music, the separation of pitch “consonances” (octaves, fifths . . .) from “dissonances” (semitones, tritones, . . .) is well established. The broad structure of this is relatively settled, though theorists have long argued over the details, such as: the need for further divisions (separating “perfect” from “imperfect” consonances, for instance); the membership of those categories (particularly in relation to the elusive perfect fourth); and how this system came to be (naturally or artificially).

More recently (in the history of music theory, that is), these same notions of consonance and dissonance have been applied to metre. The modern literature on “metrical dissonance” was galvanised by Krebs (1999) who, in turn, cites a Berlioz article of 1837 as the earliest explicit comparison using these terms (p.13,16). Notwithstanding notable differences, there are clear grounds for this analogy between harmonic

and metrical dissonance and sufficiently strong commonalities to set them out in comparable ways, once again based on the simplicity of proportional relationships.

Types of Metrical Dissonance

Example 1 sets out the two main types of metrical dissonance: “displacement” and “grouping”.

Example 1a sees two simple rhythms in a “displacement” dissonance. All else being equal, hearing those parts separately would likely lead to different assumptions about “the” metre. The lowest part aligns with the notated metre. The upper part can be understood in terms of a version of the “same” metre, but which has been “displaced” by a quarter note, potentially inverting assumptions about which beats are strong and weak.



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[Metrical Dissonance Examples](#) by [openmusictheory](#)

Example 1. Simple prototypes for displacement and grouping dissonance.

“Displacement” Dissonance

Example 2 provides an example from Bill Withers’ iconic “Lean on me” (1972). This contrasting section (at 1’45” and 2’36”, to the lyrics “you just call . . .”) introduces a kind of rhythmic ingenuity that can be helpful to consider in terms of displacement dissonance. While the “main” metre and grouping is clear from the foregoing context and the vocal part, other parts of the texture shift to consistently displaced positions. Starting with the bass guitar, while the anacrusic pattern in the low register stays with the main metre, the bass has a prominent note in a higher register on beat 3 that asserts itself as a different voice with an alternative take on the metrical phase, potentially displacing the metre by a half-cycle to beat 3. The drum kit, in turn, emphasises beats 2 and 4 with its back-beat pattern. This can be heard in terms of displacement by a quarter cycle, though it is important to note that this is a particularly listener-dependent case: many listeners will find this pattern so familiar that the very presence of that displaced emphasis serves instead to indicate where the strong beats “really” are. Finally, and most strikingly, there are hand claps (prominent in the mix) on the 2nd and 6th eighth notes of the bar,

suggesting an eighth-cycle displacement. The “real” phase of the meter may never be in doubt, but the rhythmic-metrical richness of this passage can be helpfully understood in terms of the systematic syncopations that potentially point to alternative displacements of the meter.



Example 2. Displacement dissonance in Bill Withers’ “Lean on me” (author’s transcription). Brackets indicate the displacements discussed in the text.

“Grouping” dissonance

“Grouping” dissonance sees the combination of two metres with different internal organisation.

Example 1b and **1c** set out a “grouping dissonance”: the upper part implies an internally consistent grouping in 3s (perhaps indicating a 6/8 time signature) which contradicts the implications of the lower part’s grouping in 4s (2/4). In **Example 1b**, it is the lower, “2/4” part that aligns with the notated metre; in **Example 1c**, the “same” dissonant pairing is notated to fit the upper part’s “6/8”.

Example 3’s 3-against-4 rhythm is probably the most ubiquitous form of rhythmic-metrical pattern that can be readily heard in terms of “grouping dissonance”. Figure 2 sets out complete cycles of this grouping dissonance, but partial cycles are more common in musical practice. Versions of this pattern are common in popular musics from classic jazz (such as the melodic rhythm of Gershwin’s “I got Rhythm”) to Electronic Dance Music (EDM) and owes its origins to the Afro-Cuban “tresillo” rhythm which can be viewed as a partial cycle of the 3-against-4 dissonance broadly equivalent to the first two bars **Example 1b**, above. **Example 3** sets out an example of the partial cycle in EDM from Calvin Harris’ “I’m Not Alone” (2009). Once again, the “real” metre is clear from the context, and this ri↵ (along with much of the rhythmic content of this example) sets out a conflicting pattern based on grouping in 3s. The upper part of the example provides the riff while the lower part makes explicit the continuing 3-grouping, the possible reading of this rhythm in terms of 12/16 (with brackets), and the first note length to diverge from this pattern (marked with “!”) which leads to a re-set at the start of the next note and bar.



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I'm Not Alone by [openmusictheory](#)

Example 3. Grouping dissonance in Calvin Harris' *I'm Not Alone* (2009) as an example of a popular 3 against 4 pattern. (Author's transcription).

Changing Dissonance

Some songs and pieces get into a metrical dissonant groove and stick with it. Most don't – they use metrical dissonance in some places and no others, to shape the piece overall. Consider the Bill Withers example above: this rhythmic passage contrasts with the main section that rhythmically very straight and without dissonance. Let's close with well-known example from Brahms: his "Lullaby" ("Wiegenlied", Op. 49, No. 4).

[Click here for a full score transcription \(available freely under CCO\).](#)

The melody is extremely well-known and its rhythm is highly regular in the notated 3/4. Now have a look at the piano accompaniment in **Example 4**. The left hand (bass) is every bit as regular as the voice, but the right hand (treble) goes its own way as shown with the markings a, b, c, and d on the score and described below.

- **Example 4a:** We start with a rhythmic pattern that might fit better in 6/8 rather than 3/4 and displaced by an eighth. That's right, before the voice even enters we arguably have both displacement and grouping dissonance.
- **4b:** The grouping dissonance disappears almost immediately. We settle on a 3/4 structure, but the displacement by an eighth remains for the main part of the verse.
- **4a:** The opening double-dissonance briefly returns before giving way to ...
- **4c:** Finally the right hand plays a note on the downbeat! The pattern still suggests displacement dissonance but of a mild kind: displacement forward by a quarter note to emphasise the second beat and give something of a saraband feel.
- **4d:** A measure later we have all 6 eighth notes in the bar, in a strong-weak alternation and no sense of dissonance at all.

- The last 4 bar pattern repeats.

Assuming this reading (which you may, of course disagree with), it's easy to see this as a process of tension (albeit very slight) to release that is entirely in keeping with the mood of this lullaby.



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Wiegenlied Op. 49 No. 4 (Lullaby) by openmusictheory

Example 4. Changing metrical dissonance in Brahms' "Lullaby" ("Wiegenlied", Op. 49, No. 4).

Further Reading

- Krebs, Harald. 1999. *Fantasy Pieces: Metrical Dissonance in the Music of Robert Schumann*. New York ; Oxford: Oxford University Press.
- This chapter is based in part on the introduction to my chapter "Towards a Cognitively-Based Quantification of Metrical Dissonance" OUP *Handbook on Time in Music*:
<https://academic.oup.com/edited-volume/41628/chapter-abstract/353470064>

Assignments

- Compose short pieces (perhaps just one measure which repeats) in two parts that suggest different meters. For example:
 - 4/4 in one part and 4/4 in the other, but displacement by a half cycle (a half note)
 - 4/4 in one part and 4/4 in the other, but displacement by a quarter cycle (a quarter note)
 - 6/8 in one part and 3/4 in the other (a classic hemiola)

Media Attributions

Lean

DRUMBEATS

Scott Hanenberg

KEY TAKEAWAYS

- The backbeat is common to most pop drumbeats. The backbeat is an accented articulation on beats two and four in quadruple meters, usually played by the snare drum.
- The kick drum is often syncopated.
- Cymbals—hi-hats, ride, and crash—often play regular pulses at the beat, beat division, or beat subdivision level.
- Common drumbeats other than the basic rock beat include double-time, half-time, four-on-the-floor, and dembow.
- Quadruple meters are by far the most common meter in pop music; simple triple is the next most common. A simple triple drumbeat in pop music will often have a snare hit on beat three.

CHAPTER PLAYLIST

Drumbeats are the rhythmic cornerstone of many genres of popular music, including rap, rock, and jazz. Sometimes a drumbeat is performed on a drum kit, sometimes it's sampled from an existing recording or programmed into a sequencer or DAW (digital audio workstation). In this primer, we'll learn about the instrument itself, notating drum set parts, and the features of drumbeats that are common to many styles of music. We'll also learn how a few particular drumbeats are associated with specific genres.

The Acoustic Drum Kit

Example 1 illustrates six common components of a drum kit, each of which is described further below.



Example 1. A standard acoustic drum kit.

Instrument Audio	Description
1. Snare drum  <i>One or more interactive elements has been excluded from this version of the text. You can view them online here: https://viva.pressbooks.pub/openmusictheory/?p=12926#audio-12926-1</i>	A drum with metal wires stretched underneath that buzz when the drum is struck. This results in a noisy sound (that is, one that fills out much of the audible frequency spectrum). Played with force, it sounds like wood cracking or like a thunderclap. Played softly, it offers a range of effects from clicks and taps to buzzing rolls.
2. Kick drum (or bass drum)  <i>One or more interactive elements has been excluded from this version of the text. You can view them online here: https://viva.pressbooks.pub/openmusictheory/?p=12926#audio-12926-2</i>	The lowest-pitched drum in the kit, played with a foot pedal. It is originally based on a modified concert bass drum, and some still sound with the same booming quality. Other kick-drum sounds have a dull thud, or a sub-bass effect that (over the right speakers) is felt in the body as much as it is heard.
3. Toms (or tom-toms)  <i>One or more interactive elements has been excluded from this version of the text. You can view them online here: https://viva.pressbooks.pub/openmusictheory/?p=12926#audio-12926-3</i>	Drums with a more focused pitch fundamental than the snare and are higher-pitched than the kick. There are often two or three toms on a drum kit, each with a distinct pitch. The pitch can be a more or less prominent feature of the toms' sound.

Instrument Audio	Description
4. Ride cymbal  <i>One or more interactive elements has been excluded from this version of the text. You can view them online here: https://viva.pressbooks.pub/openmusictheory/?p=12926#audio-12926-4</i>	A large suspended cymbal. Depending on the thickness of the cymbal, the ride may sound like a warm wash of sound (thinner rides, common in jazz) or a sharp, high-pitched crunch (thicker rides, common in metal music). High, pure ringing sounds can be produced by playing the “bell” of the ride, located in the middle of the cymbal.
5. Hi-hat cymbals  <i>One or more interactive elements has been excluded from this version of the text. You can view them online here: https://viva.pressbooks.pub/openmusictheory/?p=12926#audio-12926-5</i>	A pair of cymbals of the same size; the bottom cymbal is upside-down so only their edges touch. The cymbals are open by default and close when a foot pedal is pressed. When struck, the hi-hats’ timbre depends on how open or closed the two cymbals are. The hi-hat is most often struck while closed, producing a characteristic, bright “tick tick tick”; the open sound has a more aggressive crashing or rattling quality; and a wide range of intermediate timbres are also available. When played with the foot pedal only, the cymbals make a splashing effect.
6. Crash and accent cymbals  <i>One or more interactive elements has been excluded from this version of the text. You can view them online here: https://viva.pressbooks.pub/openmusictheory/?p=12926#audio-12926-6</i>	Depending on size, contour, and playing technique, these can produce a variety of crashing, splashing, sizzling, and barking sounds. They range in size (6–18” diameters are common) and thickness. Some have shapes and contours unlike other cymbals, or are augmented with rivets or large holes.

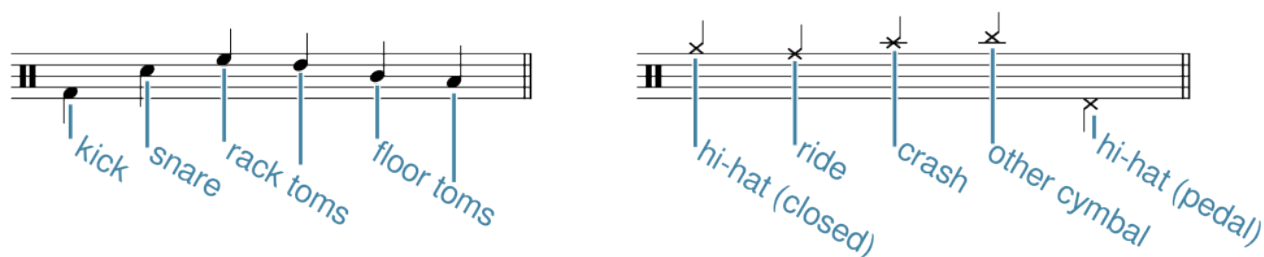
The drum kit is uniquely modular—that is, most (some might say all) of its constituent parts are optional. Other auxiliary percussion add-ons found on some drum kits include cowbells, tambourines, wood blocks, and electronic pads that can trigger programmed sounds. The sheer variety of drum kit elements and their various configurations is near-limitless.

Not all pop music uses an acoustic drum kit for its percussion. Drum machines, electronic drum sets, and plug-ins for digital audio workstations allow further customization for music composition and production. Most of the sounds used in electronic percussion are samples or imitations of acoustic instruments.

Five-Line Staff Notation for Drum Kit

Many drumbeats are created, performed, and recorded without ever being written down. But drummers, arrangers, and other music-industry professionals often use a five-line staff to communicate the details of a drumbeat. Drum kit notation is not fully standardized due to the improvisatory and modular nature of its performance practice, but the conventions given below and used throughout this textbook represent a particularly common method. Best practice is always to include explanatory notes and/or a drum key whenever the notation could be at all ambiguous.

Example 2 shows how each line and space of the staff denotes a different part of the drum kit. As a percussion instrument, the drums take a percussion clef. Standard oval noteheads are used for drums (snare, kick, tom, etc.), while cross (x) noteheads are used for cymbals. The kick drum uses the bottom-most space on the staff, the snare takes the third space, and the toms are shown on the other lines and spaces in the staff. Hi-hats occupy the space above the staff, the ride takes the uppermost line, and other crash and accent cymbals use ledger lines above the staff. When the hi-hat is played with the foot pedal, rather than with drumsticks, this is notated in the space just below the staff. Other elements and effects may not have a standard representation, and should be labeled to avoid confusion.



Example 2. Common notation for various parts of the drum kit. Using these particular stem directions and notehead types are important for clarity.

When notating a drum part, separate things into two voices, as in **Example 3**:

1. The cymbals, which usually keep a steady pulse; notated with upstems.
2. The kick and snare drum, which often cooperate to articulate the characteristic features of a drum groove; notated with downstems.



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Example 3. *The standard rock beat with kick on beats one and three, a snare backbeat on two and four, and regular eighth notes in the hi-hat.*

When the hi-hat is played with the foot pedal, however, it may be stemmed either direction: up to show coordination with other cymbal articulations, or down to show coordination between the feet (that is, with the kick drum). Notated drum fills are another place where this two-voice rule may be broken, because a regular cymbal pulse will often stop so that the drummer can use both hands to play snare, toms, etc.

The Snare Drum and the Backbeat

Most popular songs are in a simple quadruple meter (usually notated by transcribers as $\frac{4}{4}$), and most popular music grooves in this meter have a backbeat. The backbeat refers to beats two and four, usually played by the snare drum. **Example 3** above shows how a snare-drum backbeat is one layer of the basic rock beat: kick-drum hits on beats one and three alternate with the snare backbeat, complemented by a regular eighth-note pulse in the hi-hat. The same alternation of kick and snare hits underpins the “boom-bap” beat found in much golden-age hip hop.

In many genres the snare backbeat is the most stable of the three layers. Below, we’ll see how the kick and cymbal layers can be manipulated to change the character of a groove, without sacrificing the familiarity of the backbeat. Two common ways that songwriters and producers modify the backbeat are:

- Giving the backbeat rhythm to instruments other than the snare drum
- Speeding up or slowing down the backbeat rhythm enough to alter its relationship to the tempo of a groove.

Each technique is discussed further below.

Non-Snare Backbeats

The snare isn’t the only instrument that can play the backbeat. In Queen’s “We Will Rock You” (**Example 4**), the basic rock beat is made with stomping feet and clapping hands instead of drums. In

hip hop and electronic music, it's common to replace snare hits with hand claps, or to layer both together to create a variety of backbeat timbres (as in **Examples 8** and **9** below).



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Example 4. A backbeat without drums in Queen's "We Will Rock You" (1977).

In many jazz subgenres, including swing and bop, the drummer might play a backbeat on the hi-hats by closing the two cymbals together with a foot pedal. The result is usually a short, sharp, percussive sound, similar in many ways to the timbre of the snare drum (see [Swing Rhythms](#), Example 1). This hi-hat backbeat was the precursor to the snare backbeat. **Example 5**, from Ella Fitzgerald's rendition of "Fascinating Rhythm," shows a hi-hat backbeat on beats two and four (and one eighth-note anticipation). Notice how the snare in this example plays a syncopated rhythm, whereas the hi-hat is much more regular.

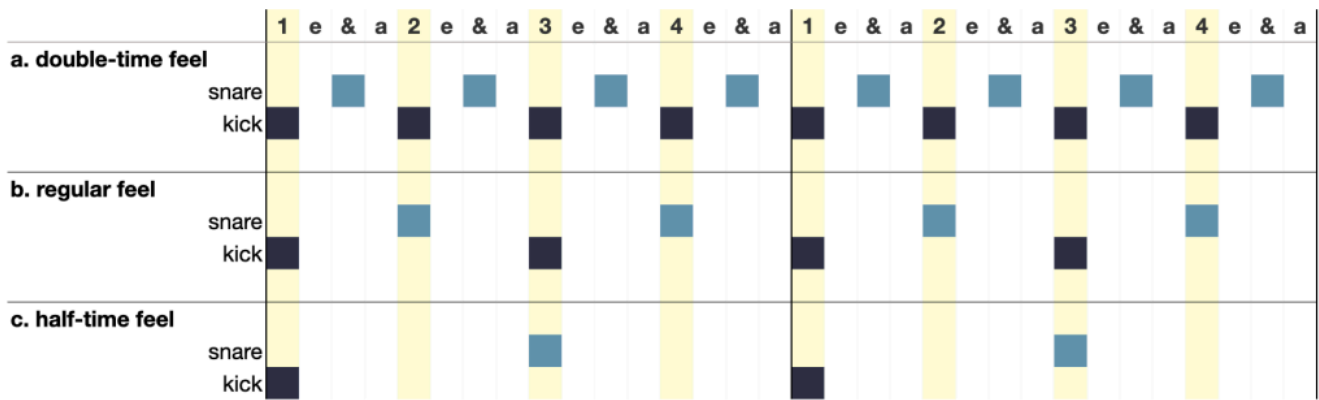


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Example 5. A typical jazz backbeat on the hi-hats in Ella Fitzgerald's recording of "Fascinating Rhythm" (1959).

Half- and Double-Time Feels

When the tempo is 80–160 bpm, the rhythm of the kick and snare in a basic rock beat will likely be understood as the beat or tactus. Such drumbeats can be said to have a normal feel, in which the drums and tempo work together to establish a clear groove that would be easy to dance to. Sometimes grooves use the same alternation of kick and snare to suggest a tempo above 160 bpm or slower than 80 bpm. These fast and slow drumbeats might still support the tempo for a groove, if that tempo is also felt as notably fast or slow. Other times, however, the rest of the groove still suggests a tactus of 80–160 bpm *despite* the unusually fast or slow backbeat. In such cases, we use the terms double-time and half-time to describe the misalignment of the drums with the rest of the groove (**Example 6**).



Example 6. Box notation illustrating (a) double-time, (b) normal, and (c) half-time feels. The yellow shading indicates the tactus, which would be the same for all three feels. Dark blue is used for kick drum, and light blue for snare.

The main groove of Metallica’s “Trapped Under Ice” has a double-time feel (see **Example 7**). The snare suggests a backbeat alternating at a tempo of about 320 bpm—a pace at which it’s uncomfortable to count “1 2 3 4,” let alone move your body. Headbanging fans are more likely to lock into a tactus half the speed of the backbeat (160 bpm). The disagreement between the unusually fast drums and the slower (but still fast!) tactus gives this song a frantic, driving energy. Later in the song (2:00), the drums shift to a normal feel.



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Example 7. A double-time backbeat in *Metallica’s “Trapped Under Ice” (1984)*.

Phil Collins’s “Take Me Home” has a tempo of 119 bpm, right in the middle of the preferred tempo range for a tactus. The song’s slow backbeat would suggest a tempo of only 60 bpm—too slow for most listeners (see **Example 8**). If we instead keep time at the 119-bpm pulse, we hear a half-time drumbeat. The tension between the slow pacing of the backbeat (with a clap substituting for snare) and the skittering sixteenth-note hi-hats and syncopated toms, supported by a similarly fast synth ostinato, gives this groove a fractured feeling, at once relaxed and anxious.





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Example 8. A half-time backbeat in Phil Collins's "Take Me Home" (1985).

Dembow

The snare drum doesn't always play the backbeat, and one non-backbeat snare pattern is particularly noteworthy. Dembow refers to both a genre of music and a rhythmic pattern common in that genre and in others (e.g., reggaeton, dance hall). In its simplest form, the dembow drumbeat has a kick drum on all four beats and snare drum playing the last two parts of a tresillo (3+3+2) rhythm. The chorus of Bad Bunny's "Moscow Mule" is one example (see **Example 9**, 0:52).



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Example 9. A dembow pattern in Bad Bunny's "Moscow Mule" (2022).

The Kick Drum

Whereas the snare-drum backbeat is the most reliable feature of a quadruple meter groove, the kick drum pattern is more flexible. As we've seen, kick drum played on beats one and three is a common option, forming part of the basic rock beat. Another common pattern is called four on the floor: the kick drum plays every quarter note, usually alongside a snare-drum backbeat, as in Blondie's "Heart of Glass" (**Example 10**), or with no snare at all.



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Example 10. A four-to-the-floor + backbeat pattern in *Blondie's "Heart of Glass" (1978)*.

Syncopation is more common in the bass drum than in the snare of pop drumbeats. **Example 11** shows the drumbeat of Kendrick Lamar's "HUMBLE.", which has a consistent backbeat provided by the hand claps, but plenty of sixteenth-note syncopation in the kick drum. Note that the kick still enters reliably on the downbeat of each measure, despite syncopation elsewhere.



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Example 11. Kick drum syncopation in *Kendrick Lamar's "HUMBLE." (2017)*. The "o" over some hi-hats indicates the cymbals are opened slightly with the foot pedal. The "x" in the snare space indicates claps.

Cymbals

The cymbals also can have varying rhythms in relation to the snare backbeat. The most common rhythmic options are consistent eighth notes or sixteenth notes, though steady quarter notes are by no means rare. Other patterns are also possible, like in "Heart of Glass" where the hi-hats mostly play only the offbeats (see **Example 10** above). The hi-hats are the most common cymbal used to keep this pulse in many genres; the ride cymbal is also common; the crash cymbal is an option used most often for slower-paced pulses and/or in more aggressive sounding grooves and genres.

The next two examples show the range of options for cymbals in drumbeats. The first is from Xiao Zhan's "Made to Love,"¹ with a consistent sixteenth-note pulse in the hi-hats (**Example 12**; you can also hear a snappy non-snare sample for the backbeat and, starting around 0:10, a syncopated kick drum). The second example is from Dream Theater's "As I Am" (see **Example 13**). The song's first drumbeat (at 0:55) is a half-time backbeat with quarter notes on the china cymbal and downbeats marked by the crash cymbal. The next groove (1:14) speeds up a little and shifts to a normal feel with the crash playing eighth notes.

1. "Made to Love" is also known as "Spotlight," or in Chinese, "光点" ("Guāngdiǎn").



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Example 12. Sixteenth-note hi-hats in Xiao Zhan’s “Made to Love” (2020).



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Example 13. Two drumbeats using accent cymbals (china and crash) in Dream Theater’s “As I Am” (2003; 0:55).

Compound Quadruple and Simple Triple Drumbeats

Most pop music is in simple quadruple meter, but the next most common meters in most popular music genres are compound quadruple and simple triple.

In compound quadruple time, the basic rock beat is simply adjusted for the new three-part beat division: the kick drum still plays on one and three, the snare still plays the backbeat on two and four, and cymbals (or some other instrument) still articulates the beat division, as in “If You Don’t Know Me by Now,” by Harold Melvin & the Blue Notes (see **Example 14**).²



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2. Note that the tempo is just 31 bpm! The tactus is likely to be felt at the eighth-note beat division level.

Example 14. A slow compound quadruple drumbeat in *Harold Melvin & the Blue Notes's "If You Don't Know me By Now"* (1972).

In simple triple time, it isn't possible to alternate kick and snare hits of equal length in each measure. The most common approach is to delay the snare "backbeat" until the third beat of every measure; this is what happens in Paramore's "That's What You Get" (see **Example 15**). After an intro with exuberant "3 e + a" fills on the snare, the drums settle into the groove transcribed below. The tresillo kick-drum rhythm keeps things interesting while delaying the snare hit. The second verse of this song (0:27) is also notable: the drums shift to a basic rock beat (as if in quadruple meter) while the rest of the band keeps playing in the triple meter established up to this point.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://viva.pressbooks.pub/openmusictheory/?p=12926>

Example 15. A 3/4 drumbeat in *Paramore's "That's What You Get"* (2007).

Further Reading

- Brennan, Matthew, Joseph Michael Pignato, and Daniel Akira Stadnicki, editors. 2021. *The Cambridge Companion to the Drum Kit*. Cambridge: Cambridge University Press.
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Assignments

Coming soon!

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Footnotes

GLOSSARY

12-bar blues progression

Typically comprises three phrases of four bars each. The first phrase is entirely tonic harmony (I). The second phrase contains two bars of subdominant (IV) and two bars of tonic (I). The final phrase begins with one bar of dominant (V) followed by one bar of subdominant (IV) and two bars of tonic (I). The third phrase may or may not end with a turnaround.

16-bar blues progression

A variation on the 12-bar blues progression. Typically composed of four four-bar phrases, usually two iterations of tonic, followed by subdominant and dominant. The final phrase may or may not end with a turnaround.

AABA form

Also called 32-bar song form. AABA consists of at least four sections. It begins by repeating two strophes, moving to a contrasting bridge section, and then repeating the primary strophe again. AABA forms typically then include another repetition of BA, making the entire form AABABA.

absent tonic

Occurs when the tonic is never actually sounded as a harmony during the song, but is still implied through the melody or through the use of conventional harmonic progressions.

absolute

Existing on its own, without reference to another system. For example, "absolute pitch" refers to the phenomenon of being able to sing a pitch without referencing an instrument or another pitch.

accelerando

A gradual increase in speed (tempo).

accent

A stress or emphasis on a note.

accent cymbals

Cymbals ranging in size (6–18” diameters are common) and thickness. Some have shapes and contours unlike other cymbals or are augmented with rivets or large holes. Depending on size, contour, and playing technique, these can produce a variety of crashing, splashing, sizzling, and barking sounds.

accidental

A symbol that alters a pitch, such as the sharp ($\sharp$), flat ($\flat$), and natural ($\natural$) symbols.

acoustic collection

A seven-note collection similar to the mixolydian mode but with fi ($\uparrow 4$); corresponds roughly to the lowest partials of the harmonic series.

acoustics

The physical science of sound.

active note

In tonal music, a note that has a tendency to move to a specific note in the following chord, usually a step up or down. Also called a "tendency tone."

additive rhythm

A compositional device that begins with a small rhythmic unit and gradually adds length to the durations.

aeolian

A diatonic mode that follows the pattern W–H–W–W–H–W–W. This is like the natural minor scale. This scale can also be found by playing the white notes of the piano starting on A.

aeolian cadence

$\flat\text{VI}-\flat\text{VII}-\text{i}$, or $\text{A}\flat-\text{B}\flat-\text{Cmi}$ in C minor. This schema implies the aeolian mode. Very frequently, the i chord is altered to be major, yielding a sequence of three major chords related by steps in the same direction. This progression, especially with a major I chord, is often associated with heroic themes in video games and movies.

aeolian shuttle

$\text{i}-\flat\text{VII}-\flat\text{VI}-\flat\text{VII}$. This progression can be understood as a shuttle between i and $\flat\text{VI}$, with the intermediate $\flat\text{VII}$ s acting as passing chords.

after-beat fifths or octaves

Two consecutive weak-beat fifths or octaves in fourth species counterpoint; e.g., from two successive 9–8 suspensions.

aggregate (twelve-tone)

The complete chromatic collection (i.e., all twelve pitch classes).

all-interval row

A twelve-tone row that contains all eleven ordered pitch-class intervals.

alternative path

A technique of internal phrase expansion. It occurs when new material causes a phrase to deviate from its expected trajectory toward the cadence. These deviations may be permanent ("reroutes") or temporary ("detours").

alto

The second-highest voice part in SATB style, written in the treble clef staff with a down-stem; its generally accepted range is G_3-D_5 .

alto clef

As a "C" clef, the alto clef shows that C_4 is the middle line of the staff by centering on it.

American Standard Pitch Notation (ASPN)

Designates specific musical frequencies by combining a note name (such as C) with an octave designation (such as 4), creating a bipartite label (C₄).

ametric

Music that does not have any perceivable meter

anacrusis

Notes on an upbeat that lead into the first downbeat of a phrase.

answer

A repetition of the fugue's subject, transposed to another pitch level. May be a "real" answer (a literal transposition) or a "tonal" answer (an inexact transposition).

antecedent

A phrase consisting of a basic idea followed by a contrasting idea that ends with a weak cadence.

anticipation

A two-note embellishing tone gesture in which a chord tone is heard early as a non-chord tone.

antiphony

A call-and-response texture in which musical material is passed from group to group.

applied chord

A chord from another key inserted into a new key, in order to tonicize a diatonic chord other than I.

appoggiatura

An embellishing tone often occurring on a strong beat that is approached by leap and left by step in the opposite direction.

Arabic numerals

The numerals 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

archetype

Phrases that are "archetypal" or that follow an archetype are related to the sentence, the period, or one of the hybrid phrase-level forms.

arpeggiating 6/4

A 6/4 chord that results from an arpeggiated bass line (e.g., if the bass line alternates between the root and fifth of the same chord).

arpeggio

A melodic, "horizontal" statement of a triadic harmony; in other words, each note of a triadic harmony played in succession (rather than simultaneously). Also referred to as a "broken chord."

articulation

Refers to both a note's length and the accent level of its attack.

asymmetrical meter

A meter that divides measures into unequal groupings of beats or divisions, creating an uneven metrical pulse.

atonal

An adjective describing music that lacks any sense of tonal center.

attack

The onset of a note (as opposed to the following sustain or decay).

audiate

To imagine hearing a sound in one's mind.

augmented intervals

Intervals that are one half step larger than a perfect or major interval.

augmented triad

A triad whose third is major and fifth is augmented.

aural

Auditory; related to hearing.

authentic

In church modes, authentic modes are those that range from final to final.

authentic cadence

A cadence with the harmonies V–I. The harmonies are typically in root position. Authentic cadences can be further distinguished by their melody note in the I chord: an authentic cadence ending on $\hat{1}$ in the melody is a perfect authentic cadence, while one with $\hat{3}$ or $\hat{5}$ in the melody is an imperfect authentic cadence.

auxiliary section

Auxiliary sections help frame the core sections: introducing them, providing temporary relief from them, or winding down from them.

backbeat

An accent on beats 2 and 4 of a quadruple meter. Backbeats are common in jazz and pop styles.

balanced binary form

A binary form (either simple or rounded) in which the tail end of the first reprise returns at the tail end of the second reprise.

bar lines

Vertical lines that create measures.

basic idea

Basic ideas are short units that are typically associated with beginnings. They don't usually end with cadences, and they often establish tonic. They are the first units we hear in a presentation, an antecedent, a consequent, and a compound basic idea.

basic rock beat

A simple drum pattern in which the kick drum is played on beats one and three, alternating with the

snare on beats two and four, while eighth notes are played on a closed hi-hat. (This description presumes a 4/4 time signature.)

bass (instrument)

Any one of several bass-range string instruments, including the double bass (upright bass, string bass, contrabass, acoustic bass) or the bass guitar (electric or acoustic).

bass (voice)

The lowest voice in SATB style, written in the bass clef staff with a down-stem; its generally accepted range is F_2 – D_4 .

bass clef

As an "F" clef, the bass clef shows which line of the staff is F_3 by surrounding it with two dots.

bass line

The lowest part (or "voice") of a composition.

beam

The horizontal lines that connect certain groups of notes together.

beat

A pulse in music to which one can tap or clap along. A grouped hierarchy of beats forms a meter.

beat unit

Which note value gets the beat (e.g., the quarter note in 4/4 or the dotted quarter note in 6/8).

becoming $\Rightarrow$ (the process of)

The process of becoming is an analytical phenomenon that captures an in-time, analytical reinterpretation regarding a formal/phrasal unit's function, abbreviated with a rightward double arrow symbol ($\Rightarrow$). Examples include primary theme $\Rightarrow$ transition, continuation $\Rightarrow$ cadential, or suffix $\Rightarrow$ transition.

beginning

One of three formal functions (with the other two being middle and ending). Beginnings are often signaled by establishment of a new melody or repetition of the beginning of a previously heard melody, emphasis on tonic harmony (especially root position), a melody that opens up musical space by ascending, a statement of a motive that is developed through the remainder of the phrase.

binary form

A type of form that has two core sections. These sections are often called "reprises" because each is typically repeated. There are two main types of binary form: rounded and simple.

block chord

A chord in which all the notes are played simultaneously.

blue notes

Notes whose exact pitch sounds somewhere between the flat and regular versions of a scale degree, particularly 3 and 7.

bpm

Beats per minute. A standard unit of measurement for tempo.

breath mark

Indicates a breath (for wind instrumentalists and vocalists) or a pause (for percussionists and string players).

bridge

A type of contrasting section that tends to function transitionally in the formal cycle. Bridges tend to emphasize non-tonic harmonies and commonly end on dominant harmony.

cadence

A melodic and harmonic goal. In classical tonal music, cadence types include Perfect Authentic (PAC), Imperfect Authentic (IAC), and Half (HC).

cadential

One of the three common ending types. Its distinguishing characteristic is its bass line: mi–fa–sol–do (3–4–5–1), which may be elaborated with chromaticism.

cadential 6/4

A common embellishment of the cadential V chord, in which the fifth of the V chord (re, 2) is replaced with the sixth (mi/me, 3) and the third (ti, 7) is replaced with the fourth (do, 1). The sixth and fourth form a 6/4 chord, hence its label. The cadential 6/4 resembles a I6/4 in its pitch content.

caesura

Indicates a break and/or a cutoff.

caesura fill

When a single voice of the musical texture bridges what would otherwise be a gap between two sections.

call-and-response

A feature of musical phrasing that features a simulated dialogue between two instruments or groups of instruments.

cantus firmus

Literally meaning “fixed voice,” this is a pre-existing melodic line that serves as the basis for a new counterpoint exercise or other composition.

cardinality

The number of elements in a set or other grouping.

caret

A symbol akin to an angled bracket, placed above Arabic numerals to indicate scale degrees; a circumflex symbol.

change of register

In counterpoint, a type of consonant weak beat that steps in the opposite direction following a large leap.

changing meter

A term for a meter consisting of several rapid time-signature changes.

china cymbal

A kind of crash cymbal with an especially bright, forward, and splashy sound.

chord

Any combination of two or more pitch classes that sound simultaneously.

chord construction

The pitch content of a chord.

chord loops

Repeated chord progressions, often four bars long, that are repeated throughout a portion or all of a song.

chord substitution

Replacing a standard chord (i.e., within a harmonic schema) with a different chord. The substituted chord is typically identical in harmonic function to the standard chord, and often shares at least two notes with the standard chord.

chord symbols

A system of naming chords that specifies the note name of the root, chord quality, and any alterations.

Some basic symbols are given below as a quick reference, but for more detail, see the [Chord Symbols chapter](#).

chord quality	chord symbol (for a chord with a root of C)
major triad	C
minor triad	Cmi, Cm, C-
diminished triad	C ^o , C ^{dim}
augmented triad	C ⁺ , C ^{aug}
dominant seventh chord	C ⁷
major seventh chord	C ^{ma7} , C ^{Δ7} , C ^{maj7}
minor seventh chord	Cmi ⁷ , C- ⁷ , Cm ⁷
half-diminished seventh chord	C ^{ø7} , Cm ^{7b5} , C- ^{7b5}
diminished seventh chord	C ^{o7}

chordal 7th

Refers to the 7th of a chord. For example, V⁷ in the key of C is spelled G-B-D-F. The note F is the chordal 7th. We say chordal 7th to distinguish it from the leading-tone (Ti, $\hat{7}$).

chordal seventh

Refers to the seventh above the root of a chord. For example, V⁷ in the key of C is spelled G-B-D-F; F is the chordal seventh.

chorus

A core section of a popular song that is lyric-invariant and contains the primary lyrical material of the song. Chorus function is also typified by heightened musical intensity relative to the verse. Chorus sections are distinct from refrains, which are contained within a section.

chorusification

A process where modules are stripped away from the formal cycle until only the chorus module (C) remains.

chromatic

Relating in some sense to the chromatic scale. The term may be used to refer to notes that are outside the given key.

chromatic scale

A collection of notes that consists of twelve half steps.

circle of fifths

A graphic that shows the relationship between major (and/or minor) key signatures by placing the key signatures around a circle in order of number of accidentals.

class

In set theory, a class is a group whose members are all equivalent in some sense—transposition, inversion, octave, enharmonic, etc.

clausula vera

A contrapuntal cadence in which a perfect octave or unison is approached through contrary motion by step. One line will have re–do (2–1) while the other has ti–do (7–1). This results in the sequence of harmonic intervals sixth–octave, tenth–octave, or third–unison.

clef

A symbol placed on the left side of a staff that indicates which notes are assigned to different lines and spaces.

closed spacing

A chord spacing in which the chord fits within one octave.

closing rhetoric

Closing rhetoric involves common patterns and techniques that signal that the end of the song is likely coming soon.

closing section

A large suffix in sonata-form works. The closing section is usually very stable and often consists of many V–I or IV–I motions confirming the local tonic.

coda (classical)

A large suffix section occurring at the end of a work (or end of a movement within a multi-movement work), after the PAC that ends the piece's core sections.

coda (pop)

A coda is a song-ending section that presents new material. Like outros, codas exhibit closing rhetoric.

codetta

A type of suffix (external expansion). Codettas are usually medium length (for example, between 4 and 8 measures), they often occur at the end of a section within a piece, and they often feature repeated units. They may or may not contain a full phrase.

collection

A group of pitches being used as the basis for a composition. This term is more neutral than "key," which may imply a hierarchy.

color note

For modes in pop music, the color note is the pitch that distinguishes a mode from major (in the case of mixolydian/lydian) or from minor (in the case of dorian/phrygian).

comes

The second (following) part in a pair of imitative voices (compare to *dux*).

common practice

A periodization of Western music utilized by music theorists and musicologists encompassing c. 1600–1900.

common tone

A tone that is present in more than one chord.

common-tone diminished seventh chord (CT^{°7})

A diminished seventh chord that, instead of having dominant function, is a neighbor chord that

embellishes the chord that comes after it. The $CT^{\circ 7}$ has a common tone with the root of the following chord; all the other notes are a step away from a note in the following chord.

complement mod 12

An integer x 's complement mod 12 is the number y that would sum to 12. For example, 11's complement mod 12 is 1.

complementary set

The set that, together with an original set, will make the complete twelve-tone collection. Complements are literal when referring to pitch class sets and abstract when referring to set classes.

compound basic idea

A compound basic idea (c.b.i.) is an antecedent without a cadence. It consists of a basic idea followed by a contrasting idea.

compound duple

A meter with two beats, each of which divides into three. The top number of a compound duple meter will always be "6". 6/8 is the most common compound duple meter, though 6/4 is also somewhat common.

compound form

Occurs when one form is composed of other smaller forms. For example, a period may be composed of two sentences, or one or more of a ternary form's sections may be composed of a binary form.

compound interval

An interval that is larger than an octave.

compound meter

A meter that divides the beat into three parts.

compound quadruple

A meter with four beats, each of which divides into three. A time signature for compound quadruple will always have "12" as the top number. 12/8 is the most common compound quadruple meter.

compound ternary form

A type of ternary form where at least one of the form's parts (A, B, or the second A section) is composed of its own complete form (typically a binary form). The term "compound" can also be used to clarify that a single section contains a complete form. Compare with simple ternary form.

compound triple

A meter with three beats, each of which divides into three. The top number of a compound triple meter will always be "9". 9/8 is the most common compound triple meter.

conductor

The director of an ensemble.

connective auxiliary sections

A category of formal sections that connect two core sections; for example, transitions and retransitions.

consequent

A phrase consisting of a basic idea followed by a contrasting idea that ends with a strong cadence. It usually forms the second half of a phrase-level form.

consonance

As an acoustic phenomenon, frequencies vibrating at whole-number ratios with one another; as a cultural phenomenon, perceived stability in a chord or interval.

consonant passing tone

Passing motion that does not involve dissonance.

continuation

A subphrase that features a mix of any of the following: fragmentation, increase in harmonic rhythm, increase in surface rhythm, or sequences. Continuations end with a cadence and are usually found in the second half of a theme.

contour lines

Lines that indicate whether pitch moves up, down, or stays the same.

contraction

Contraction refers to the process of making a phrase shorter than expected. It always occurs within a phrase.

contraction (motivic)

Making the durations of a motive shorter than the original.

contrary motion

When two voices move melodically in opposite directions—that is, one voice moves up and the other moves down.

contrasting beginning

The contrasting beginning is like an antecedent without a cadence. It is a beginning part of a phrase-level form that consists of a basic idea followed by a contrasting idea, and it doesn't end with a cadence.

contrasting idea

A small unit that contrasts with the material that came immediately before it, usually in terms of contour. It's featured in the antecedent and the compound basic idea.

contrasting section

A core section that provides contrast with the main section. May be stable or unstable.

core bass pattern

A core bass pattern is the basic series of notes that defines a common progression. This series of notes may be embellished with other, less important notes, but the pattern is still recognizable because the basic series is still present.

core section (classical)

A formal category including both main sections (e.g., A, primary theme, refrain) and contrasting sections (e.g., B, C, D, secondary theme, episode, contrasting middle, development, digression). In contrast to auxiliary sections, core sections present the main musical material of a work and generally represent the bulk of a composition.

core section (pop)

Core sections comprise the main musical and poetic content of a song. Core sections include strophe (AABA and strophic form only), bridge, verse, chorus, prechorus, and postchorus.

counterpoint

A general term for music that involves multiple simultaneous and independent melodic lines. The term comes from the idea that each note (point) has another note against (counter to) it. This term can also refer specifically to a musical line added to a cantus firmus.

countersubject

A melodic line that is consistently sounded with (and complements) the subject/answer of a fugue.

crash cymbal

A mid-sized suspended cymbal. Can be various diameters (16–18” are typical) and thicknesses. Depending on size, contour, and playing technique, these can produce a variety of crashing, splashing, sizzling, and barking sounds.

crescendo

Getting gradually louder; sometimes represented in notated scores with a hairpin symbol.

crux

The moment when the tail end of the first reprise returns at the tail end of the second reprise of a binary or sonata form.

cuatro

A Latin American guitar-like instrument particularly prevalent in Puerto Rican music.

cycle

A grouping that contains one or more sections, typically in the same order. Sometimes one or more sections are omitted in the repetition of a cycle, especially toward the end of a song.

dance chorus

An intensified version of the chorus that retains the same harmony and contains the hook of the song, which increases memorability for the audience and encourages dancing.

deceptive motion

A cadence-like resolution from V to a non-tonic harmony. The most common deceptive motion is V–vi; the next most common is V–IV⁶.

decrescendo

Getting gradually softer; sometimes represented in notated scores with a hairpin symbol.

delay of melodic progression

In counterpoint, a type of consonant weak beat that skips by third and then steps into the following downbeat.

dembow

A drumbeat in which the kick drum plays on every beat, while the snare plays the last two parts of a tresillo rhythm.

dependent transition

A sonata-form transition that reuses motivic material from the primary theme.

derived row

A 12-tone tonerow formed of the same pitch class set several times such as 3 tetrachords or 4 trichords.

detour

A type of alternative path. A detour creates a temporary deviation from a phrase's expected trajectory toward a cadence. Detours are initiated by a diversion onto the detour and they end with a resumption of rhetoric from earlier in the phrase.

development

A section of a sonata form that is unstable, and that may or may not explore thematic material established in the exposition.

diatonic

1. A scale, mode, or collection that follows the pattern of whole and half steps W–W–H–W–W–W–H, or any rotation of that pattern.
2. Belonging to the local key (as opposed to "chromatic").

diatonic harmony

Harmony that is based in a diatonic scale, such as the white notes of the piano. In analysis, diatonic harmonies may be labeled with with Roman numerals.

diatonic mode

A scale made up of the notes of the diatonic collection.

dictation

A type of aural skills exercise in which aural examples are written by the student in staff notation.

diminished intervals

Intervals that are one half step smaller than a perfect or minor interval.

diminished seventh chord

Another name for a fully diminished seventh chord, a seventh chord with a diminished triad and a diminished seventh.

diminished triad

A triad whose third is minor and fifth is diminished.

diminuendo

Getting gradually softer; decrescendo.

direct fifths or octaves

Similar motion into a fifth or octave. Also called hidden fifths or octaves.

discrete

Non-overlapping; separate.

displacement (of a motive)

Changing the metric position of the motive relative to its original statement.

dissonance

A perceived quality of auditory roughness in an interval or chord.

division unit

The note value that divides the beat into two or three parts (in simple or compound meters, respectively); for example, the eighth note in 4/4 or 6/8.

dominant function

A category of chords that provides a sense of urgency to resolve toward the tonic chord, including V and vii° (in minor: V and vii°).

dominant lock

Extensive prolongation of the V chord. Also known as "standing on the dominant." Often involves a pedal point on *sol* (5).

dominant seventh chord

A seventh chord in which the triad quality is major and the seventh quality is minor.

doo-wop schema

||:I – VI – IV – V :||, or C – Ami – F – G in C major.

Common alterations: substituting ii for IV; rotation.

dorian

A diatonic mode that follows the pattern W–H–W–W–W–H–W. This is like the natural minor scale, but with a raised 6. This scale can also be found by playing the white notes of the piano starting on D.

dorian shuttle

IV–i, or F–Cmi in C minor. This shuttle implies the dorian mode. It can sound like ii–V to someone who is not used to the dorian mode.

double flat

Lowers a note by two half steps.

double neighbor

An embellishment that surrounds a note with its upper and lower neighbor (e.g., C–B–D–C). The note being embellished may be articulated between the two neighbor tones, as in C–D–C–B–C.

double plagal schema

$\flat$ VII–IV–I, or B $\flat$ –F–C in C major. The term comes from duplicating the plagal relationship (IV–I) by applying it to IV as well (IV/IV–IV, or $\flat$ VII–IV).

double sharp

Raises a note by two half steps.

double whole note

A note value that lasts the duration of two whole notes. Notation: 

double-time feel

A drum pattern where the backbeat is played twice as fast as usual (that is, on the second eighth of each beat, rather than on beats two and four).

doubling

Duplicating some notes of a chord in multiple parts.

downbeat

Beat 1 of a measure, which is conducted with a downward motion.

duple meter

A meter with two beats per measure.

duplet

A tuplet that involves dividing a beat in compound meter into two parts.

dux

The first part in a pair of imitative voices (compare to *comes*).

dynamics

The musical term for loudness.

eighth note

A note value that lasts half the duration of a quarter note, or the duration of two sixteenth notes.

Notation: 

eighth rest

A type of rest that lasts half the duration of a quarter rest, or the duration of two sixteenth rests.

Notation: 

embellishing harmony

A harmony whose function is to prolong another harmony, rather than to advance the phrase toward its cadential goal. Embellishing harmonies are often said to be passing or neighboring.

embellishing tones

Notes that decorate other, more structurally important notes. Embellishing tones are often not part of the prevailing chord. Types of embellishing tones include passing tones, neighbor tones, appoggiaturas, escape tones, pedal tones, suspensions, and anticipations.

emergent tonic

A tonic that is initially absent for the first sections of a song, but arrives later on (often in the chorus). Often tied to lyrical themes of attained triumph, self-confidence, or clarity.

energy gain

A quality in a passage of music that heightens the perceived energy of the passage. This can be through more active rhythmic activity, faster harmony changes, thicker texture, expanded range, crescendo, or drive toward a cadence or goal.

enharmonic equivalence

A relationship between notes, intervals, or chords that sound the same but are spelled differently.

episode

A term used when describing the sections of a rondo form that are not the main theme (a.k.a. A or refrain). Episodes provide contrast with the main theme through changes in multiple domains, primarily key and melodic/rhythmic/harmonic material.

escape tone

An embellishing tone that is approached by step and left by leap in the opposite direction.

essential expositional cadence (EEC)

The goal of the S area. The EEC is the first satisfactory PAC that is followed by new material (not based on S).

evaded cadence

Any situation where a composer sets up the expectation for a cadence, then avoids cadencing. Examples include deceptive motion, inversion of the cadential dominant or tonic, and/or omitting an essential voice (such as the bass note of the tonic chord or the soprano note of the tonic chord).

expansion

The process of making a phrase longer than expected. This lengthening might occur within the phrase (internal expansion) or outside of the phrase (external expansion).

exposition (fugue)

The first part of a fugue, in which each voice states the subject or answer.

exposition (sonata form)

The first large section in a sonata-form work. It usually establishes the main themes of a work and sets up a conflict that is later resolved in the work. This conflict often takes the form of differing key centers (such as when the primary theme of a sonata is in tonic and the secondary theme is in the dominant).

extended cadential ending

A subphrase that harmonizes the core bass pattern mi–fa–sol–do (3–4–5–1). Functions similarly to a continuation.

extension (harmony)

Adding additional thirds on top of the triad. Most commonly refers to ninths, elevenths, or thirteenth rather than sevenths, although sevenths are also extensions.

external auxiliary section

A category of auxiliary sections including prefixes (which introduce a piece/section) and suffixes (which follow the generic conclusion of a piece/section).

external expansion

Lengthening a phrase by adding extra material to it either before it begins ("prefix") or after it cadences ("suffix").

feathered beaming

A gradual change in the speed of notes within a single beam.

fermata

A symbol that indicates one should hold a note longer than its written duration. Notation: 

ficta

Musica ficta are un-notated accidentals added to Renaissance music. Competent performers know to add ficta in appropriate places. In modern editions of Renaissance music, ficta are often provided by the editor.

figured bass

Arabic numerals and symbols that indicate intervals above a bass note. These are realized into chords and non-chord tones by musicians.

final

In church modes, the final loosely corresponds to the modern notion of "tonic," in that it is a melodic

goal. However, the final may not always be emphasized in the way a tonic is. Finals are named by the fact that the last note of a Gregorian chant will always be the final of the mode.

first inversion

A triadic harmony with the third in the bass.

fixed do

A system of solfège in which *do* is always the pitch class C, *re* the pitch class D, etc., regardless of scale.

flag

A curved line placed at the end of a stem. Each flag added to a stemmed note represents the reduction of the note value by half. For example, the symbol for an eighth note is like a quarter note plus a flag; the eighth note is one-half the value of the quarter note.

flat

Lowers a note by a half step.

form

Refers to the structure of a passage or piece. Form can be understood as a hierarchical grouping of units, and we often speak of form at one of two levels: phrase-level form (referring to motives, ideas, subphrases, or phrases) or composition-level form (referring to sections, movements, or whole pieces).

forte

Loud.

Forte number

A nomenclature for set classes developed by Allen Forte; each set class has a unique Forte number. The first number refers to the cardinality of the set, and the second number is semi-arbitrary, but generally proceeds from the most compact to the most expanded set.

four on the floor

A drumbeat in which the kick drum is sounded on every beat.

fragile tonic

The tonic chord is present, but weakened. Usually, the weakening comes from using the tonic chord in inversion, or otherwise from placing the tonic chord in a metrically unstable mid-phrase position (versus a more typical usage where the tonic is a stable point of arrival or departure).

fragmentation

Making unit sizes smaller than the previously established size. For example, if units had previously been two measures long, fragments might be one measure long.

free atonal music

Music that is atonal, avoiding a traditional pitch center and harmonic hierarchy, but is not serial.

free counterpoint

Contrapuntal writing without any specific thematic content.

frequency

Acoustically, how often a sound wave repeats; the pitch of a sound.

fully diminished seventh chord

A seventh chord whose triad is diminished and whose seventh is diminished.

function

The role that a musical element plays in the creation of a larger musical unit.

gap-fill

A principle of melody writing suggesting that any large leaps that open up a new register ought to be filled in afterward with stepwise motion.

generic interval

The number of scale steps between notes of a collection or scale.

grand staff

Two staves placed one above the other, connected by a brace. The top staff has a treble clef, while the bottom staff has a bass clef.

graphic notation

A notational technique where pitch and durations are specified by nonstandard symbols.

ground bass

A repeated bass pattern that forms the foundation for a set of variations, not unlike the cyclical progressions of pop/rock songs.

hairpins

A crescendo or decrescendo symbol.

half cadence (HC)

A kind of inconclusive cadence that occurs when a phrase ends on V. Occasionally, particularly in Romantic music, the final chord of a half cadence will be V^7 .

half note

A note value that lasts half the duration of a whole note, or the duration of two quarter notes. Notation:

**half rest**

A type of rest that lasts half the duration of a whole rest, or the duration of two quarter rests. Notation:

**half step (semitone)**

One-twelfth of an octave; generally considered to be the smallest interval in Western musical notation.

half-diminished seventh chord

A seventh chord in which the triad quality is diminished and the seventh quality is minor.

half-time feel

A drum pattern in which the backbeat is twice as slow as usual (that is, the snare hits occur only on beat three of each measure, instead of beats two and four).

harmonic elision

The suppression of an expected chord. Two kinds of elision are a leading-tone elision, in which the expected triad is replaced by the dominant seventh chord with the same root or by a functionally equivalent diminished seventh chord, and raised-root elision, in which the root of the expected chord is raised to become a leading tone (or applied leading tone).

harmonic function

Refers to three categories of chords: tonic, predominant, and dominant. A chord's membership within a category indicates something about how that chord typically behaves in tonal harmonic progressions in Western classical music. For example, tonic function chords are stable and tend to represent points of resolution or repose.

harmonic interval

An interval whose notes sound together (simultaneously).

harmonic inversion

Changing the bass note of a harmony so that, for example, the third is in the bass instead of the root.

harmonic major

A major scale with *le* (↓6) instead of *la* (6): *do-re-mi-fa-sol-le-ti-do* (↑2–3–4–5–↓6–7–↑).

harmonic minor

An ordered collection of half and whole steps with the ascending succession W–H–W–W–H–3Hs–H. Like natural minor, but with a raised 7.

harmonic rhythm

The rate at which chords change, usually expressed in chords per measure. A common rate of chord change in 18th-century classical music is one chord per measure, for example.

harmonic series

A series of notes whose frequencies are multiples of the first frequency: 1:1, 1:2, 1:3, 1:4, 1:5, etc. Starting with the pitch C₂, this would result in the series of pitches C₂, C₃, G₃, C₄, E₄, G₄, B $\flat$ ₄, C₅, etc.

harmonically

Notes played or sung all together at the same time.

harmonically closed

A phrase or module is harmonically closed when it ends with tonic harmony (I in root position).

harmonically open

A phrase or module is harmonically open when it ends on a harmony other than tonic.

harmonics

An overtone of a complex sound that occurs at a whole-number ratio to the fundamental.

harmony

A vertical sonority.

head refrain

A refrain that is the first line or so of the section's text.

Hertz

A unit of measurement for the frequency of a sound, equivalent to one cycle per second.

heterophony

A musical texture with multiple simultaneous variants on a single melodic line.

hexachord

A six-note collection. In serial music, "hexachord" is typically used to refer to either the first or last six notes of a twelve-tone row.

hexachordal combinatoriality

A property of a row in which combining one hexachord from a version of a row with a hexachord from another version of a row creates the chromatic collection.

hexatonic scale

A six-note collection that alternates between half steps and minor thirds, such as C–C♯–E–F–G♯–A.

Hexpole (H) transformation

A Neo-Riemannian transformation that connects a triad to its modal opposite a third away by moving each voice by a single semitone (e.g., connecting C major and A♭ minor).

Hi-hat cymbals

A pair of smaller cymbals, matched in size, typically 14” in diameter, mounted on a specially designed stand. The bottom cymbal sits upside down, unmoving, and the top cymbal is attached to the stand so that it can be controlled by a foot pedal. When struck, the hi-hats’ timbre depends on how open or closed the two cymbals are. The hi-hat is most often struck while closed, producing a characteristic, bright “tick tick tick”; the open sound has a more aggressive crashing or rattling quality; and a wide range of intermediate timbres are also available. When played with the foot pedal only, the cymbals make a splashing effect.

hierarchical

Arranged according to rank.

home key

A term used to describe a piece's overall tonic. If a movement is in the key of A major, then the home key is A major. The term is used to distinguish itself from local keys.

homophony

A musical texture consisting of one melodic part (usually the topmost) and other subordinate accompanying parts. This includes chorale texture and melody-and-accompaniment texture.

homorhythm

Rhythmic unison among multiple parts.

hopscotch schema

IV–V–vi–I. This four-chord schema has become increasingly common in pop music since 2010.

hybrid form

A phrase form that combines aspects of the sentence and the period into one phrase-level form.

hypermeter

Groupings of measures into different patterns of accentuation akin to meter. A hypermeasure is typically four measures long.

idea

The smallest unit of music identified by a segmentation analysis. Ideas need not end with cadences, and they may combine to form subphrases or phrases. Examples include basic idea, contrasting idea, unit, cadential idea, and fragments.

ii–V–I

$ii^7-V^7-Imaj^7$ in major, or $ii\phi^7-V^7-i^7$ in minor. A fundamentally important progression in traditional jazz.

imitation

Imitation sees two or more parts enter separately with (versions of) the same melody.

imperfect authentic cadence (IAC)

A V–I cadence in which V, I, or both harmonies are inverted, and/or *do* (Γ) is *not* in the soprano over the tonic triad. Additionally, IACs are often used to evade a cadence.

imperfect consonance

Thirds or sixths with major or minor quality.

incomplete neighbor

A type of embellishing tone that is approached by step and left by leap or vice-versa. The name comes from the idea that it functions as a neighbor tone on only one side of its embellishment. Incomplete neighbors may be called appoggiaturas or escape tones.

independent transition

A sonata-form transition that introduces new motivic material (as opposed to reusing material from the primary theme).

index number

In a transformation (T_n or I_n), n is the index number, representing the interval of transposition in semitones.

inflected

Chromatically altered from the typical version.

integer notation

A system of naming pitch classes that treats C as 0, C $\sharp$ as 1, D as 2, etc.

internal expansion

Making a phrase last longer than we expect by lengthening it after it begins, but before it cadences.

interval

The distance between two notes.

interval class (IC)

Unordered pitch-class intervals; that is, the smallest possible distance in semitones between two pitch classes. Thus, mi_2 and ma_7 are both IC 1; ma_2 , mi_7 , $+6$ are IC 2; mi_3 , ma_6 , $+2$ are IC 3, etc. The largest interval class is six semitones, because if order is disregarded, the tritone is the largest possible interval.

interval size

The number of letters (or lines and spaces) that make up the span of an interval. Interval size is written with Arabic numbers (2, 3, 4, etc.).

interval subdivision

In counterpoint, a type of consonant weak beat that divides a larger consonant leap (from downbeat to downbeat) into two smaller leaps.

intervallic inversion

Occurs when two notes are flipped: for instance, C below E is an inversion of E below C.

introduction (classical form)

A section of music that occurs before the start of the first core section.

introduction (song form)

Introduction sections transition from the unmetered silence that precedes the song to the musical activity of the first core section. They tend to be short and untexted (i.e., instrumental) and tend to present musical material from one or more core sections to come.

invariance

In serial music, invariance refers to keeping a property of a row the same through different transformations. For example, when a retrograde version of a row contains the same ordered pitch classes as a prime version of the row, we would call it "retrograde invariant" to mean that the order of pitch classes doesn't change when the row is reversed and transposed

ionian

A diatonic mode that follows the pattern W–W–H–W–W–W–H. This is equivalent to a major scale.

issimo

Italian suffix that means "very."

jazz blues

The jazz blues incorporates several alterations to the 12-bar blues to blend together blues harmony and jazz harmony. In the eighth bar, instead of remaining on tonic, there is an applied ii–V that leads to the ii chord in bar 9. In the third phrase, the V–IV–I of the standard blues is replaced with a ii–V–I more common to jazz.

key signature

In music notation, a collection of sharps or flats written at the beginning of each line (immediately after the clef) to signal that certain notes are always sharp/flat.

Kick drum

A large cylindrical drum, usually 18–24” in diameter, set on its side, typically with a wooden shell and two tensioned heads (the back one is sometimes removed or “ported,” meaning a circle is cut out), played with a foot pedal comprising a beater (a large mallet of felt, wood, or plastic) mounted to a cam and chain. The lowest-pitched drum in the kit, it is played with a foot pedal. It is originally based on a modified concert bass drum, and some still sound with the same booming quality. Other kick-drum sounds have a dull thud, or a sub-bass effect that (over the right speakers) is felt in the body as much as it is heard.

kinesthetically

Relating to movement of parts of the body.

lament bass progression (classical)

A variety of harmonic progressions that harmonize a stepwise descending bass line from tonic to dominant. The simplest diatonic version uses the bass notes do–te–le–sol and is harmonized by the progression $i-v^6-iv^6-V$. Chromatic alternatives are common.

lament schema (pop)

A harmonization of a descending upper tetrachord ($\text{f}-7-6-5$) in the bass.

lead sheet

A type of jazz/pop score that typically notates only the melody and the chord symbols (written above the staff).

leading tone

A 7 that is one half step below f . The leading tone is diatonic in major keys, but requires an accidental in minor keys.

leading-tone chord

The triad or seventh chord built on *ti* (7).

Leading-Tone Exchange (L)

A Neo-Riemannian transformation that preserves the minor third in the triad, and moves the remaining note by semitone (e.g., relating C major and E minor).

leap

A melodic interval of a third or greater. Note that some refer to thirds as "skips" rather than leaps.

ledger lines

Small lines written above or below a staff to extend the staff's range of notes.

legato

Performed smoothly or connected.

Lied

A German-language art song.

link (fugue)

A passage of a fugue that does not contain a subject statement in any voice.

locrian

A diatonic mode that follows the pattern H–W–W–H–W–W–W. This is like the natural minor scale, but with a lowered 2 and lowered 5. This scale can also be found by playing the white notes of the piano starting on B.

loose-knit

A perceived characteristic of music that is created by unconventional phrase structures, unstable harmonies, diverse motivic material, and so on. Loose organization is common in passages with transitional function.

lydian

A diatonic mode that follows the pattern W–W–W–H–W–W–H. This is like the major scale, but with a raised 4. This scale can also be found by playing the white notes of the piano starting on F.

lydian shuttle

I–II $\sharp$, or C–D in C major. This progression can easily be confused with IV–V in major or $\flat$ VII–I in mixolydian, so one should be careful when referencing this progression. It implies the lydian mode.

lyric-invariant

A module or phrase is lyric-invariant if each time it appears it brings (mostly) the same lyrics. Lyric invariance tends to come at points of formal closure (tail refrains at the ends of strophes, choruses at the end of a verse-chorus song's formal cycle).

lyric-variant

A module or phrase is lyric-variant if each time it appears it brings (mostly) different lyrics.

main section

A section that presents the work's primary musical ideas. Usually, the main section is the first core section of the work. Examples include primary themes, refrains, expositions, choruses, or strophes.

major pentatonic scale

A scale that proceeds $ma2$ – $ma2$ – $mi3$ – $ma2$ – $mi3$. For example, starting on C, the C major pentatonic scale is C–D–E–G–A.

major scale

An ordered collection of half steps (H) and whole steps (W) as follows (ascending):
W–W–H–W–W–W–H.

major seventh chord

A seventh chord with a major triad and a major seventh.

major triad

A triad whose third is major and fifth is perfect.

major-major seventh chord

A seventh chord with a major triad and a major seventh. Also known as a major seventh chord.

major-minor seventh chord

A seventh chord with a major triad and a minor seventh. Also known as a dominant seventh chord.

marcato

To play with a more forceful accent or emphasis.

measure

Created by bar lines, a measure (or bar) is equivalent to one beat grouping.

medial caesura

In sonata form, the cadence that is the goal of the transition and marks the boundary between the transition and the secondary theme. Usually a HC, in I, V, or the secondary key; sometimes an authentic cadence in the secondary key; rarely, it could be an AC in the tonic key.

melodic interval

An interval whose notes are sounded separately (one note after another).

melodic inversion

The act of mirroring pitch content vertically, so that motion down becomes up and up becomes down. Inversion often preserves intervallic content.

melodic minor

An ordered collection of half steps (H) and whole steps (W) with the ascending succession W–H–W–W–W–W–H and the descending succession W–W–H–W–W–H–W.

mélodie

A French-language art song.

melody-and-accompaniment

A type of homophony in which one can clearly distinguish between melodic and supporting voices, usually with differing rhythms between them.

meter

A recurring pattern of accents that occur over time. Meters are indicated in music notation with a time signature.

metric modulation

A means of smoothing out abrupt tempo changes by introducing subdivisions or groups of beats in the first tempo that match durations in the new tempo.

metronome marking

An indication of tempo in beats per minute (BPM).

mezzo

Moderately.

microtone

A tone that exists outside of the twelve-tone equal-tempered scale (for example, quarter tones).

mid-song introduction

Mid-song intros function similarly to introductions, but in the middle of the song. They usually introduce the first section in the formal cycle.

middle C

C₄; the C near the middle of the piano keyboard, written on the first ledger line below the treble clef staff or the first ledger line above the bass clef staff.

milieu

A physical and/or social setting.

minor blues

The minor blues differs from the standard 12-bar blues by having minor seventh chords on the i and iv chords, and replacing the V–IV–I cadence with a ii–V–I cadence.

minor iv schema

Use of a minor iv chord in a major key. This creates a semitone descent between scale degrees ↓6 and 5. It is common to precede iv with IV (major), creating a descent 6–↓6–5.

minor pentatonic scale

A pentatonic scale with the intervals $mi3$ – $ma2$ – $ma2$ – $mi3$ – $ma2$. For example, starting on A, the minor pentatonic would be A–C–D–E–G. The minor pentatonic is a rotation of the major pentatonic.

minor seventh chord

A seventh chord with a minor triad and a minor seventh.

minor triad

A triad whose third is minor and fifth is perfect.

minor-minor seventh chord

A seventh chord with a minor triad and a minor seventh. Also known as a minor seventh chord.

mixolydian

A diatonic mode that follows the pattern W–W–H–W–W–H–W. This is like the major scale, but with a lowered 7. This scale can also be found by playing the white notes of the piano starting on G.

mnemonic device

A technique used to aid memorization.

mod 12

Short for modulo 12, where numbers wrap around upon reaching 12. Arithmetic in mod 12 is most commonly encountered in clock time: after 12 o'clock, the time becomes 1 o'clock again.

modal brightness

"Bright" refers to a more major sound, while "dark" refers to a more minor sound.

mode mixture

The intermixing of major and minor versions of 3, 6, and/or 7 within a composition.

modulation

A change of key.

monophony

A musical texture with a single, unaccompanied melodic line.

monotonicity

A piece that has one overarching tonic, that is, it starts and ends in the same key and contains a single tonic that gives the impression of being the primary key of the work.

motive

A regularly recurring unit of music that's smaller than an idea, and which is typically transformed across a work. The word "motive" usually refers to pitch material, but other kinds of motives such as rhythmic or contour also exist.

motivic enlargement

Making the durations of a motive last longer than the original.

motor rhythm

Persistent rapid note values, especially sixteenth notes. Common in Baroque music.

movable do

A system of solfège in which do is the first scale degree in a scale; this is in contrast to fixed do, where do is always the pitch class C.

music-invariant

A module or phrase is music-invariant if each time it appears it brings (mostly) the same music.

music-variant

A module or phrase is music-variant if each time it appears it brings (mostly) different music.

musicologists

Music scholars.

natural

Neither sharp nor flat.

natural minor

An ordered collection of half steps (H) and whole steps (W) with the ascending succession W–H–W–W–H–W–W.

Neapolitan sixth

A $\flat\text{II}^6$ chord.

Nebenverwandt transformation (N)

A Neo-Riemannian transformation that moves both members of the minor third in a triad by semitone, and again changes the mode (e.g., relating C major and F minor).

neighbor tones (NTs)

Embellishing tones that are approached by step and left by step in the opposite direction.

neighboring

A type of motion where a chord tone moves by step to another tone, then moves back to the original chord tone. For example, C–D–C above a C major chord would be an example of neighboring motion, in which D can be described as a neighbor tone. Entire harmonies may be said to be neighboring when embellishing another harmony, when the voice-leading between the two chords involves only neighboring and common-tone motion (as in the common-tone diminished seventh chord).

neighboring 6/4

A kind of 6/4 chord that embellishes a harmony with neighbor motion. This is usually labeled with figures, e.g., with 5-6-5 in one voice and 3-4-3 in another.

normal feel

In contrast to a double-time or half-time feel, a normal feel occurs when the backbeat aligns with beats two and four of a quadruple measure (that is, the expected timing of the backbeat).

normal order

The most compressed way to write a given collection of pitch classes.

nota cambiata

A five-note species counterpoint embellishment that may occur in one of two different forms:

- 1) Down by step, down by third, up by step, up by step
- 2) Up by step, up by third, down by step, down by step

note

A musical sound that has both a pitch and a rhythmic component; the symbol may include a stem, beam, and/or flag.

note value

The relative duration of a note.

notehead

The elliptical part of the note. Can be either filled in (black) or outlined (white).

oblique motion

When one voice moves melodically while another voice remains on the same pitch.

octatonic collection

The octatonic collection is built with an alternation of whole steps and half steps, leading to a total of eight distinct pitches. One example is C–C♯–D♯–E–F♯–G–A–B♭. Jazz musicians refer to this as the diminished scale.

octave

An interval of twelve half steps between two notes with the same letter name. The frequencies of two notes related by octave form a 2:1 ratio. Abbreviated “8ve.”

octave equivalence

A relationship between pitches that share a letter name but are separated by one or more octaves.

off-beat

A rhythmic or note value that does not fall on a beat (1, 2, 3, etc.).

off-tonic

A phrase or module is off-tonic when it begins on a harmony other than tonic.

on-tonic

A phrase or module is on-tonic when it begins with tonic harmony (I in root position).

one-more-time

A technique of internal phrase expansion. Coined by Janet Schmalfeldt, the technique involves three steps: (1) the music tries to cadence, (2) the attempted cadence is evaded, and (3) the music retries the cadence.

open spacing

Notes of a chord are spaced out beyond their closest possible position.

operations (set theory)

In set theory, "operations" refers to transposition and inversion.

ordered pitch interval

The distance between two pitches measured in semitones, with a plus or minus symbol to indicate ascending or descending, respectively. For example: C₄ to E₅ would be an ordered pitch interval of +16.

ordered pitch-class interval

The distance between pitch classes from lowest to highest. In other words, pitch class intervals are measured on the clock face, always going clockwise.

ordered set

A group of things that appear in a specified sequence. An ordered pitch set, for example, appears in a consistent order within a piece of music. Compare against a pitch class set, where the pitches are unordered, meaning they can appear in any order in the piece of music.

ostinato

A repeated rhythmic or pitched musical idea.

outro

Outros function as a transition from song back to silence, and thus decrease energy. Often this is accomplished in the recording studio by way of a fadeout.

pandiatonic

Pandiatonicism uses the notes of a diatonic collection without imparting a sense of pitch center.

parallel motion

When two voices move melodically in the same direction and by the same interval—for example, both voices move upward by a melodic second. (Note: the quality of the interval may vary, and it still counts as parallel motion.) By definition, two voices moving in parallel motion will also maintain the same harmonic interval between them.

parallel relationship

When two keys/scales share the same tonic, such as C major and C minor.

Parallel transformation (P)

A Neo-Riemannian transformation that preserves the perfect fifth in the triad, and moves the remaining note by semitone (e.g., relating C major and C minor).

partial

A component frequency within a complex tone's set of overtones.

passing

A type of motion where a chord tone moves by step to another tone, then resolves by step in the same direction. For example, C–D–E above a C major chord would be an example of neighboring motion, in which D can be described as a passing tone. Entire harmonies may be said to be passing when embellishing another harmony, when the voice-leading between the two chords involves mainly passing tones (as in the passing 6/4 chord).

passing 6/4

A 6/4 chord built on a passing tone in the bass, most commonly found prolonging tonic or predominant harmonies. Importantly, the chords on both sides of the passing 6/4 are always the same function.

pedal tones

Pedal tones are often found in the bass. They consist of a series of static notes over top of which chord changes occur that do not include the bass.

pentatonic collection

A pitch collection built with the interval pattern $ma2-ma2-mi3-ma2-mi3$. This collection can also be generated by using scale degrees 1, 2, 3, 5, and 6 only of the major scale.

penultimate

Second-to-last.

percussion clef

A clef used by non-pitched percussion instruments, where each line or space is dedicated to a different sound. Notation: "

perfect authentic cadence (PAC)

A V–I cadence that ends with do (1) in the melody. Both harmonies must be in root position.

perfect consonance

Perfect octaves (twelve semitones), perfect unisons (zero semitones), and perfect fifths (seven semitones). Perfect fourths (five semitones) are sometimes considered a perfect consonance, sometimes a dissonance; this depends on the context.

period

A phrase-level form that consists of two phrases: an antecedent and a consequent.

periodize

To divide time into different periods.

phrase

A relatively complete musical thought that exhibits trajectory toward a goal (often a cadence).

phrase elision

The overlapping of two phrases, functioning as the ending of one phrase and the simultaneous beginning of the next.

phrase expansion

The lengthening of a phrase, whether internally or externally, beyond its expected duration.

phrase model

Indicates the typical order and flow of harmonic functions in a phrase:
tonic–predominant–dominant(–tonic).

phrase-level form

Refers to the various ways in which a phrase may be constructed of subphrases, ideas, and motives. Examples of phrase-level forms include sentences, periods, repeated phrases, and hybrid forms.

phrasing

The way a passage might be shaped in performance (where to push and pull the tempo, where and how to change dynamic levels, etc.).

phrygian

A diatonic mode that follows the pattern H–W–W–W–H–W–W. This is like the natural minor scale, but with a lowered 2. This scale can also be found by playing the white notes of the piano starting on E.

phrygian half cadence

The phrygian half cadence (PHC) is a special kind of cadential phrase ending that occurs only in minor and involves the progression iv6–V. It's called “phrygian” because of the half step that occurs when *le* (↓6) moves to *sol* (5) in the bass, a sound that's similar to when *ra* (↓2) moves to *do* (1) in the phrygian mode.

piano

Quiet.

picardy third

Substituting a major I chord for a minor I chord (for example, using C major instead of C minor in a piece that is in C minor overall).

pitch

A discrete tone with an individual frequency.

pitch class

A group of pitches that are octave equivalent and enharmonically equivalent.

pitch interval

A type of interval that is measured in semitones. For example, the pitch interval 2 is two semitones; the pitch interval 7 is seven semitones.

pitch-class set

A group of pitch classes.

pivot chord

A chord used to modulate between two keys that is diatonic in both.

plagal

A mode with a range of a fifth above and fourth below its tonic.

plagal cadence

A plagal cadence uses the harmonies IV–I.

plagal motion

Occurs when IV (or IV⁶) moves to I (or I⁶).

polymeter

When two or more meters are notated simultaneously.

polyphony

A musical texture with multiple independent melodic voices, distinguished from one another through different rhythms and/or intervallic profiles. Also known as counterpoint. Polyphony may occur in many styles but is commonly associated with contrapuntal genres like fugues and canons.

post-cadential extension (p.c.e.)

A type of suffix (external expansion). Post-cadential extensions are usually short, they often occur at the ends of phrases within a section, and they typically prolong the final chord of the cadence or re-state the two chords that created the cadence.

postchorus

A short section that follows a chorus and serves only to close the cycle—does not introduce or transition to the beginning of the next cycle.

prechorus

Prechorus function is most significantly typified in energy gain. Prechorus sections often use motivic fragmentation, acceleration of harmonic rhythm, movement away from tonic harmony, and harmonic openness.

predominant function

Predominant function chords are those that transition away from tonic function toward dominant function.

prefix

An external expansion that occurs before the beginning of a phrase. Prefixes are usually introductions, and they may be small, as when the accompaniment for a lied begins before the singer, or they may be large, as when a symphony begins with a slow introduction.

presentation

A subphrase consisting of a basic idea and its repetition. Presentations don't usually end with cadences.

primary theme (P theme)

The main section of a sonata-form work, in the tonic key. P themes are usually stable.

prime form

A name for a set class. The prime form is the version of the set class that is most compact to the left and transposed to begin on 0.

prime symbol

A symbol (′) that is used in the analysis of phrases and forms to indicate that some repeated material has changed, in some way, from its initial statement.

progressive tonality

A piece that starts and ends with different tonics. Compare with monotonicity, which is the default harmonic plan in most tonal works from the 17th, 18th, and 19th centuries.

prolongation

When a given harmony's influence lasts longer than a single chord. Usually this is accomplished by alternating the prolonged chord with other, less important chords.

protonotation

A system of musical notation stripped of complicating elements, focusing only on basic elements of meter, rhythm, and scale degree.

quadruple meter

A meter with four beats per measure.

quality (chord)

A term that summarizes the quality of the third, fifth, and seventh (if applicable) above the root of the chord. Common chord qualities are major, minor, diminished, half-diminished, dominant, and augmented.

quality (interval)

A term that indicates the exact number of semitones between two pitches in an interval (compare with interval size, which indicates only the number of letters between two pitches). Common interval qualities are major, minor, perfect, augmented, and diminished.

quarter note

A note value that lasts half the duration of a half note, or the duration of two eighth notes. Notation: ♩

quarter rest

A type of rest that lasts half the duration of a half rest, or the duration of two eighth rests. Notation: ♩

quatrain

A group of lyrics that is four lines long.

range

The span of notes a voice or instrument can produce.

real answer

A fugue subject transposed by fourth/fifth, stated in a second voice in response to the first voice's subject statement.

realizing

The process of turning figured bass symbols into chords.

recapitulation

A section of a sonata-form work that brings back themes from the exposition and resolves the conflict established in the exposition.

refrain (rondo form)

The primary theme of a rondo-form work, typically stated at the beginning, after each contrasting episode, and as the last section (though a coda may follow).

refrain (song form)

A lyric-invariant passage within a section that is otherwise lyric-variant. A refrain is too short to form its own section—typically a phrase or less.

relative

Considered in relation to some other system. For example, modes are said to be relative if their scales share all the same notes (like C major and A minor).

relative relationship

When two keys/scales share the same pitches.

Relative transformation (R)

A Neo-Riemannian transformation that preserves the major third in the triad and moves the remaining note by whole tone (e.g., relating C major and A minor).

repeat signs

Symbols (||: and :||) indicating that a section of music is repeated.

repeated phrase

Two phrases where the second one is a repetition of the first. The repetition is always written out (repeat signs don't signify a repeated phrase), and usually the repetition is a variation on the initial statement.

repetition

A technique of internal phrase expansion. Sometimes a composer repeats material to create extra length in a phrase. Such repetitions may be exact or varied.

reprise

A section of a work that bears repeat signs, like either of the parts of a binary form.

reroute

A type of alternative path that involves a permanent change of a phrase's trajectory toward the cadence. Reroutes are initiated by a diversion.

rest

A measured silence in a piece of music.

retardation

An embellishing tone that is approached by static note and left by step up. The retardation is on a stronger part of the beat.

retransition

A retransition is very similar to a transition, but retransitions lead to a return to the main section in the tonic key, while transitions move away from tonic. Retransitions may have a clear half-cadential ending (possibly followed by a suffix), or they may have an elided ending that coincides with the initiation of the following section.

retrograde

Describes when a theme, row form, or motive is played backward in comparison to an initial (or original) statement.

rhythm

The duration of musical sounds and rests in time.

rhythm dot

Increases a note or rest value by half.

rhythm section

In jazz, the piano, guitar, bass, and percussion.

rhythmic solmization

A system that pairs rhythmic values with particular syllables.

Ride cymbal

A large suspended cymbal, usually 20–24” in diameter. Depending on the thickness of the cymbal, the ride may sound like a warm wash of sound (thinner rides, common in jazz) or a sharp, high-pitched crunch (thicker rides, common in metal music). High, pure ringing sounds can be produced by playing the “bell” of the ride, located in the middle of the cymbal.

ritardando

A gradual decrease in speed (tempo).

Roman numeral analysis

Labeling chords with Roman numerals (and, often, figures).

Roman numerals

Numerals I, II, III, IV, V, VI, and VII for 1–7, respectively. In the analysis of harmony, Roman numerals represent triads built on the corresponding scale degree (for example, a V chord is a triad built on 5).

root

The lowest note of a triad or seventh chord when the chord is stacked in thirds.

root motion

The distance between roots of adjacent chords. For example, "root motion by step" refers to the distance between two chords that are only one step apart, such as I and ii, IV and V, etc. Note that the root is not always in the bass, so this is a separate concept from bass motion.

root position

Ordering the notes of a chord so that it is entirely stacked in thirds. The root of the chord is on the bottom.

rotation (pop schemas)

Beginning a harmonic schema on a different chord within the schema, but proceeding through the harmonies in the same order.

rounded binary form

A type of binary form where the material at the start of reprise 1 returns somewhere near the middle of reprise 2. Both appearances of that repeated music are expected to be in the home key.

row

The ordered elements in a serial composition, also referred to as a series. These elements are often pitches, but could be other things such as durations or dynamics.

row class

A collection of all forms of a given row. Most row classes contain 48 versions of a row, but some contain fewer due to duplications of row forms. For example, a prime version of a row may be equivalent to a retrograde version of the row.

row form

A particular version of a row in serial music; that is, prime, transposed, inverted, or retrograded.

row matrix

A 12-by-12 grid that sets out all 48 forms of a row class.

SATB

A musical texture with soprano (S), alto (A), tenor (T), and bass (B) parts.

scale

An ordered collection of half steps and whole steps.

scale degree

The relative position of a note within a diatonic scale. Indicated with a number, 1–7, that indicates this position relative to the tonic of that scale.

scale-degree names

A movable system of names for scale degrees based on their function within the scale, such as tonic (do, 1) and dominant (sol, 5).

schema

A prototypical chord progression or formal structure.

second inversion

A triadic harmony with the fifth in the bass.

secondary dominant

A chromatic chord that temporarily tonicizes another key besides the tonic key, by taking on a dominant function in that new key.

secondary key

A temporary key within a piece that is overall in a different key. For example, a piece in A major may temporarily modulate to E major; E major is a secondary key within A major.

secondary leading-tone

A leading-tone chord that makes a non-tonic chord temporarily sound like tonic. Most often, secondary leading-tone chords are fully diminished, though occasionally they are half-diminished.

secondary theme (S theme)

The contrasting section of a sonata-form work. The S theme begins and ends in a contrasting key (usually V in major-mode sonatas and either III or v in minor-mode sonatas). S themes are usually stable.

section

The highest-level division of the overall form of the piece. Examples include the exposition in sonata form, the first part of a binary form, or the chorus of a pop song.

segment

A portion of a larger grouping. In serial analysis, segments of a row can be any number of elements (for example, in a twelve-tone row, it's common to look at three- or four-note segments).

segmentation

The process of dividing a passage or piece of music into its component parts.

sentence

A special kind of phrase consisting of a presentation and a continuation.

sentential

A phrase that differs substantially from the archetypal sentence while still exhibiting some traits of a sentence-structure phrase.

sequence

A pattern that is repeated and transposed by some consistent interval. A sequence may occur in the melody, the harmony, or both.

sequence copy

The segment of a sequence that repeats and transposes the material from the model.

sequence model

The segment of music that establishes the pattern for a sequence; in other words, the segment that gets copied in a sequence.

serialism

A strategy of putting elements of music (pitch, duration, dynamics, etc.) in a particular order.

series

Refers to the ordered elements in a serial composition. These elements are often pitches, but could be other things such as durations or dynamics.

set

In set theory, a group whose members are not necessarily related.

set class

A group of pitch-class sets related by transposition or inversion. Set classes are named by their prime forms; for example, (012) is a set class.

set theory

A methodology for analyzing pitch in atonal music. Pitch classes are given an integer name (0–11, where C is 0, C $\sharp$ is 1, etc.). Groups of pitches are considered together as "sets." Sets may be related by inversion or transposition.

seventh chord

A triad with an additional third above the fifth, creating a seventh between that top note and the bass and totaling four notes.

sharp

Raises a note by a half step.

sight counting

Counting at "sight" (that is, never having seen or heard the rhythm before).

sight singing

Singing music at "sight" (that is, never having seen it before).

similar motion

When two voices move melodically in the same direction (either upward or downward).

simple binary form

A type of binary form that does not contain the thematic return of a rounded binary. Instead, the second reprise continues with A material without ever having departed from it (thus there is no "return"), or it contains relatively new material throughout.

simple duple

A meter with two beats, each of which divides into two. The top number of a simple duple meter will always be "2". 2/4 and 2/2 (cut time, C) are the most common simple duple meters.

simple intervals

An octave or smaller.

simple meter

A meter that divides the beat into two parts.

simple quadruple

A meter with four beats, each of which divides into two. The top number of a simple quadruple meter will always be "4". 4/4 (common time, C) is the most common compound quadruple meter.

simple ternary form

A ternary form whose sections are each made up of one or more phrases but not complete forms. The term "simple" can also be used to clarify that a single section does not contain a complete form.

Compare with compound ternary form.

simple triple

A meter with three beats, each of which divides into two. The top number of a simple triple meter will always be "3". 3/4 is the most common compound triple meter.

simultaneity

A general term for two or more sound events occurring at the same time.

singer/songwriter schema

I–V–vi–IV in major, or III–VII–i–VI in minor (C–G–Ami–F, for example). This chord progression often loops throughout a pop song. Frequently, this progression begins on the vi/i chord instead of the I/III chord.

sixteenth note

A note value that lasts half the duration of an eighth note. Notation: .

sixteenth rest

A type of rest that lasts half the duration of an eighth rest. Notation: .

skip

Melodic movement by third.

skipped passing tone

In counterpoint, a type of consonant weak-beat motion that is approached by skip (third) and left by step in the same direction.

slash notation

An abbreviated form of musical rhythmic notation, that involves dashes to indicate articulations, horizontal lines to indicate a sustained note, and circles to indicate rests.

Slide transformation (S)

A Neo-Riemannian transformation that moves the two pitches that form the perfect fifth in a triad by semitone and changes the mode of the triad (e.g., relating C major and C $\sharp$ minor).

slur

A curved line placed over notes to indicate that they should be played or sung without separation.

snare drum

A cylindrical drum, typically 14" in diameter, made of wood or metal with tensioned heads (or skins) on the top and bottom and a set of snare wires stretched below the bottom head to create the drum's characteristic buzzing and cracking sounds. Played with force, it sounds like wood cracking or like a thunderclap. Played softly, it offers a range of effects from clicks and taps to buzzing rolls.

solfège

The application of solmization syllables (do, re, mi, fa, sol, etc.) to scale degrees.

solmization

A system that pairs each note of a scale with a particular syllable.

sonata form

A complex large-scale musical form that can be understood as an elaborate version of rounded binary form with a balanced component. The larger level names are as follows: Exposition ($\approx A$), Development ($\approx B$), and Recapitulation ($\approx A'$). In general terms, the exposition contains two main sections (primary and secondary) separated by a transition. The secondary theme is presented in a non-tonic key in the exposition, and crucially, it is restated in the recapitulation in the tonic key. The exposition and recapitulation often end with a large suffix (closing section).

soprano

The highest part in SATB style, written in the treble clef staff with an up-stem; its generally accepted range is C $_4$ –G $_5$.

sound wave

An acoustic wave (energy vibration) that is perceived as sound.

spacing

The intervals between voices. For chords in strict SATB style, there should be no more than an octave between upper voices (soprano and alto, alto and tenor), and no more than a twelfth between the tenor and bass.

species counterpoint

A traditional approach to composition pedagogy focused on counterpoint as a way of learning to think of music horizontally (melodically) and vertically (harmonically) simultaneously. Consists of five “species,” each of which focuses on a single compositional element.

spondee

A poetic foot consisting of two stressed syllables in a row.

srdc

A four-part phrase structure in popular music: statement, restatement, departure, and conclusion. An srdc structure shares many features with the Classical sentence.

stability

A perceived quality created in music through tonic expansions, regular hypermeter, absence of modulations, diatonic melodies, and diatonic harmonies, among other things.

staccato

Played or sung with more separation, leaving space between notes.

staff

Five evenly spaced horizontal lines on which notes are placed.

stanza

In lyrics, a stanza is a group of lines of lyrics. In music notation, a stanza is a group of staves that are played simultaneously.

stem

A vertical line that originates at the notehead, used to indicate rhythm and voicing.

stem direction

On a grand staff in SATB style, the soprano and tenor are up-stemmed, while the alto and bass are down-stemmed.

straight eighth notes

Eighth notes that are equal, as opposed to swing eighths (which are unequal).

straight syncopation

Taking a series of notes of equal durations, cutting the duration of the first note in half, and shifting the rest early by that half duration.

stretching

A technique of internal phrase expansion. It occurs when a composer lengthens a harmony or melody by increasing its duration so that it lasts longer than expected. When that happens, we say that the unit that contains the harmony or melody has been stretched.

string instrument

An instrument that produces sound via one or more vibrating strings.

strophe

A basic multi-phrase unit. In pop music, a strophe is a focal module within strophic-form and AABA-form songs.

strophic form

A large-scale song structure, in which the same basic multi-phrase unit is repeated throughout (AAA). The basic unit that is repeated is called a strophe. Strophic form is more common in early rock-and-roll (1950s–1960s) than in the 1970s and beyond.

structural features

Musical features that pertain to section divisions and form.

subdominant

A harmonic function that may either lead toward a dominant-function chord or back to a tonic-function chord. Subdominant function is most typically associated with the **IV chord**, otherwise known as the subdominant chord, and the **II chord**, otherwise known as the supertonic chord.

subject

A short melody that forms the melodic basis of a fugue and recurs throughout.

subphrase

A unit in some phrase-level forms that is one level smaller than a phrase, but one level larger than an idea.

subset

A set that is entirely contained within another larger set.

substitution (counterpoint)

In counterpoint, a type of consonant weak beat that involves a leap of a fourth followed by a step in the opposite direction. The name implies that this motion substitutes for a more common passing-tone motion.

subtonic shuttle

$\flat$ VII–I, or $B\flat$ –C in C major. This shuttle can imply mixolydian if the tonic chord is major, or aeolian if it is minor. In this shuttle, the $\flat$ VII chord has dominant function.

subversion of a cadence

Occurs when a potential cadence point is declined by the material that follows it. A common strategy is for a composer to write music that proposes a cadence, but then to "back up" in the phrase and try the cadence again. See also the "one-more-time" technique in the chapter on phrase expansion.

suffix

A type of external expansion that occurs after the end of a phrase. There are three terms commonly used to describe suffixes, ranging in size from smaller to larger: post-cadential extension, codetta, and coda.

superscript

In typesetting, superscript characters appear higher on the page than the regular characters—like an exponent in math. For example, in the chord symbol C^7 , the 7 is superscript.

superset

A larger set that contains other smaller sets. For example, a superset of (037) is the diatonic collection, (013568t).

suspension

An embellishing tone that is approached via static note and left by step down. The suspension is on a strong part of the beat.

swing eighths

A performance practice in which two notated eighth notes are performed unequally, in about a 2:1 proportion.

syncopation

A rhythmic phenomenon in which the hierarchy of the underlying meter is contradicted through surface rhythms. Syncopation is usually created through accents and/or longer durations.

syntax

The norms or principles according to which musical elements are combined into meaningful and stylistically appropriate successions.

tactus

The perceptual equivalent of a "beat"—the pulse that you might tap your foot or bob your head along to. A tactus is felt, not notated.

tail refrain

A refrain that is the last line or so of a section's text.

tempo

How fast or slow a work is performed; many tempo markings are in Italian or another non-English language.

temporal

Relating to time.

tenor (church modes)

Related to the word "tenuto," the tenor of a mode is the pitch frequently sustained in a chant melody using that mode.

tenor (voice)

The second lowest part in SATB style, written in the bass clef staff with up-stems; its generally accepted range is C₃–G₄.

tenor clef

As a "C" clef, the tenor clef shows that the second-highest line of the staff is C₄ by centering on that line.

tenuto

A type of articulation marking used to indicate smooth, connected playing, indicated by small horizontal lines above or below the notes.

ternary form

A musical form consisting of three distinct sections, in an ABA (not ABC) formal structure. The B section typically contains contrasting material in a new key. Repeat signs around each section are common.

tetrachord

A four-note collection.

texture

The density of and interaction between voices in a work.

third inversion

A triadic harmony with the chordal seventh in the bass.

through-composed

An attribute of a musical form where no sections of music return. Similar motivic material may be present in different sections, but the sections would each be considered distinct.

tie

Connects two or more notes of the same pitch; notes after the initial one are not rearticulated.

tight-knit

A perceived characteristic of music that is created by conventional theme types, harmonic stability, symmetrical groupings, and consistent motivic material.

time signature

An indication of meter in Western music notation, often made up of two numbers stacked vertically.

timeline notation

A contemporary metric technique that uses seconds as the measure of time, rather than traditional bar lines and meters.

Toms

Drums of various sizes (diameters of 10–16” are most common), similar to the snare drum but with deeper bodies and lacking the snares. They have a more focused pitch fundamental than the snare and are higher-pitched than the kick. There are often three toms on a drum kit, with pitches that are low, middle, and high. The pitch can be a more or less prominent feature of the toms’ sound.

tonal

An adjective used to describe music that adheres to the Western system of functional harmony.

tonal ambiguity

A property of certain chord progressions, where the progression does not inherently imply a single chord as the tonic chord.

tonal answer

An imitative repetition of a subject that is not an exact transposition of the subject (that is, a real answer) but modifies the intervals to fit within the same key as the original subject. A common modification is to change a perfect fifth do–sol (1–5) in the subject to a perfect fourth sol–do (5–1) in the answer. The term "tonal answer" refers to the fact that this preserves the tonal relationships (e.g., between do and sol) instead of preserving intervallic relationships.

tone cluster

A chord composed entirely of seconds (major or minor), rather than thirds or any larger interval.

tonic

The home note or home chord of a scale, or something with the function of that home note.

tonic function

A category of chords that sound stable, providing a sense of home or center. The I chord is the paradigmatic tonic-function chord, but vi and iii occasionally have tonic function.

tonicization

The process by which a non-tonic triad is made to sound like a temporary tonic. It involves the use of secondary dominant or leading-tone chords.

transition

A section of music that functions to connect two thematic sections, especially where the upcoming section is not the initiation of a large-scale return.

transposition

The act of moving pitch content by a certain interval.

treatment of the chordal seventh

In strict four-voice writing:

- 1) Approach the chordal seventh by step or common tone
- 2) Resolve the chordal seventh down by step

Reminder: the chordal seventh is different from the leading tone.

treble clef

As a "G" clef, the treble clef designates the second-lowest line of a staff as G₄ by curling around it.

tresillo

A division of a rhythmic unit (one beat, two beats, one measure, etc.) into three almost-equal groups, in a 3+3+2 pattern: for example, dividing a half note into two dotted eighth notes and an eighth note.

triad

A three-note chord whose pitch classes can be arranged as thirds.

trichord

A collection of three notes.

triple meter

A meter with three beats per measure.

triplet

A tuplet that involves dividing a beat in simple meter into three parts.

tritone

An augmented fourth or diminished fifth. The name reflects that the two notes of a tritone are three (tri-) whole steps (tones) apart.

tuplet

A rhythm that involves dividing the beat into a different number of subdivisions from that usually implied by the time signature.

turn

An embellishment that indicates to decorate a note with its upper and lower neighbor, in that order. (The opposite order would be an "inverted" turn.) For example, a turn on C would be performed C–D–C–B–C. This embellishment is a specific kind of double neighbor.

turnaround

The use of a non-tonic chord (usually dominant) at the end of a harmonically closed unit to transition into the beginning of the following on-tonic unit. In jazz, the term "turnaround" often refers to the progression vi–ii–V–I. The exact qualities of these chords are highly variable, and one or more of the chords may be substituted with a different, related chord.

typical four-part writing procedure

1. Write the entire bass
2. Write the entire soprano to make a smooth melody that interacts well with the bass. Choose active notes for the soprano above dominant-function chords, and remember you do not always need to write left to right.
3. Write the inner voices by asking, "What notes do I already have? What notes do I still need? Considering spacing and resolution, what note placement would give me the smoothest motion?"

unit

A segment of music that expresses whatever the prevailing higher-level grouping expresses. For example, if a unit is contained within a continuation, it expresses continuation function. We often apply the term "unit" to ideas that aren't easily categorized using terms such as basic idea, contrasting idea, or cadential idea.

unordered pitch intervals

The distance between two pitches, measured in semitones. For example, C₄ to E₅ would be an unordered pitch interval of 16.

unvoiced

Spelling chords stacked in thirds or in closed position, within a single staff, usually for abstract or theoretical purposes, rather than for performance.

upbeat

The last beat of a measure which is conducted with an upward motion.

verse

Sections that are lyric-variant and often contain lyrics that advance the narrative.

verse-chorus form

The most common form of pop songs today, consisting of lyric-variant verses and lyric- and music-invariant choruses that deliver the primary narrative material of the song.

voice (musical line)

An independent, monophonic part within a piece of music (instrumental or vocal). Each voice may be played by a different instrument, or multiple voices may be played by one instrument (especially in polyphonic instruments like keyboard or guitar).

voice crossing

When a higher voice part moves below a lower voice part. In strict SATB style, the ranges of voices should not cross; the soprano must always be higher than the alto, the alto must always be higher than the tenor, and the tenor must be higher than the bass.

voice leading

The way a specific voice within a larger texture moves when the harmonies change. For example, in a choir with four parts, soprano/alto/tenor/bass, one might discuss the voice leading in the tenor part as the entire choir moves from I to V.

voice overlap

In a multi-voice texture, when one voice leaps beyond the previous note in another voice.

voicing

Distribution of notes in a chord into idiomatic registers for performance.

wavelength

The distance between two peaks of a sound wave.

Western

Related to European or American culture.

whole note

A note value that lasts the duration of two half notes. Notation: ♩.

whole rest

A type of rest that lasts the duration of two half rests. Notation: 

whole step

An interval equal to two half steps

whole-tone collection

A pitch collection composed entirely of whole steps. There are six whole steps in a whole tone collection, and there are only two possible whole tone scales: C–D–E–F $\sharp$ –G $\sharp$ –A $\sharp$, or C $\sharp$ –D $\sharp$ –E $\sharp$ –F–G–A–B.

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