compact sets 1–3

for string trio

in memoriam Larry Polansky

written for Alex Bruck, Aleida Pérez, and Natalia Pérez Turner

michael winter
(cdmx and schloss solitude; 2024)

notes **1**

compact sets 1 - in the beginning/b'rey'sheet **3**

compact sets 2 - everything in between **13**

compact sets 3 - rise/yitgadal **24**

Description (which can optionally be used/adapted as a program note)

compact sets 1–3 are written in memory of my dear friend, composer Larry Polansky, who passed away on May 9th, 2024. The first piece of the set, *in the beginning/b'rey'sheet* is based on a Jewish Hebrew cantillation of a Torah passage, *B'rey'sheet*, which Polansky set in his seminal electronic work of the same name. The second two pieces, *everything in between* and *rise/yitgadal* are random walks in an extended just intonation system such that chords are not repeated to the extent possible.

The musical processes realized in *compact sets 1–3* explore a reexamination of the traditional concept of 'voice leading': how individual melodic lines create and maintain harmonies in aggregate while sometimes modulating. However, this musical question is recontextualized in a phenomenological framework called *just-intonation* in *harmonic space*. In just-intonation, whole number ratios express the frequency relationship between pitches. The resulting musical scales are untempered. They do not favor the accuracy of one interval over another such as with different well- and equal-temperaments, which prioritize and sacrifice the accuracy of different intervals for key cyclicness.

Traditionally, distance between pitches is typically measured in terms of subjective height expressed in units of semitones or cents (100th of a tempered semitone). This particular concept of a musical space can be referred to as pitch (or melodic) space. In contrast, distance in harmonic space is measured as a complexity function on the frequency ratio between two tones: the smaller the quantity and size of the prime factors needed to express the numbers in the frequency ratio, the closer they are in harmonic space and relatively easier to tune. For example, the perfect 5th (a frequency ratio of 3/2) is one of the closest intervals in harmonic space but relatively far (7 semitones) in pitch space. On the contrary, smaller melodic and chromatic differences/movements in pitch space are often distant in harmonic space. This gives rise to several vexing musical questions. How is it possible to reconcile these two very different, well-defined measures of distance? How can one tune stepwise movement in pitch space when the relationship between two tones may actually be distant in harmonic space? How can one modulate in harmonic space as the space is by definition acyclic?

In *compact sets 1–3*, these problems are explored using a custom software program that maintains 'compact sets' (consonant groups of tones) in harmonic space among any simultaneously sounding tones, but favors smaller steps in pitch space when one voice moves melodically. A compact set is defined as a group of notes such that each note in the group is close in harmonic space to some other note in the group, but not necessarily all of them. When one voice moves melodically, the program will favor notes that move by a smaller step in pitch space within a voice while modulating/transitioning to another compact set among all the voices.

Any individual part would be near impossible to play by itself. However, because compact sets are always maintained, each successive tone within a part can always be tuned via a relatively simple interval in harmonic space to a tone that is already sounding in one of the other instruments.

These pieces would not have been possible without Larry's mentorship nor his significant creative and theoretical contributions to music.

General Remarks

Each of the pieces may be played individually or any subset of the pieces can be played together. If all three pieces are played, *everything in between* should always be played second, but the order of the first and last piece can be determined by the ensemble. Optionally, during the beginning of *rise/yitgadal*, someone can chant the Jewish Mourner's Kaddish.

Tuning

Each written note indicates the closest pitch in twelve-tone equal temperament with a cents-deviation (100th of a tempered semitone) provided above.

As explained in the description above, the note-to-note melodic movement may be very complex. However, each note can always be tuned via a relatively simple interval from a note that is currently sounding or has recently terminated in one of the other parts. For the purposes of the following explanation, the current note will be referred to as the *referencing note* and the pitch against which it can be tuned will be called the *reference pitch*.

A Roman numerals below a note indicates the part in which the reference pitch is. The Arabic superscript and the corresponding arrow indicate the exact interval, up or down, of the referencing note from the reference pitch as detailed below. It can be assumed that the reference pitch was initiated before the referencing note and continues to sound unless the reference note is in the same part, which only occurs if it is the same pitch as the prior note within the respective part.

A Roman numeral with a superscript of 1 below a referencing note means that its pitch is an octave equivalent of the reference pitch.

A Roman Numeral with a superscript of 3, 5, 7, 11, or 13 followed by an up arrow indicates that the pitch of the referencing note is a frequency ratio of a 3/2, 5/4, 7/4, 11/8 or 13/8, respectively, from the reference pitch if the reference pitch were transposed to the nearest octave *below* the pitch of the referencing note.

A Roman Numeral with a superscript of 3, 5, 7, 11, or 13 followed by a down arrow indicates that the pitch of the referencing note is a frequency ratio of a 2/3, 4/5, 4/7, 8/11 or 8/13, respectively, from the reference pitch if the reference pitch were transposed to the nearest octave *above* the pitch of the referencing note. That is, the down arrow is the inversion of an up arrow and it could alternatively be understood that the referencing note is a frequency ratio of 4/3, 8/5, 8/7, 16/11, or 16/13, respectively, from the reference pitch if the reference pitch were transposed to the nearest octave *below* the pitch of the referencing note.

Tempo and Dynamics

The scores are written with a 2/2 time signature and should be played at a tempo such that a half note is approximately 60 beats per minute (2 seconds per measure).

All pieces should be played at clear, but not loud, dynamic. In *everything in between* and *rise/yitgadal*, each tone should enter and exit from as soft as possible.

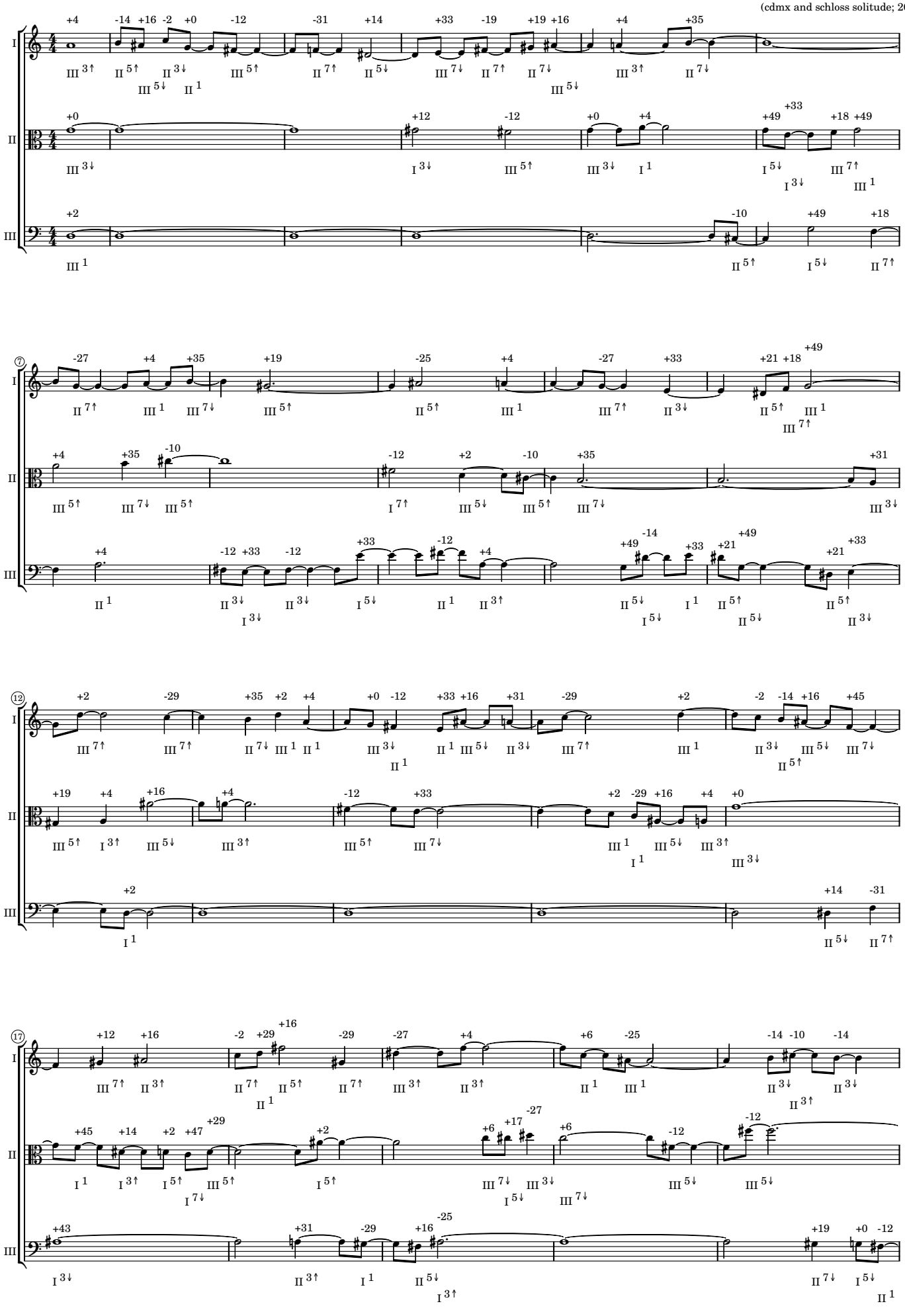
version generated: 2025-01-30

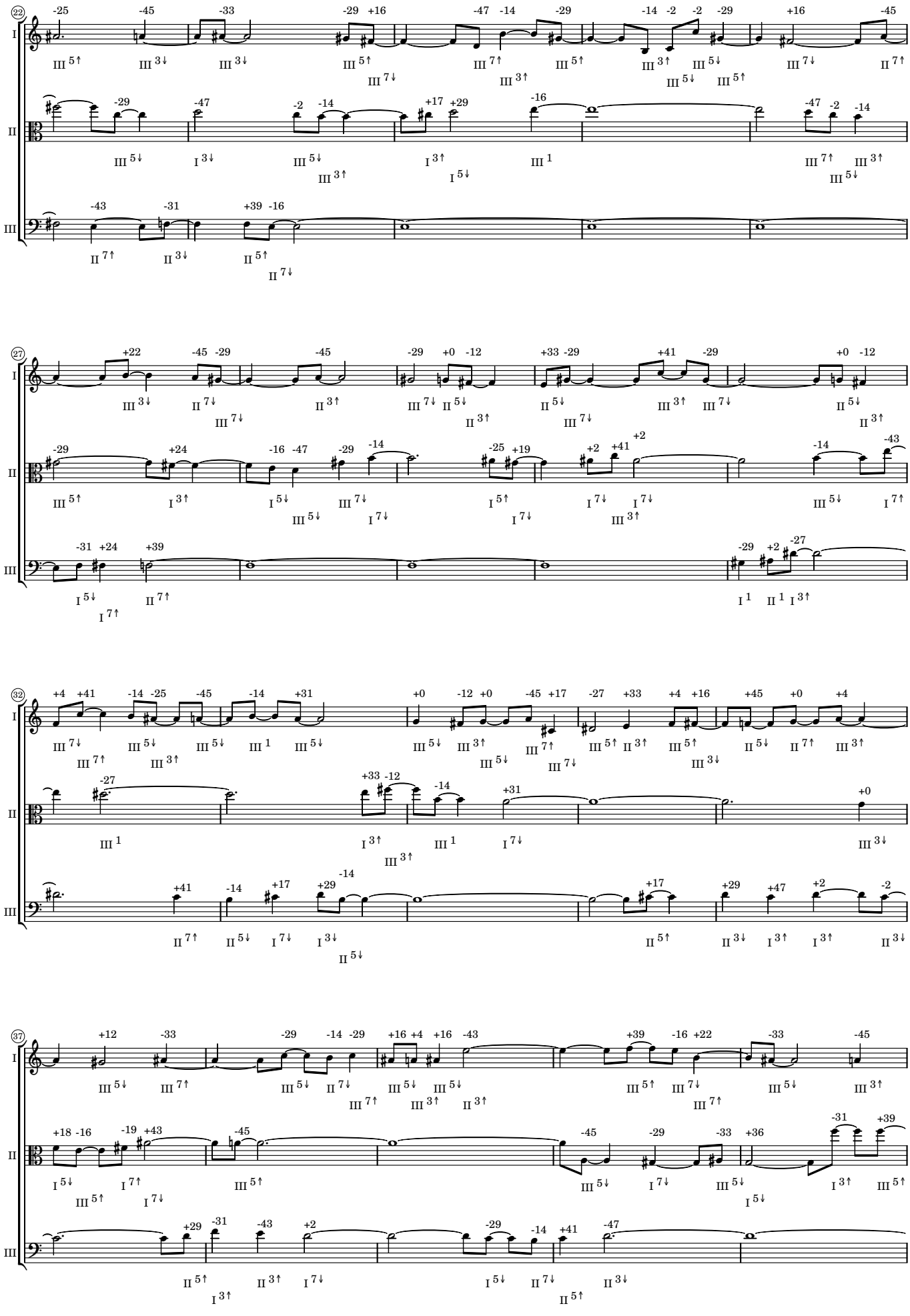
compact sets 1

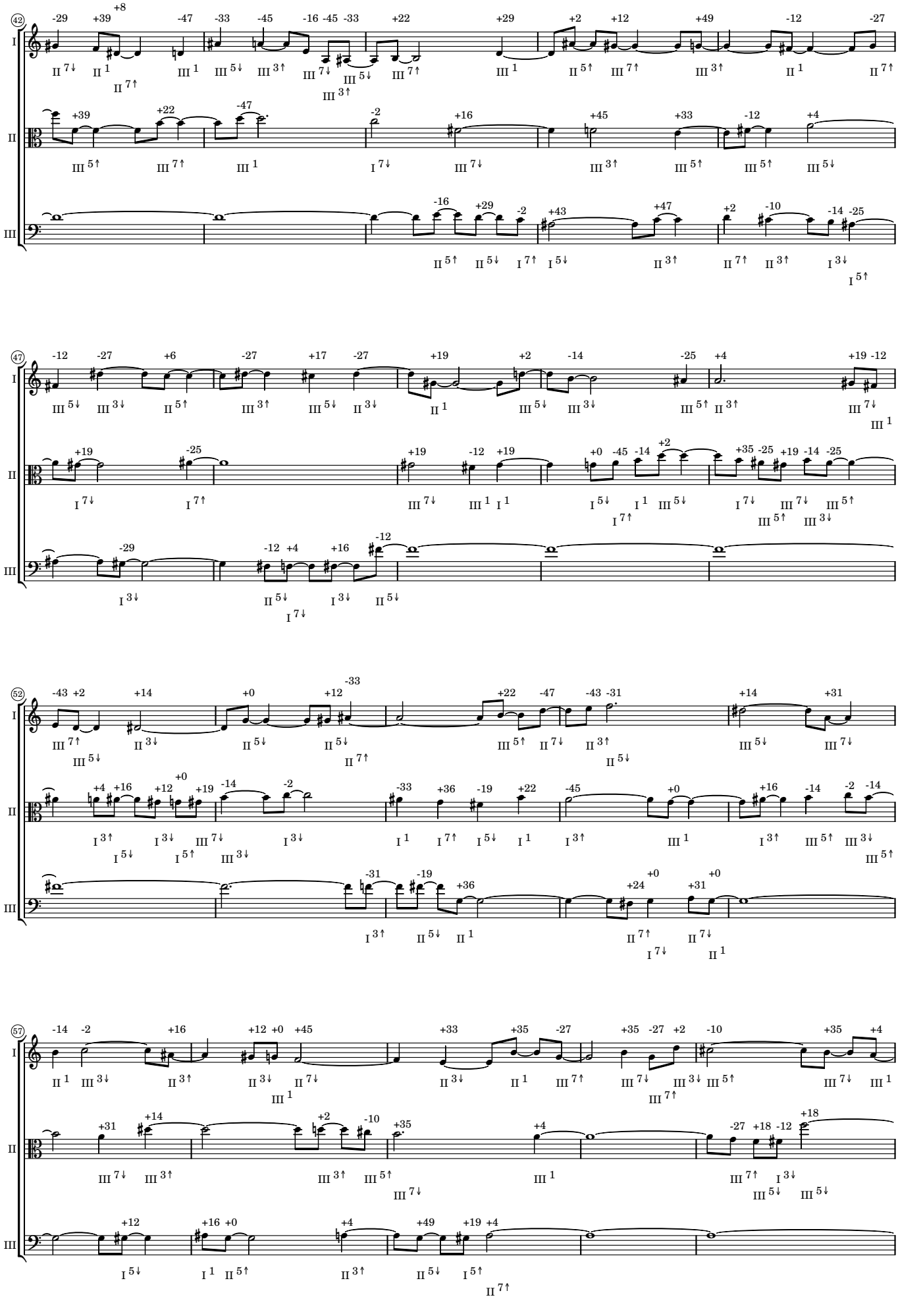
in the beginning/b'rey'sheet

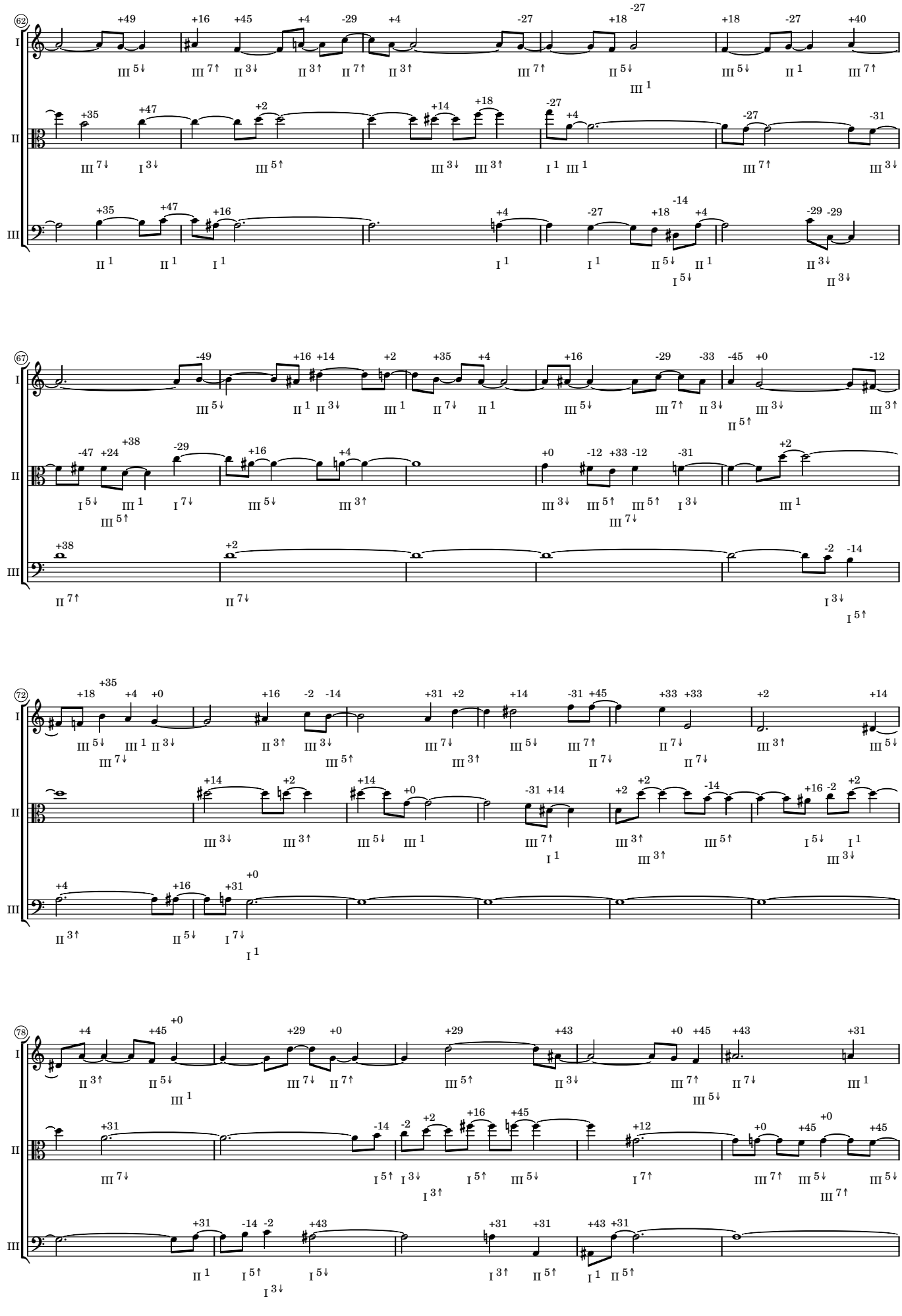
michael winter

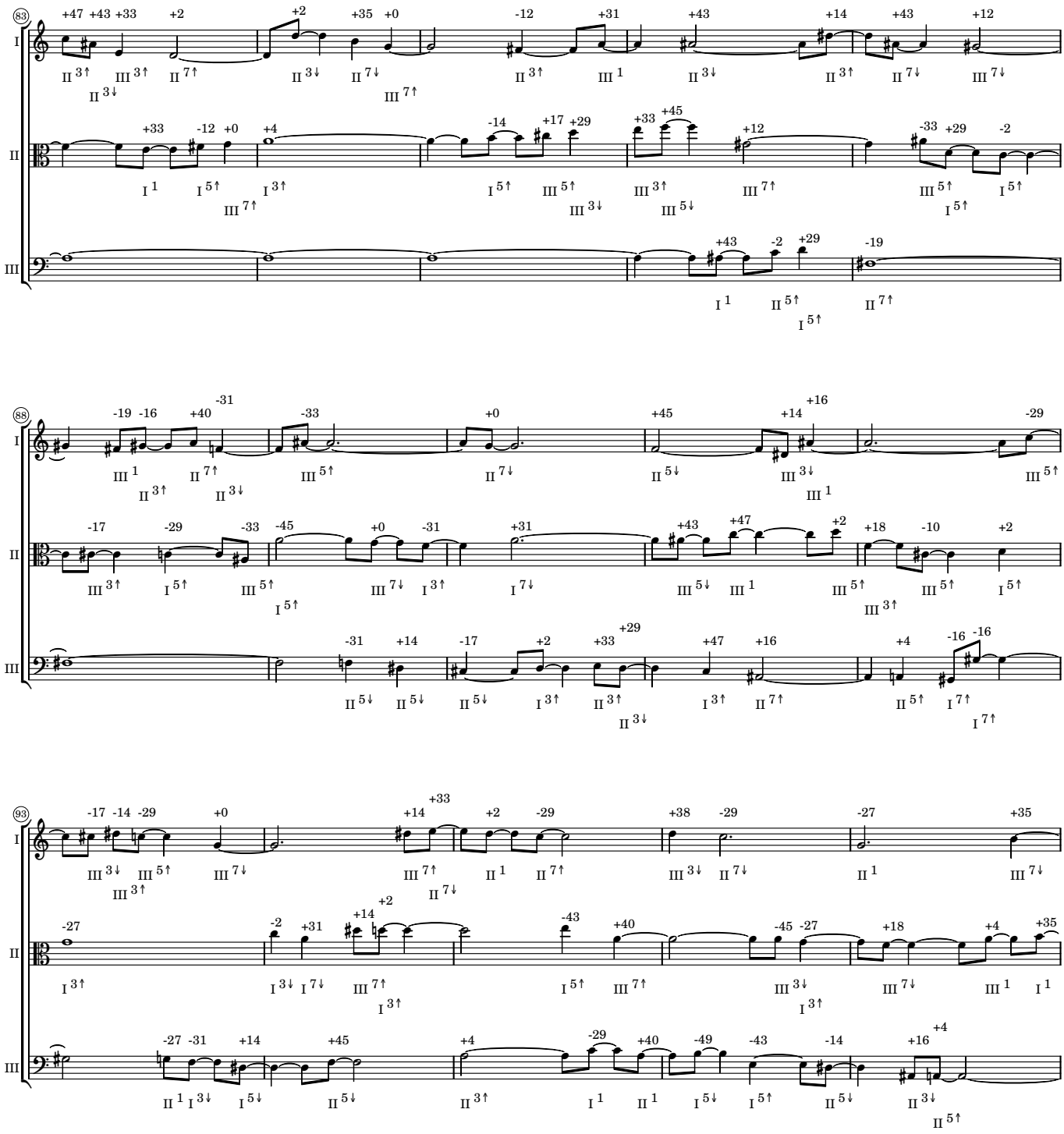
(cdmx and schloss solitude; 2024)







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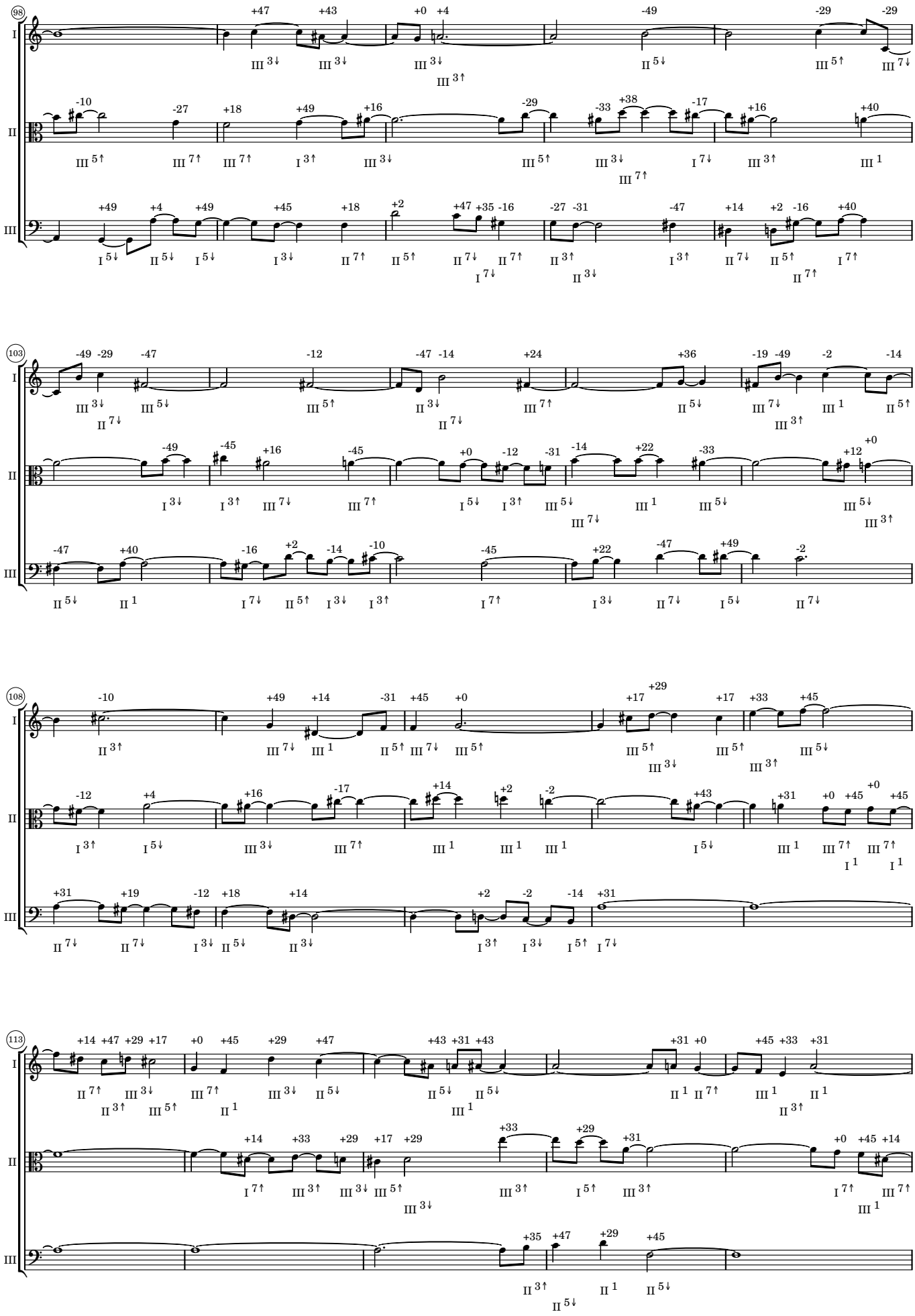

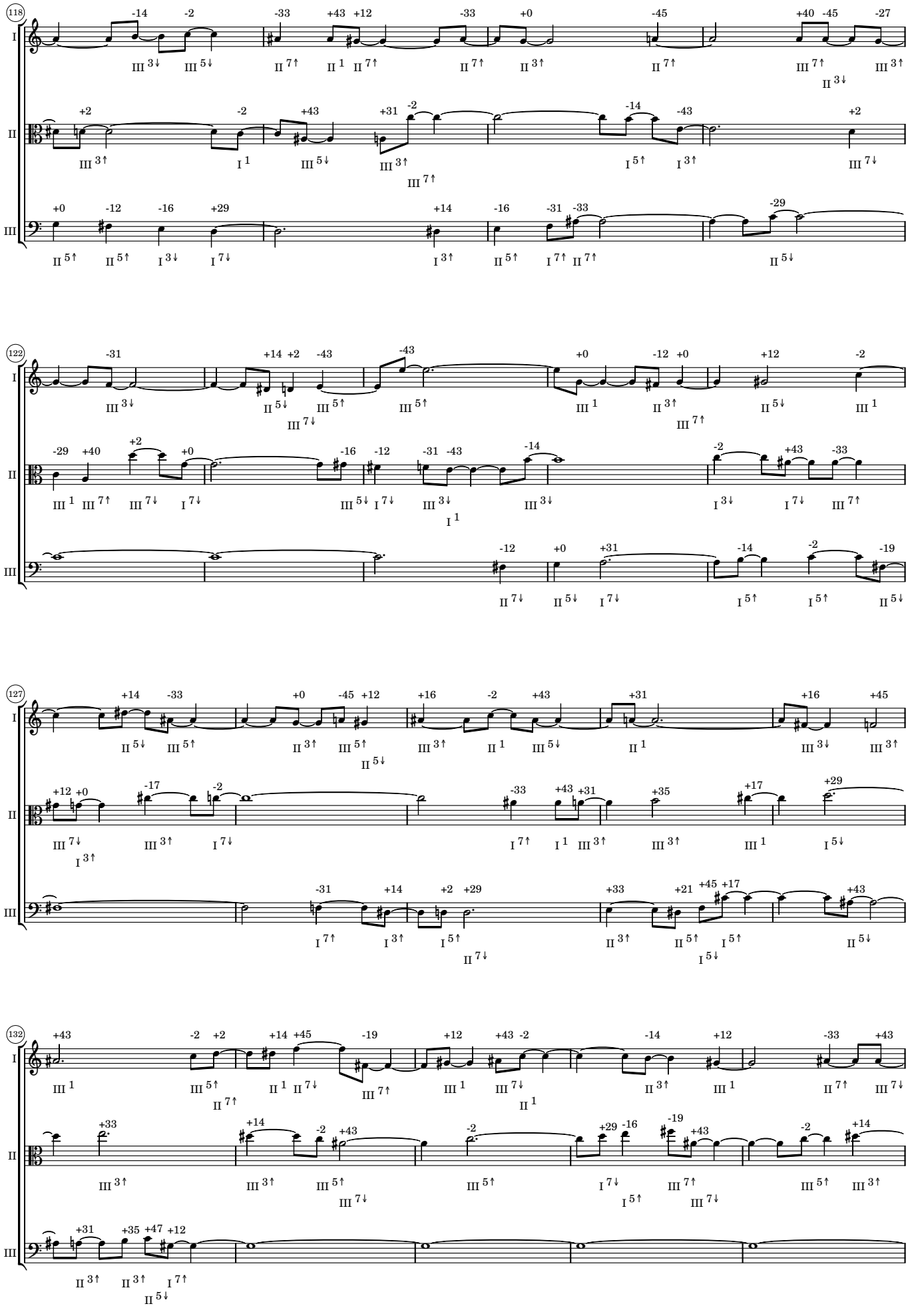

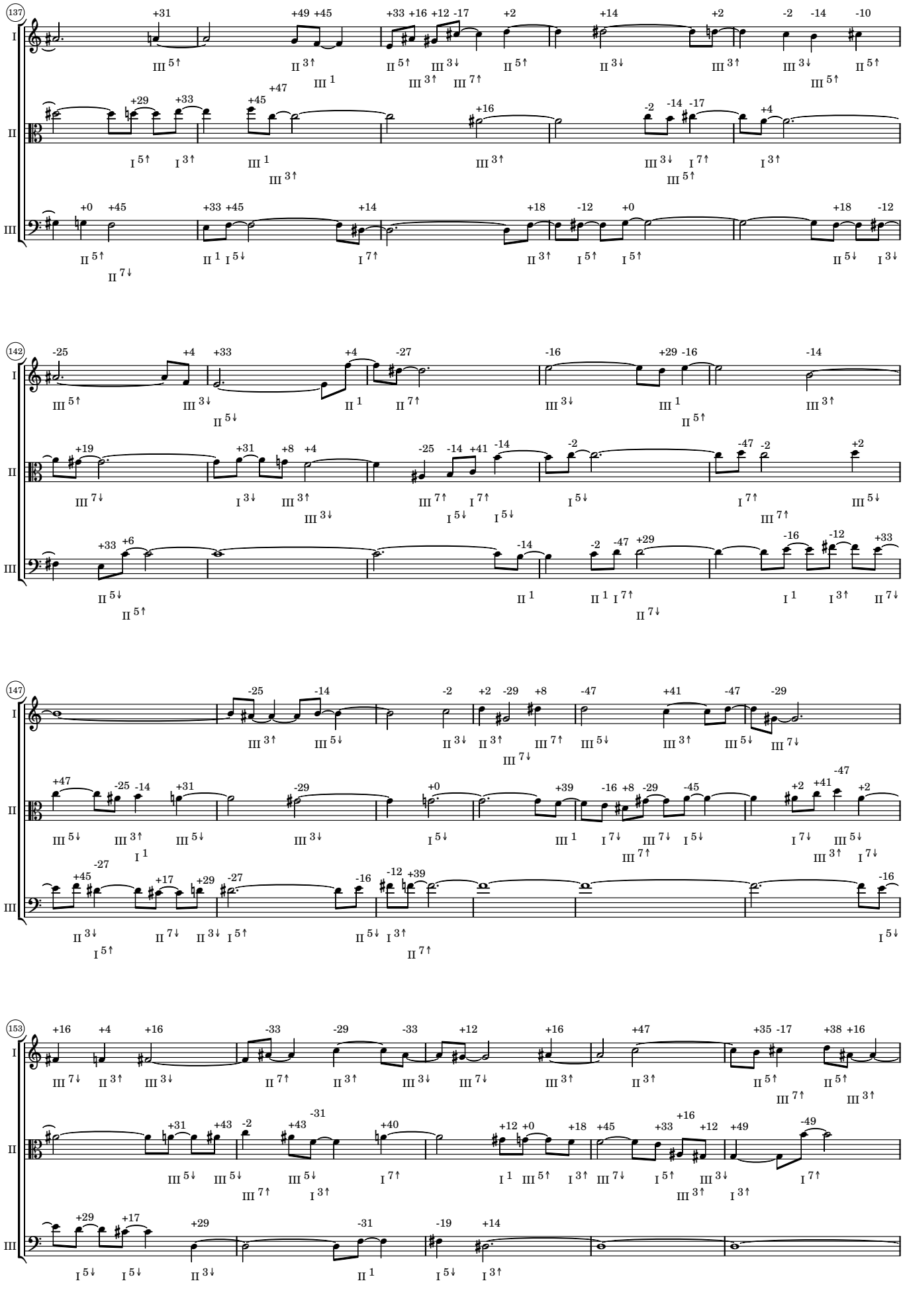
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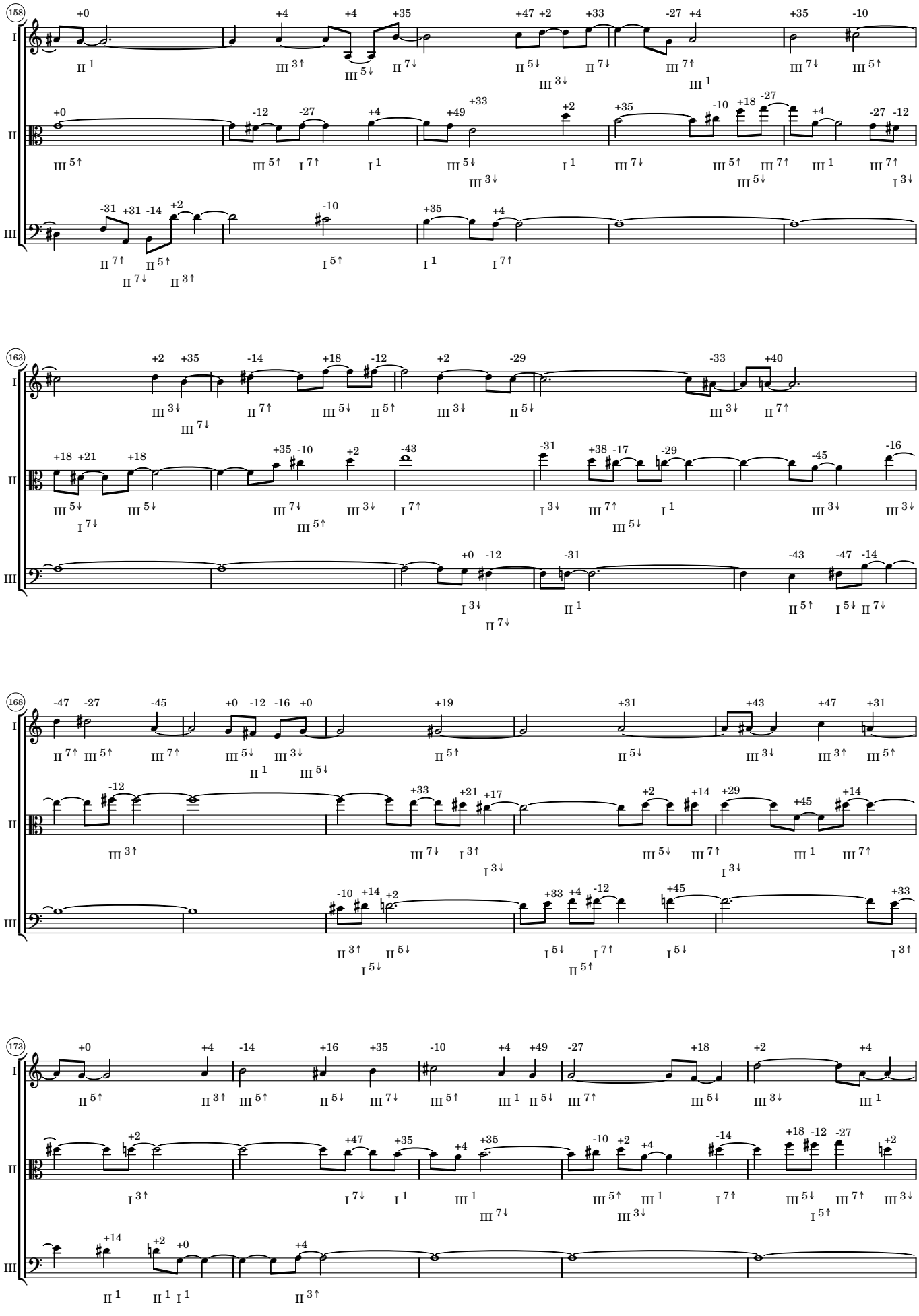

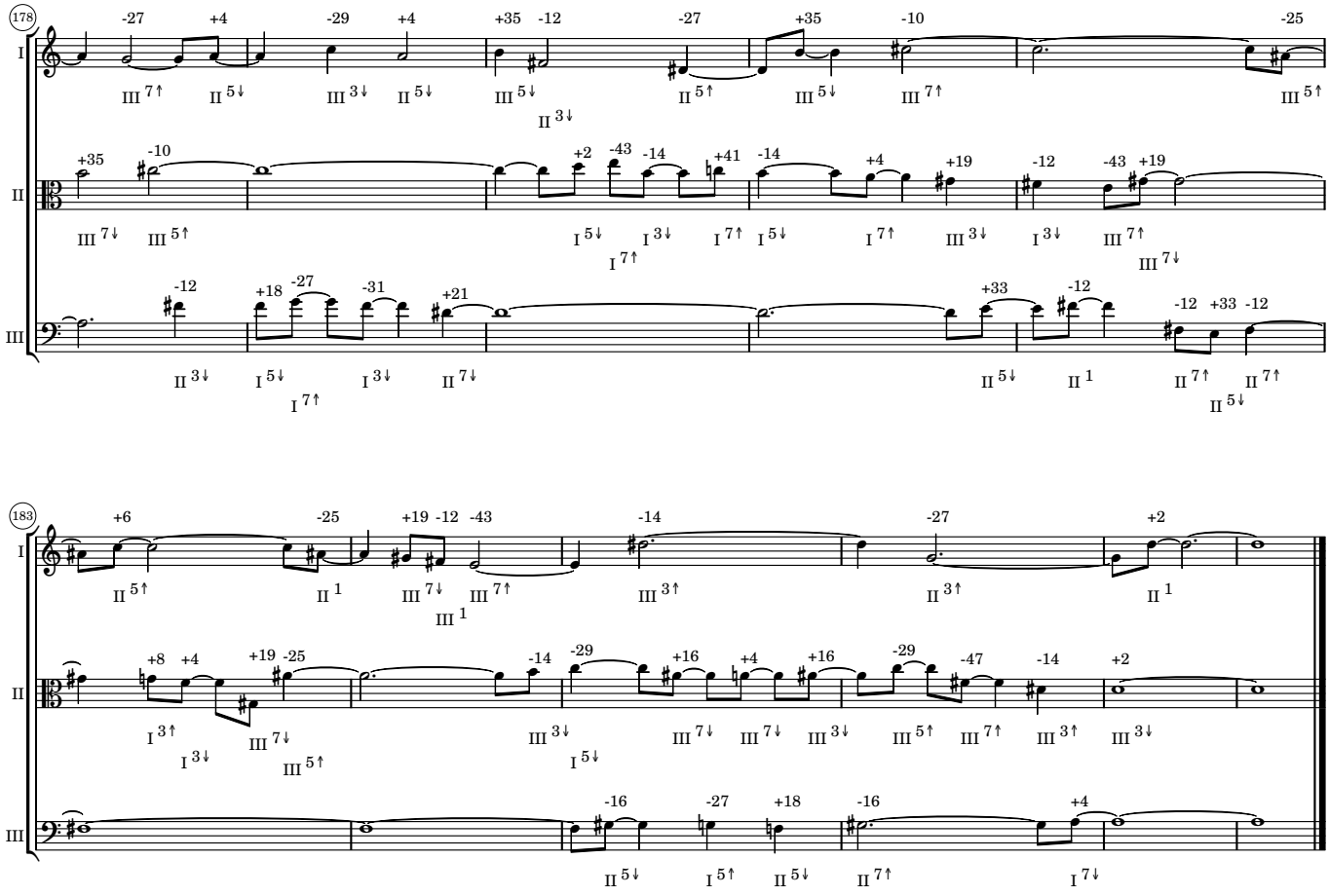
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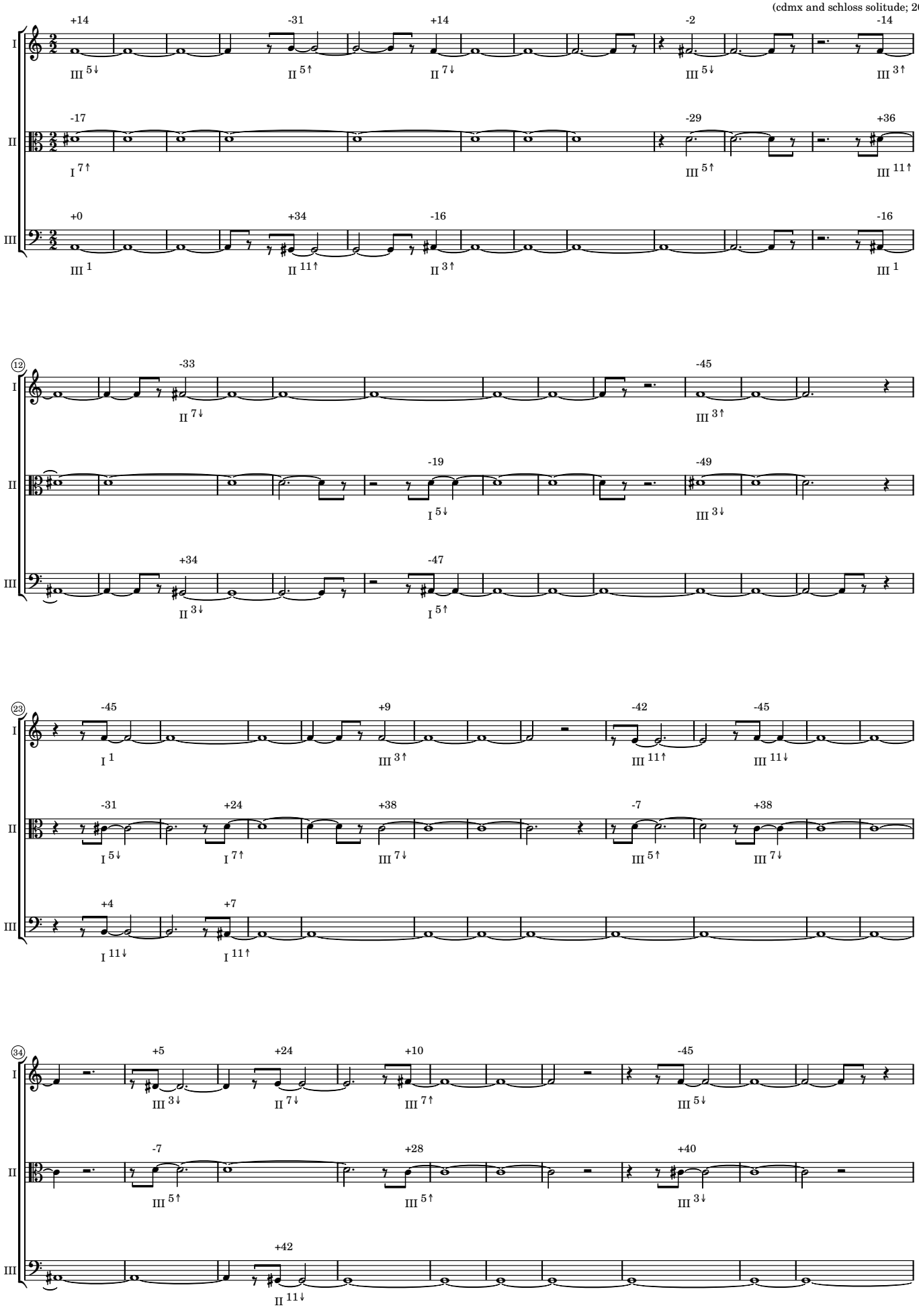
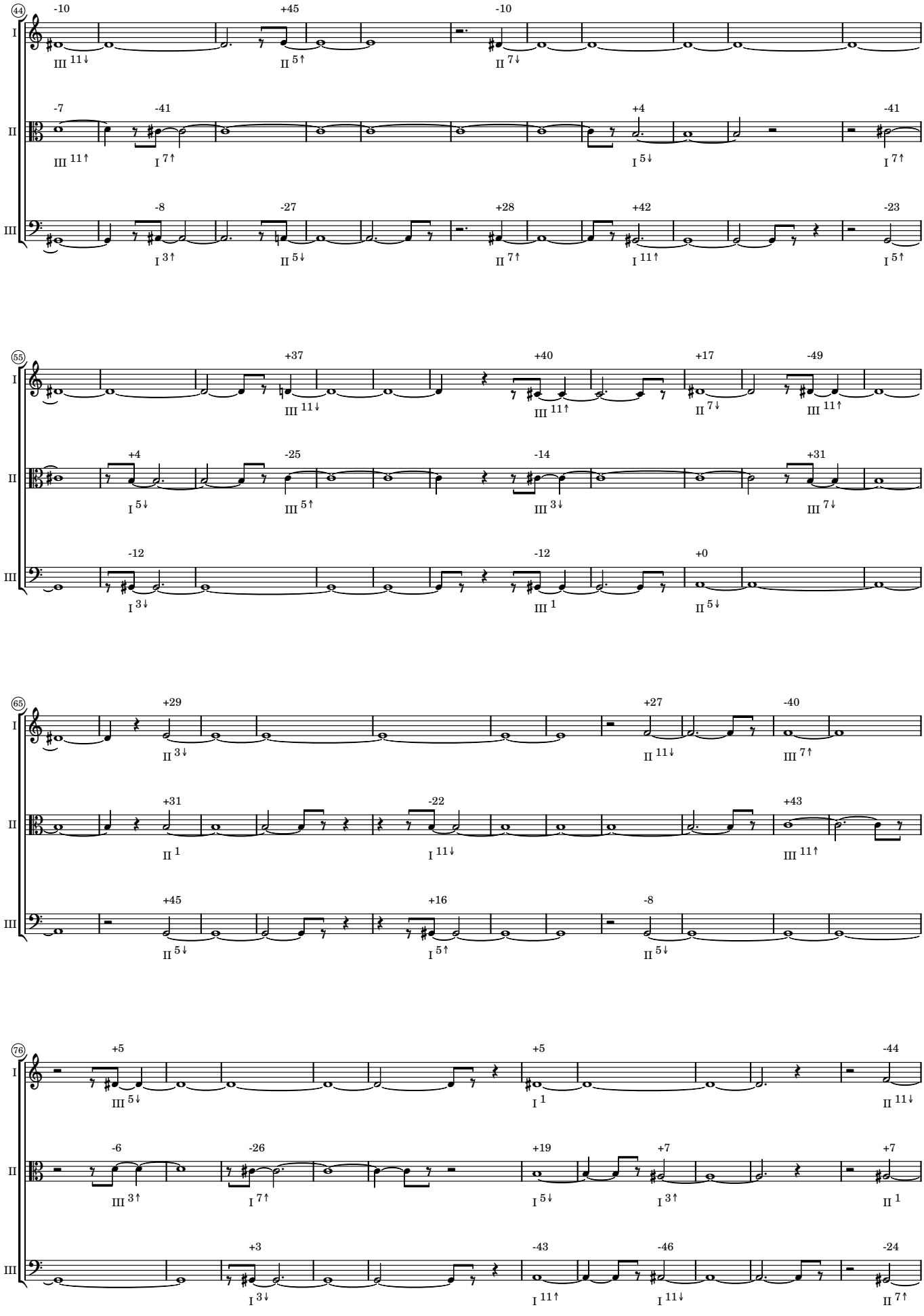
compact sets 2

everything in between

michael winter

(cdmx and schloss solitude; 2024)

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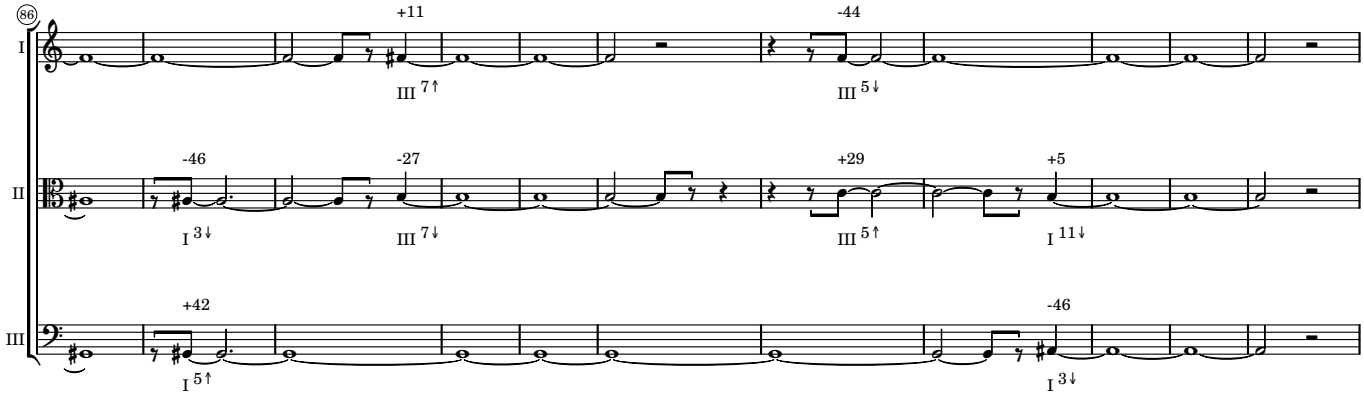
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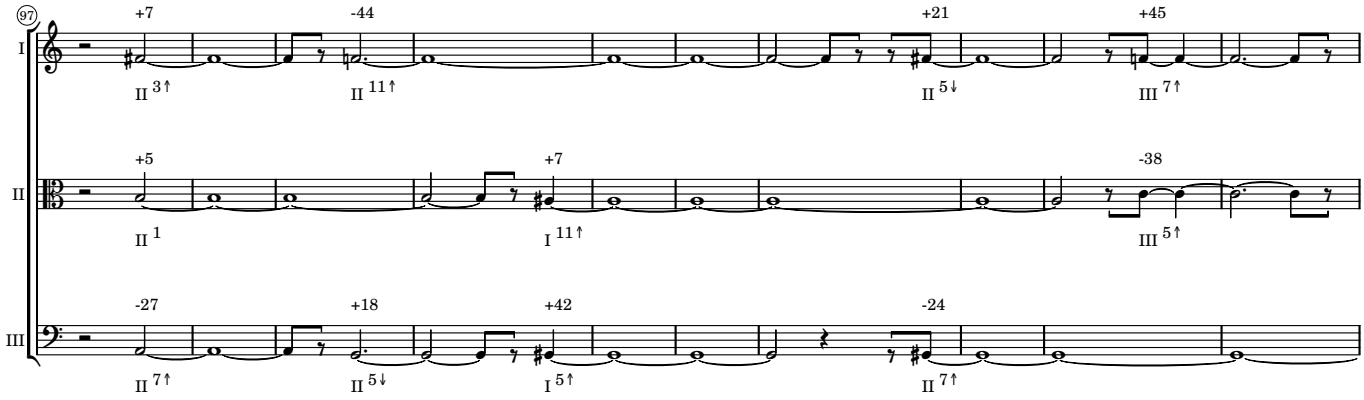
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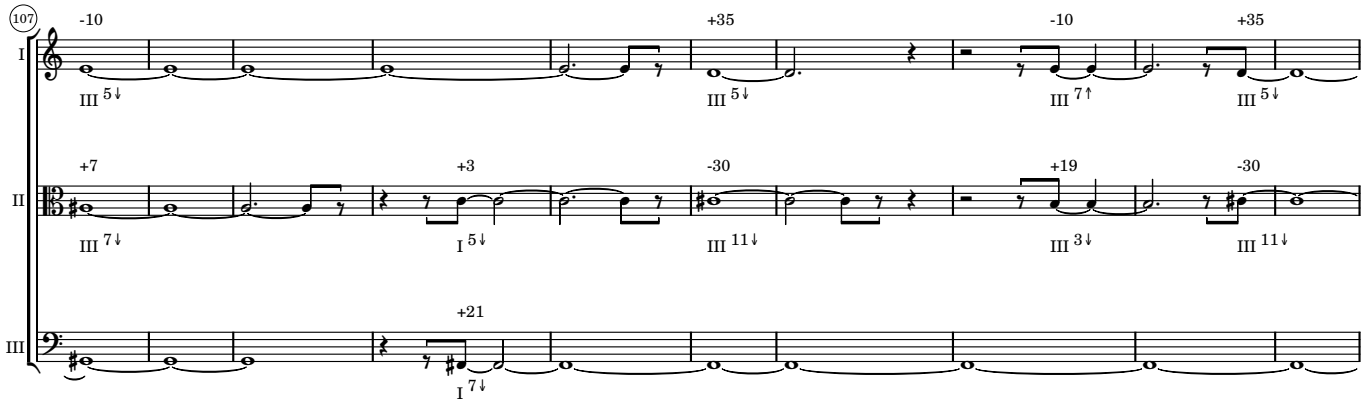
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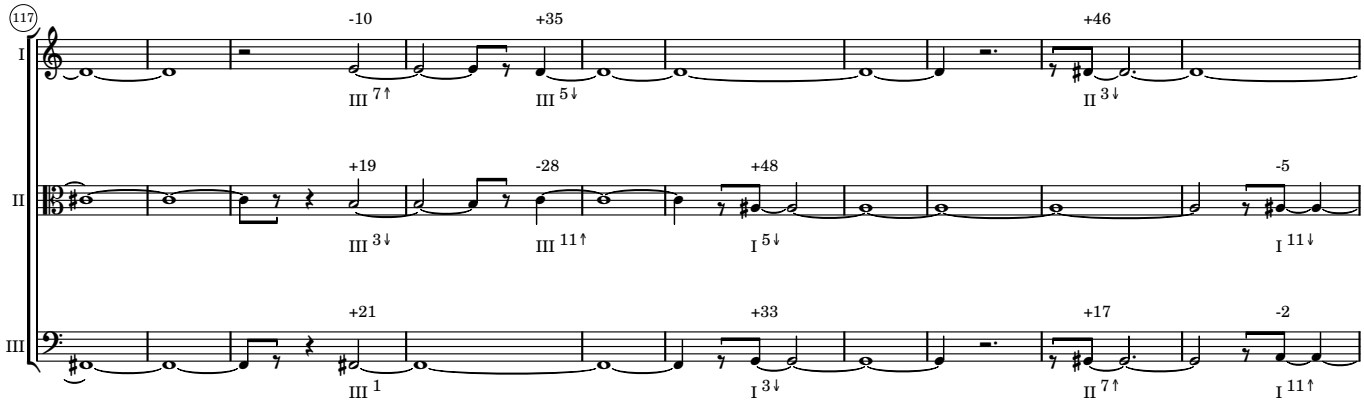
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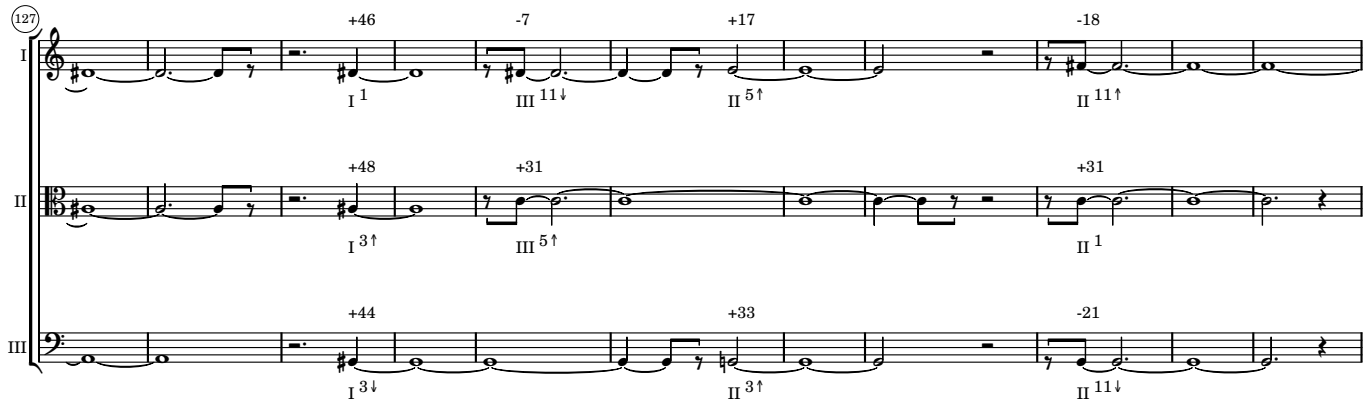
I 11↑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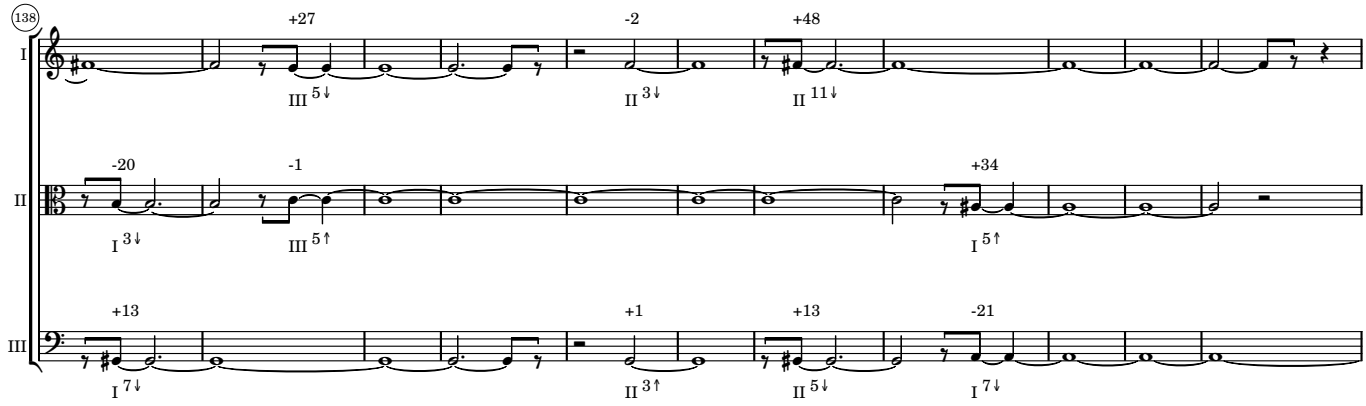
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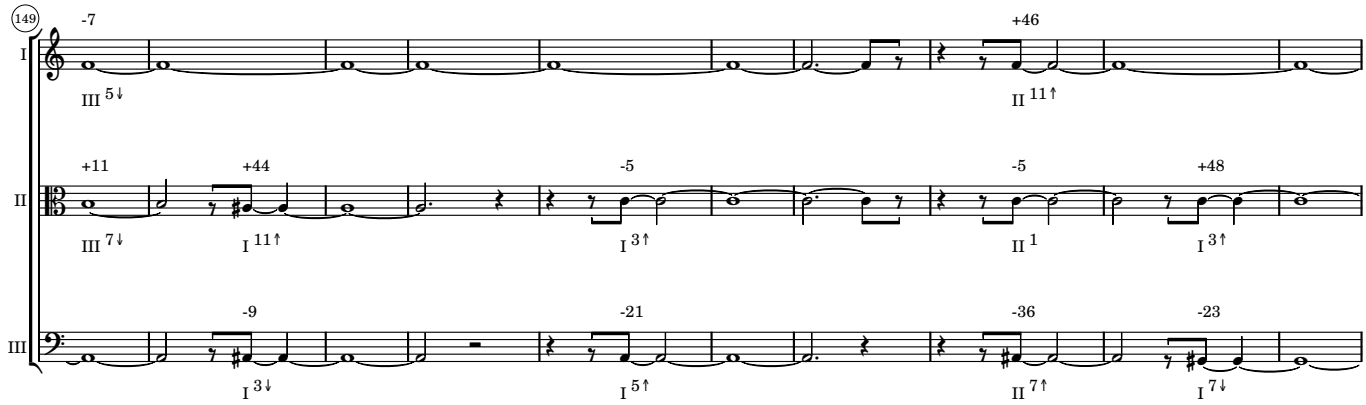
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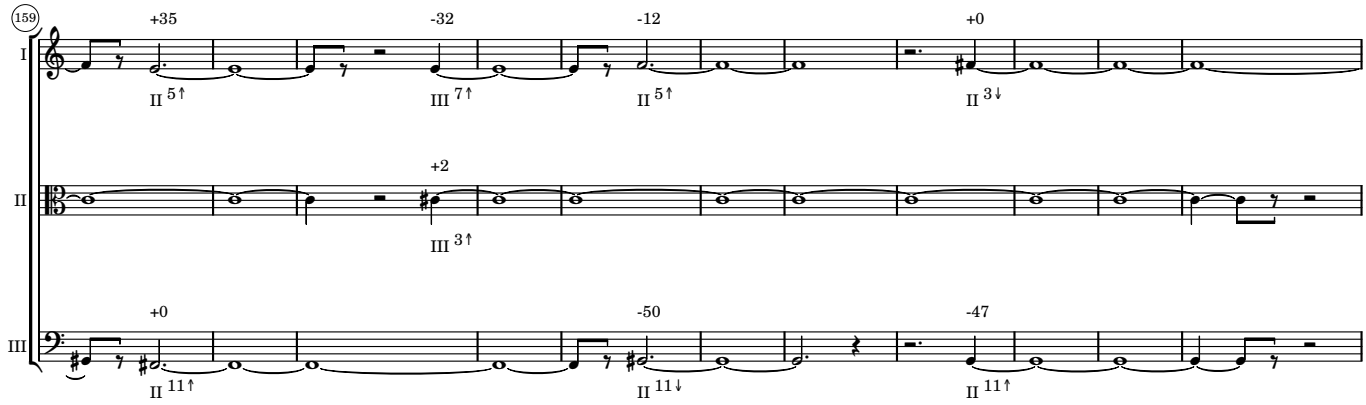
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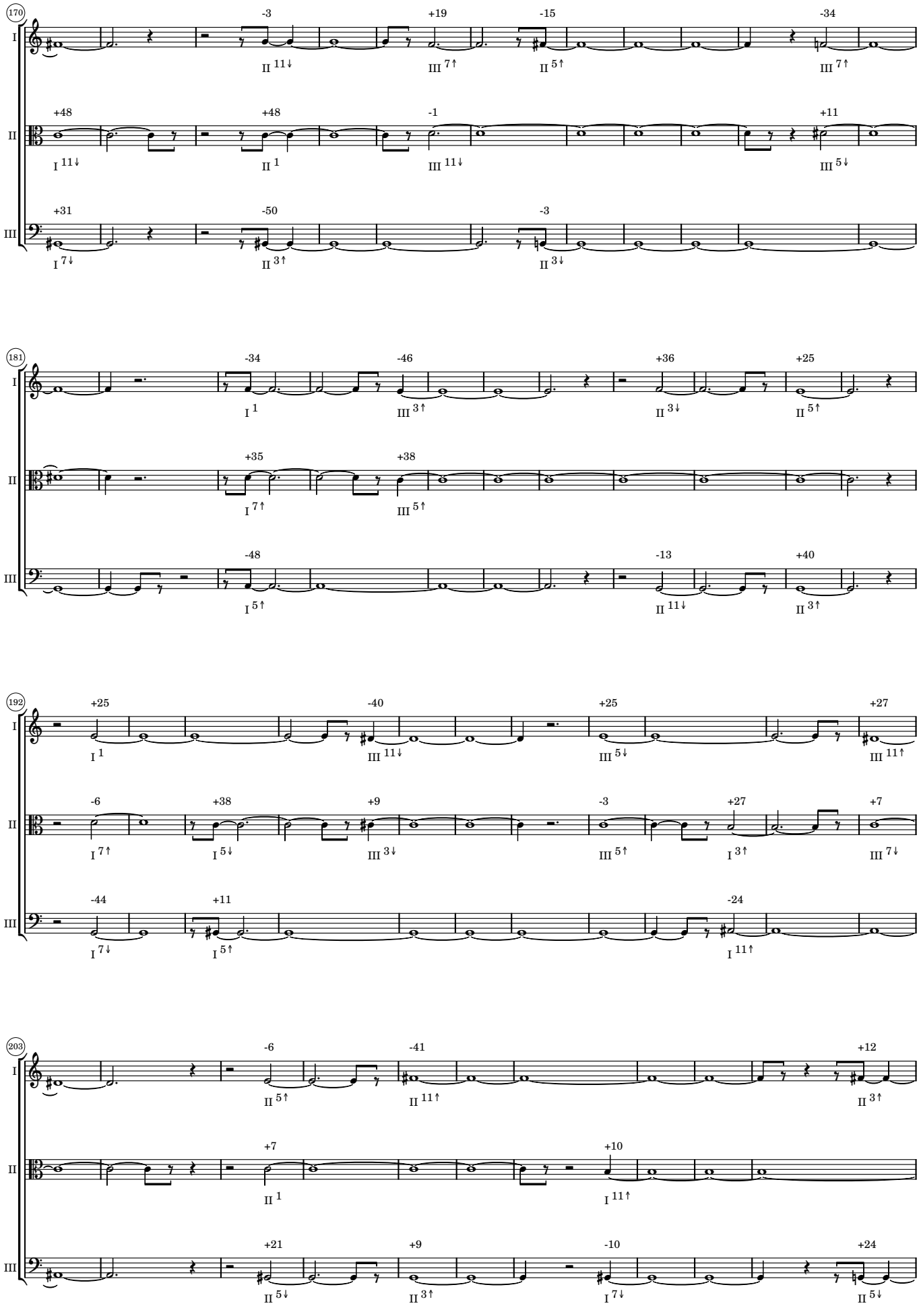
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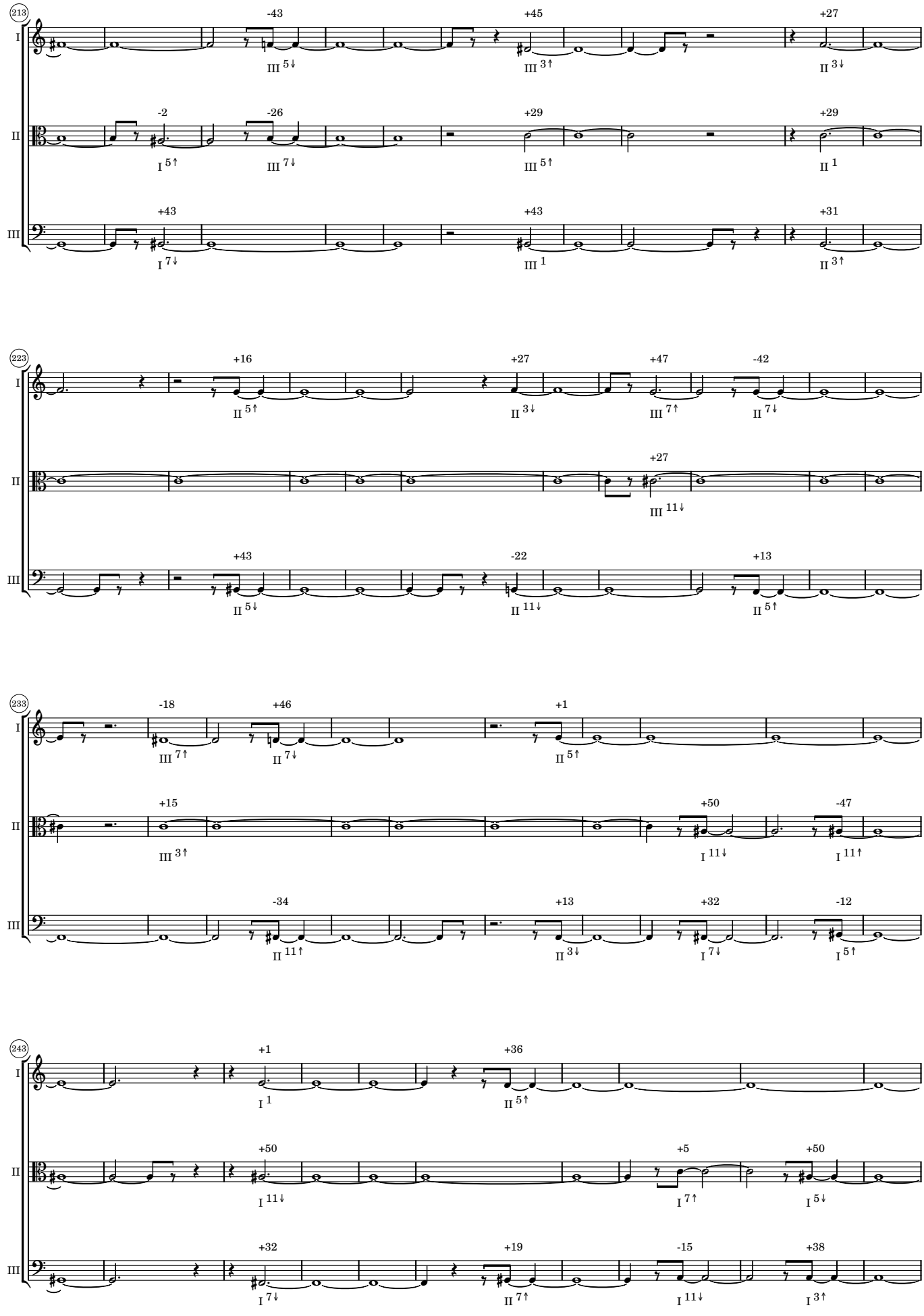
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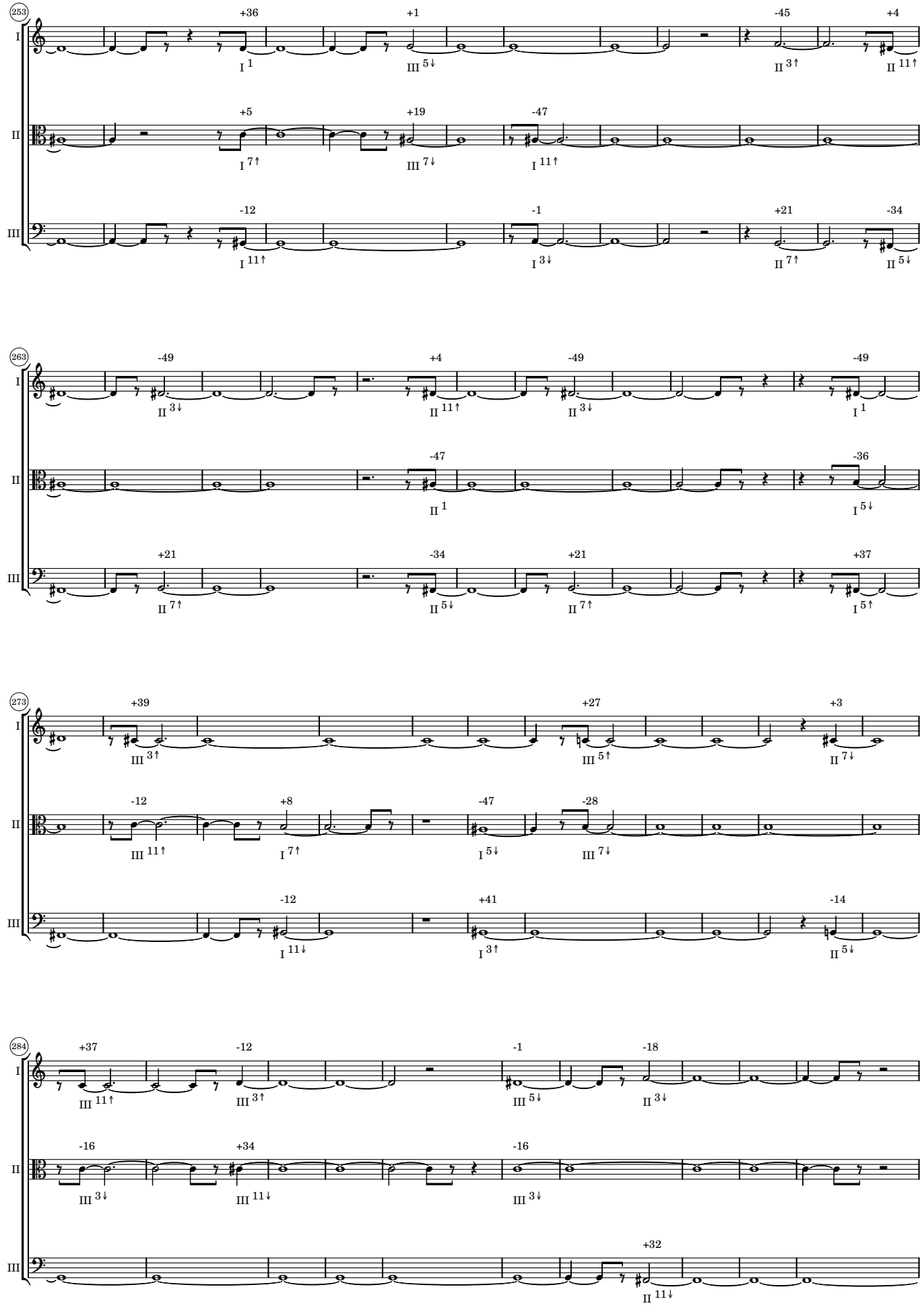
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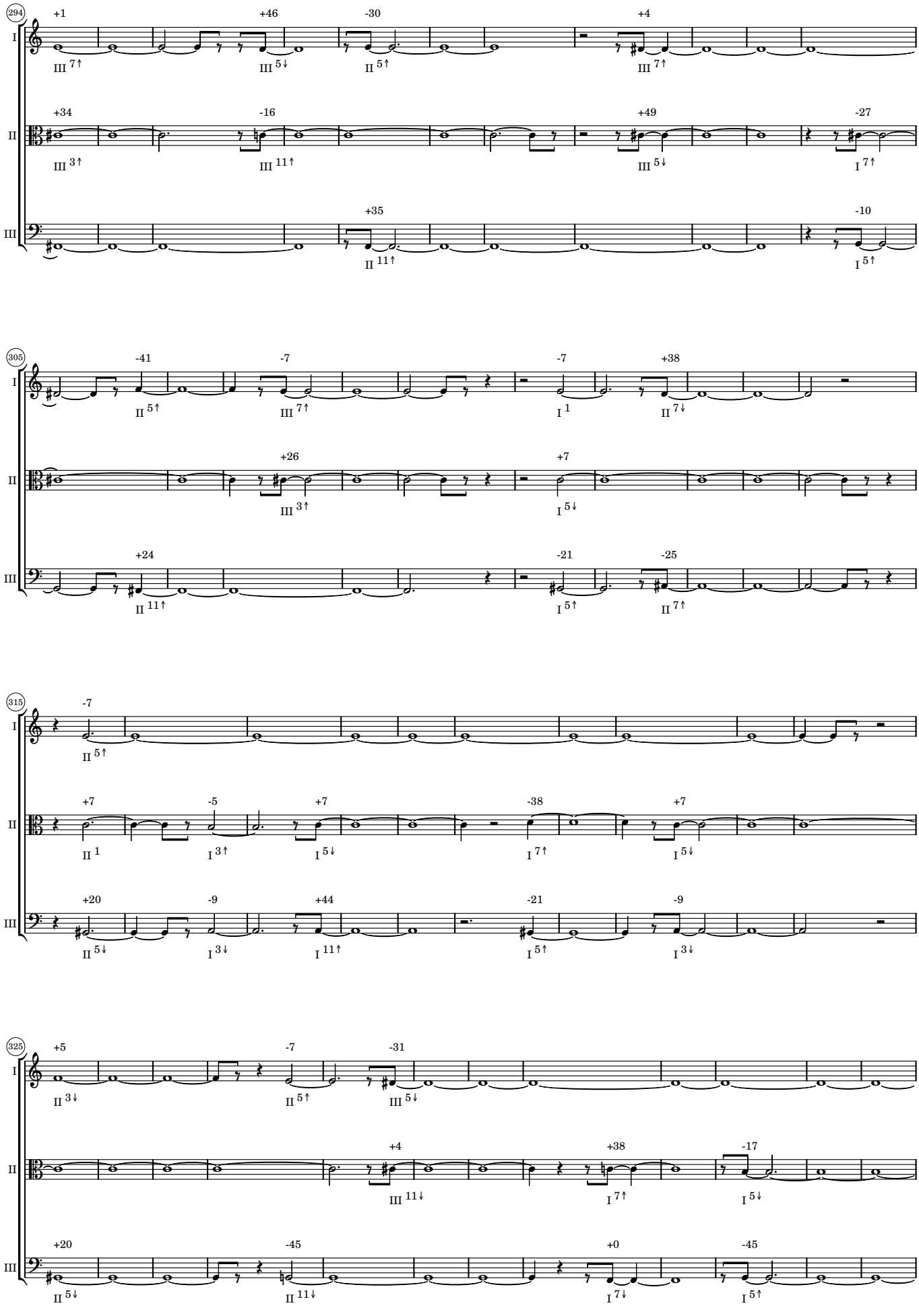
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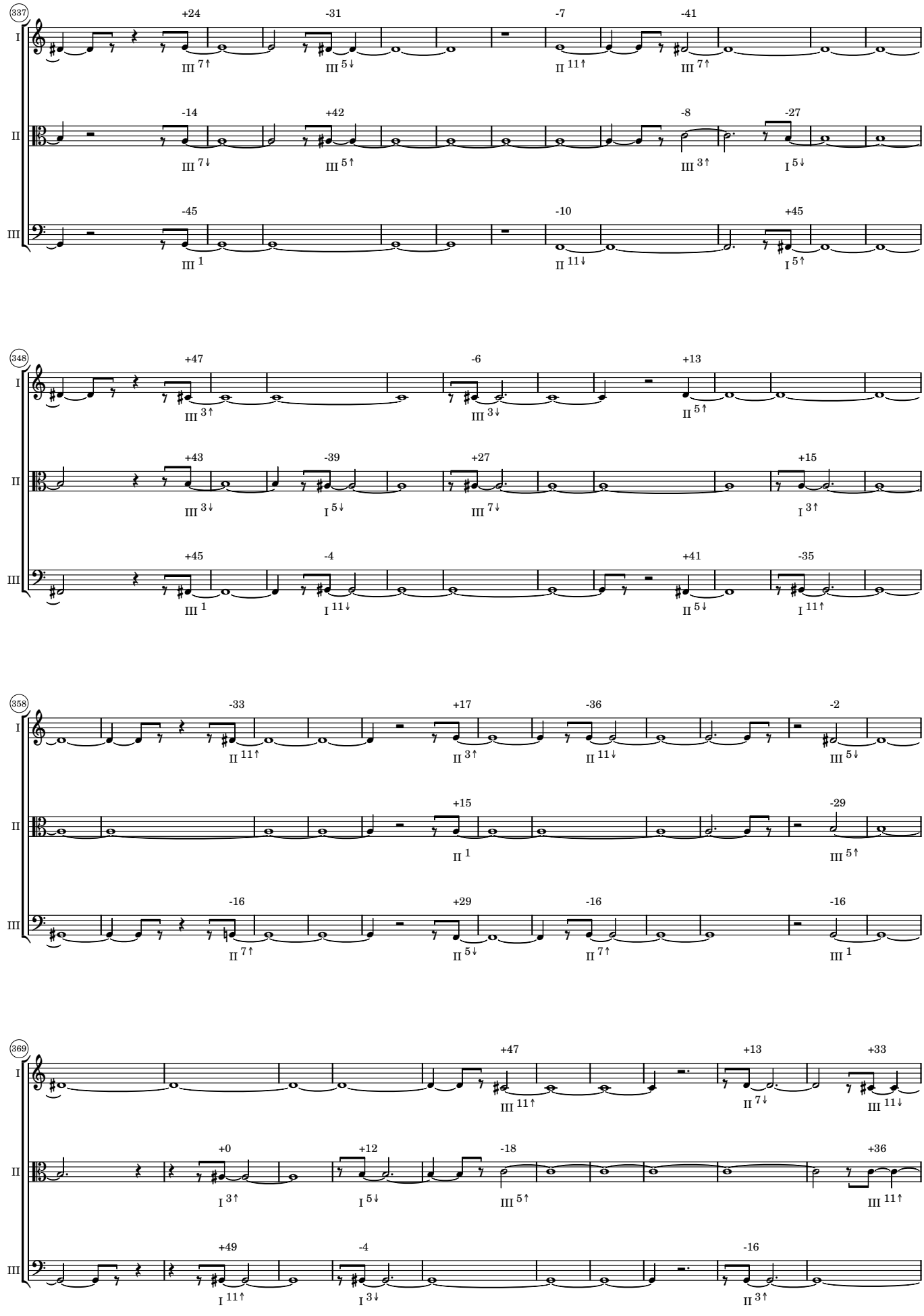
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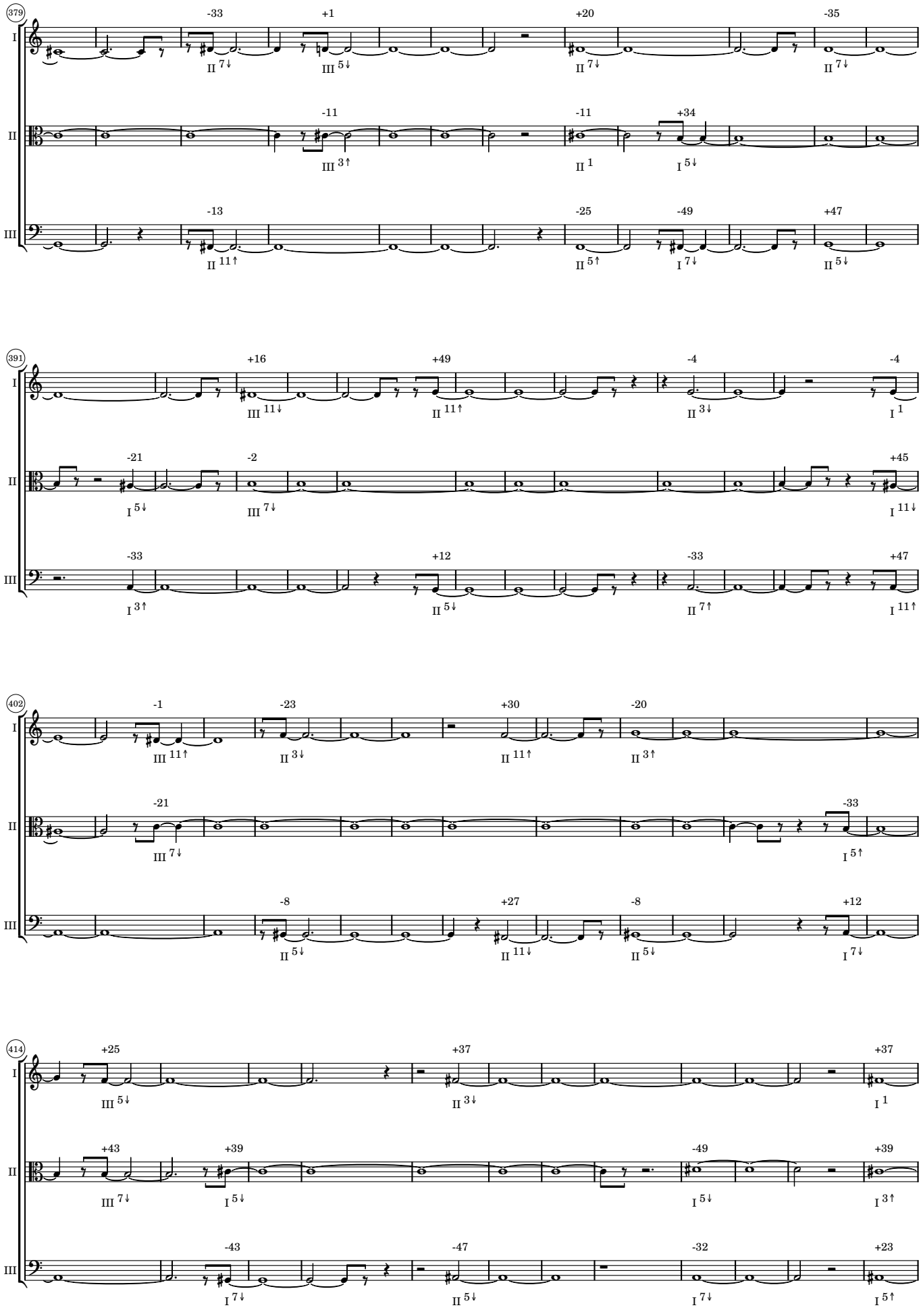
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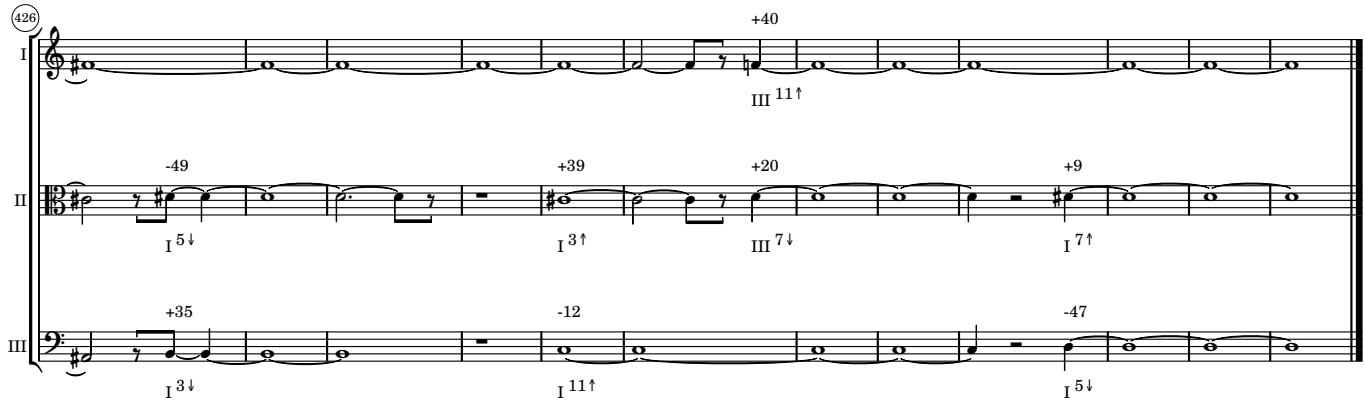
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I 3↓
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I 11↑
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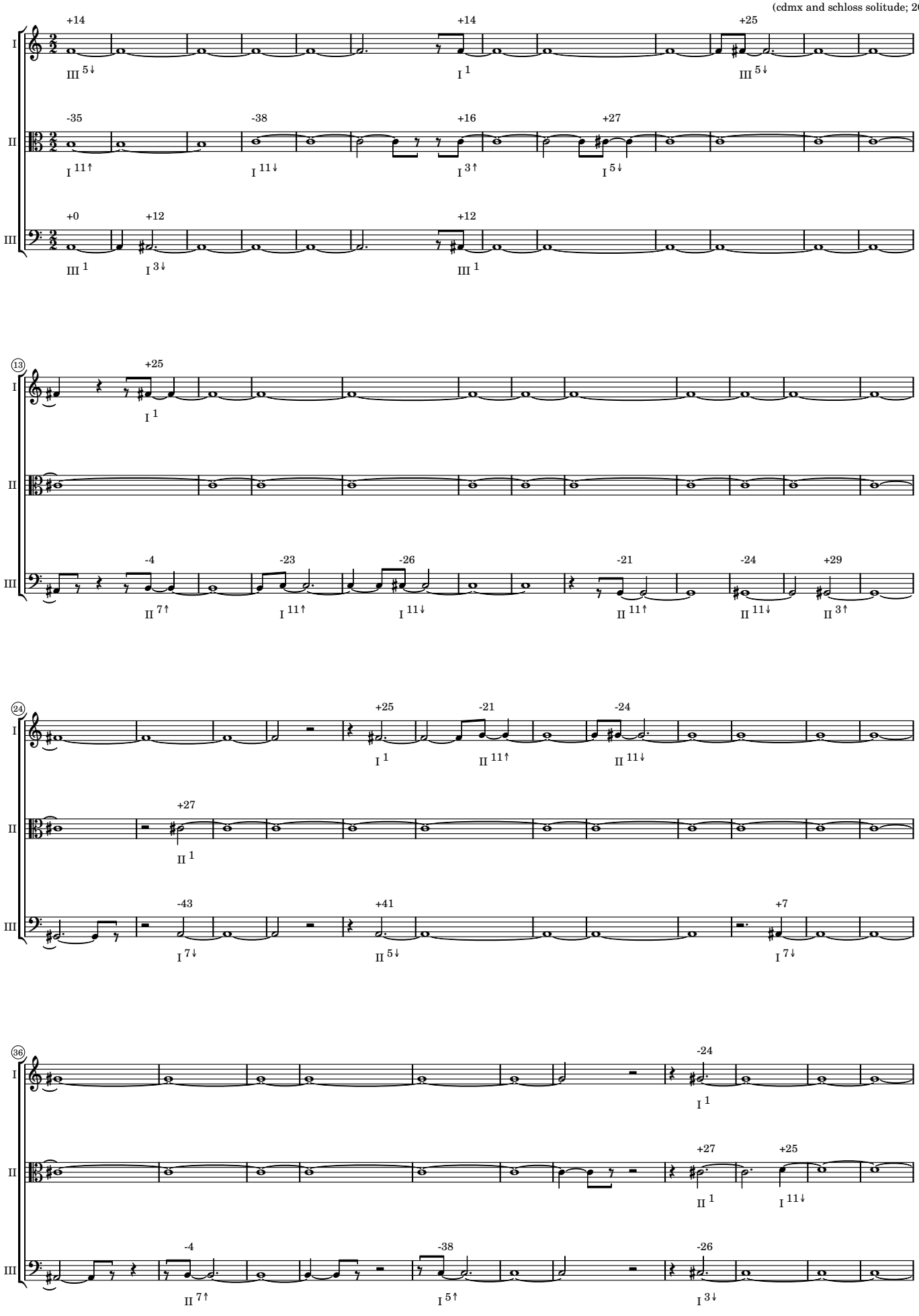
I 5↓

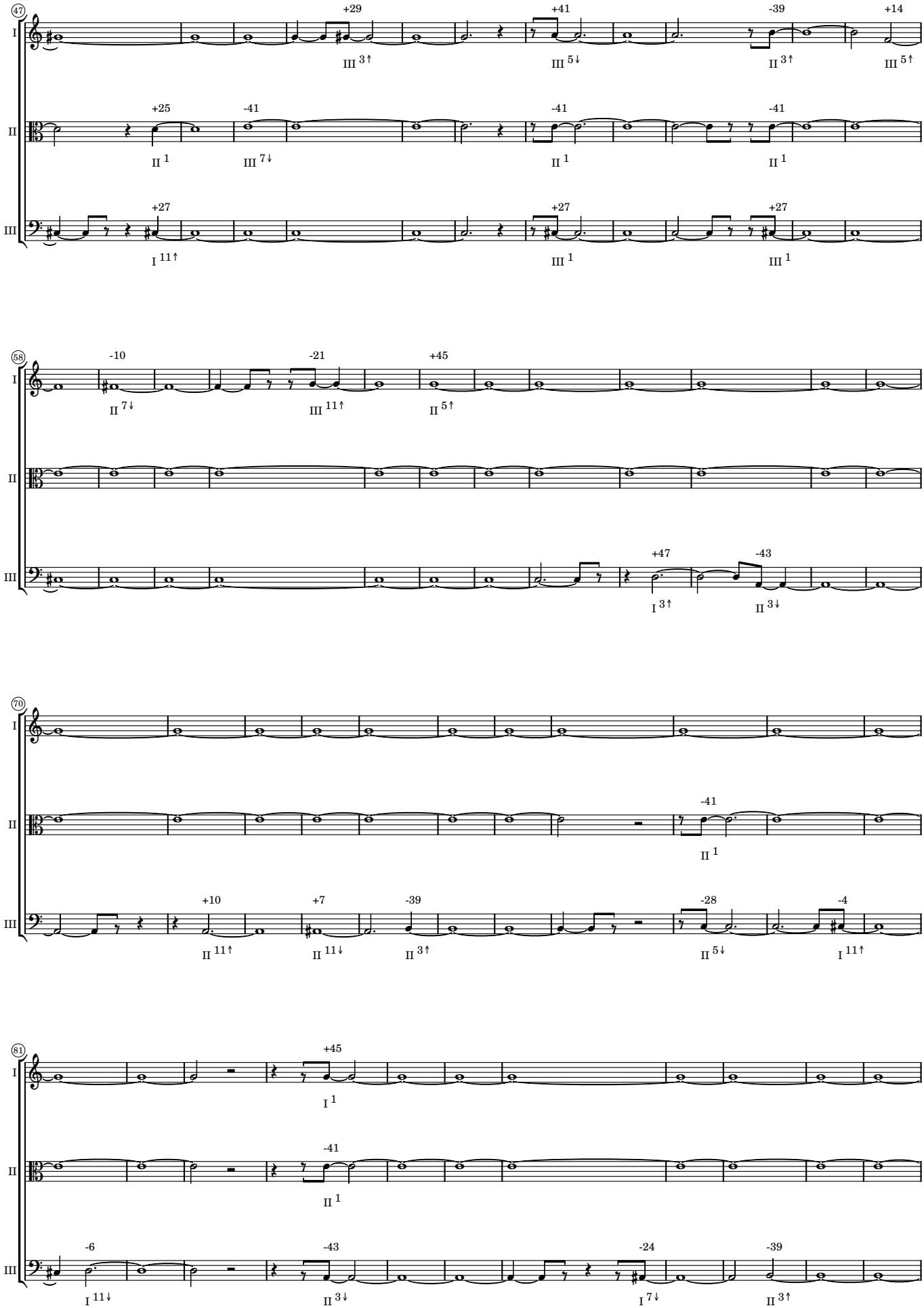
compact sets 3

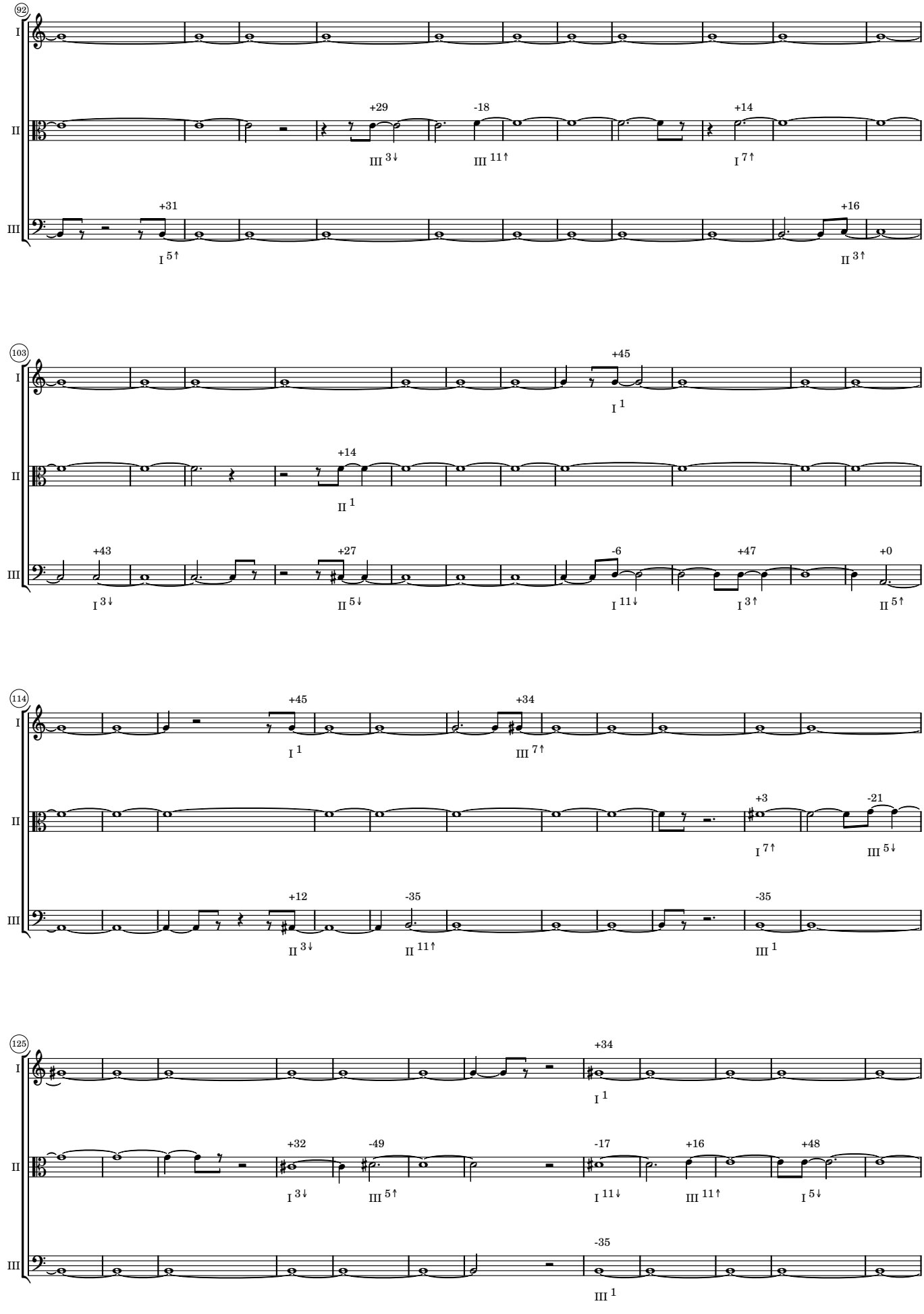
rise/yitgadal

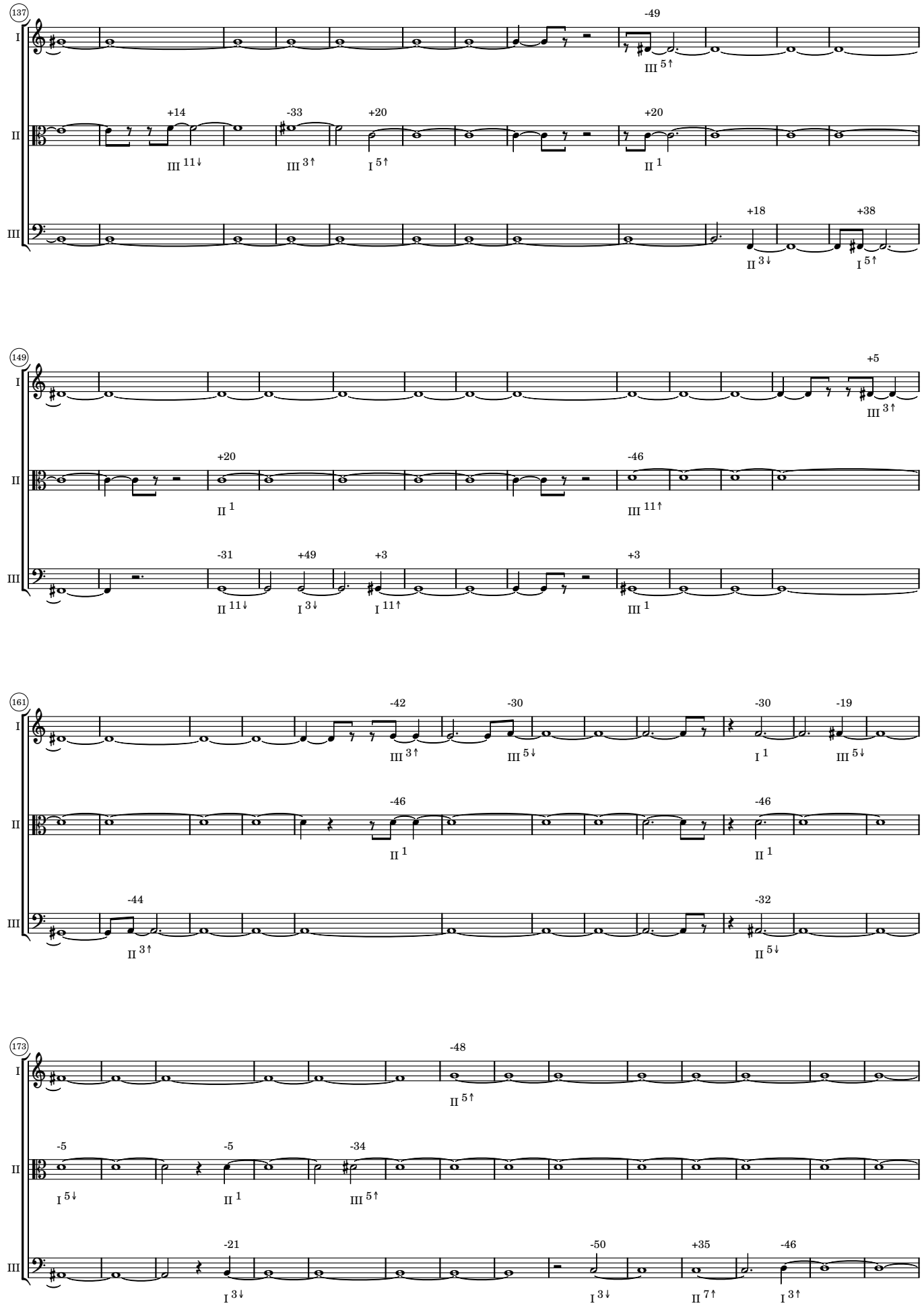
michael winter

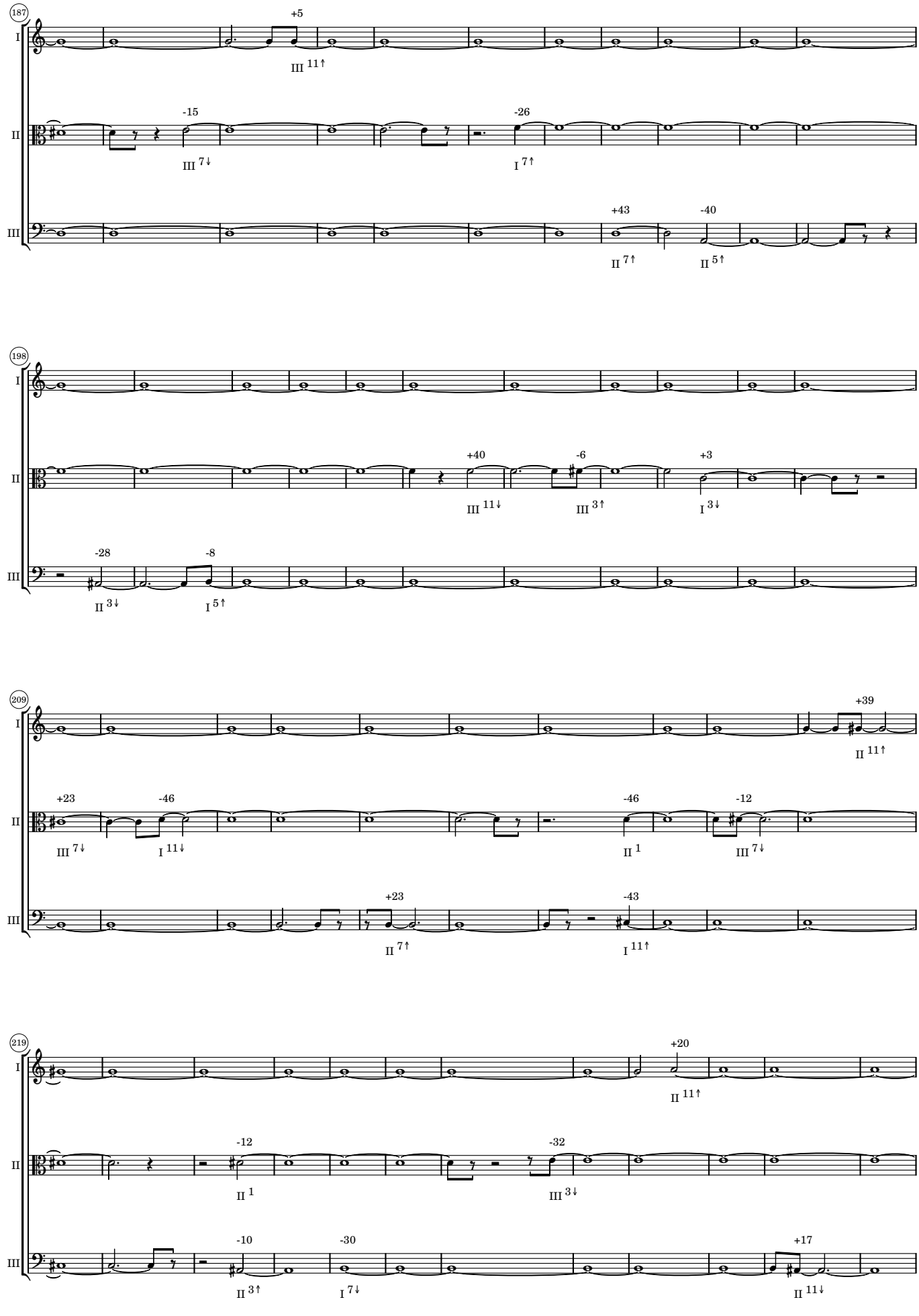
(cdmx and schloss solitude; 2024)

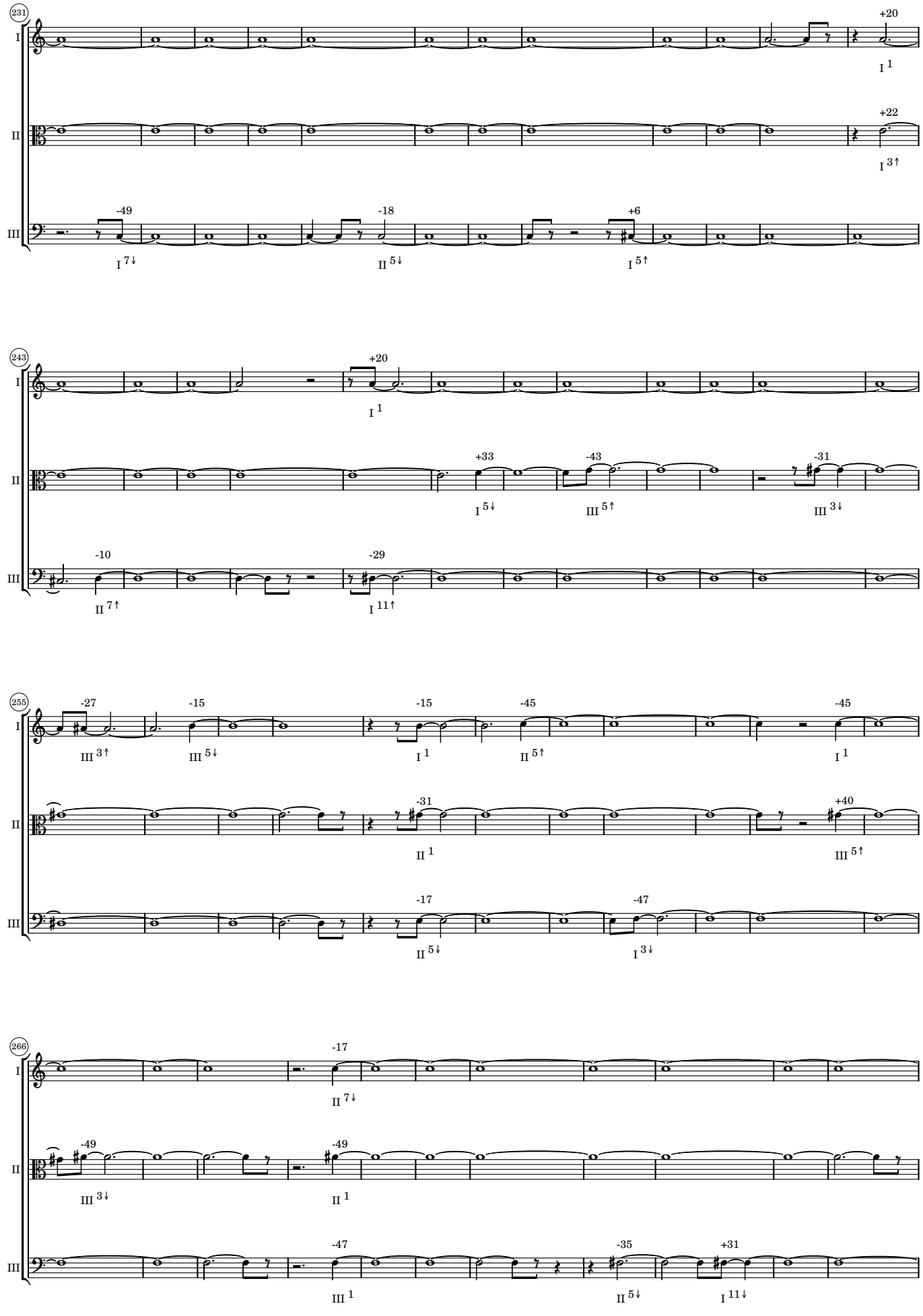


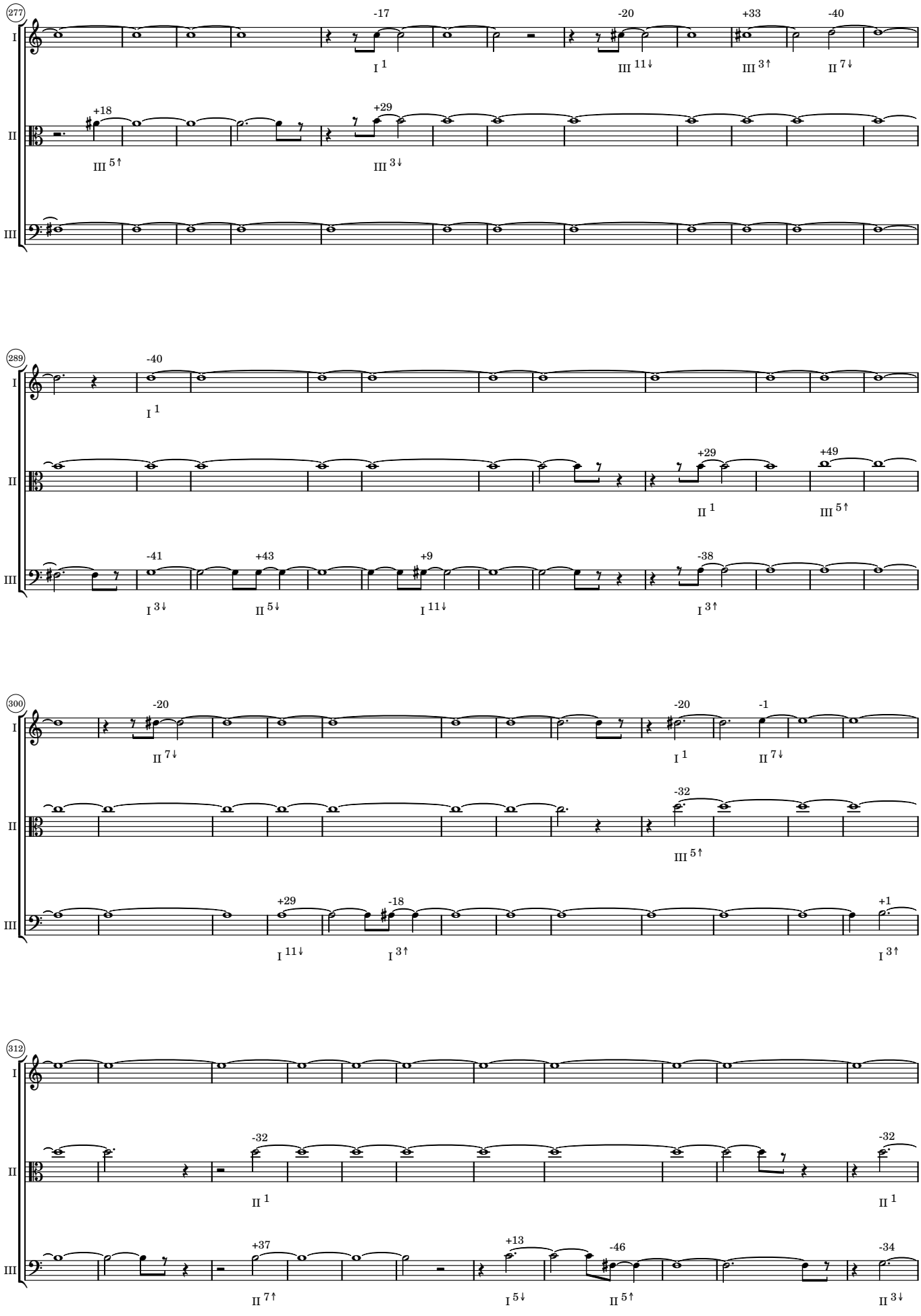

47
I
II
III
+29
III 3↑
+41
III 5↓
-39
II 3↑
+14
III 5↑
+25
II 1
-41
III 7↓
-41
II 1
-41
II 1
+27
I 11↑
+27
III 1
+27
III 1
58
-10
II 7↓
-21
III 11↑
+45
II 5↑
+47
I 3↑
-43
II 3↓
70
-41
II 1
+10
II 11↑
+7
II 11↓
-39
II 3↑
-28
II 5↓
-4
I 11↑
81
+45
I 1
-41
II 1
-6
I 11↓
-43
II 3↓
-24
I 7↓
-39
II 3↑

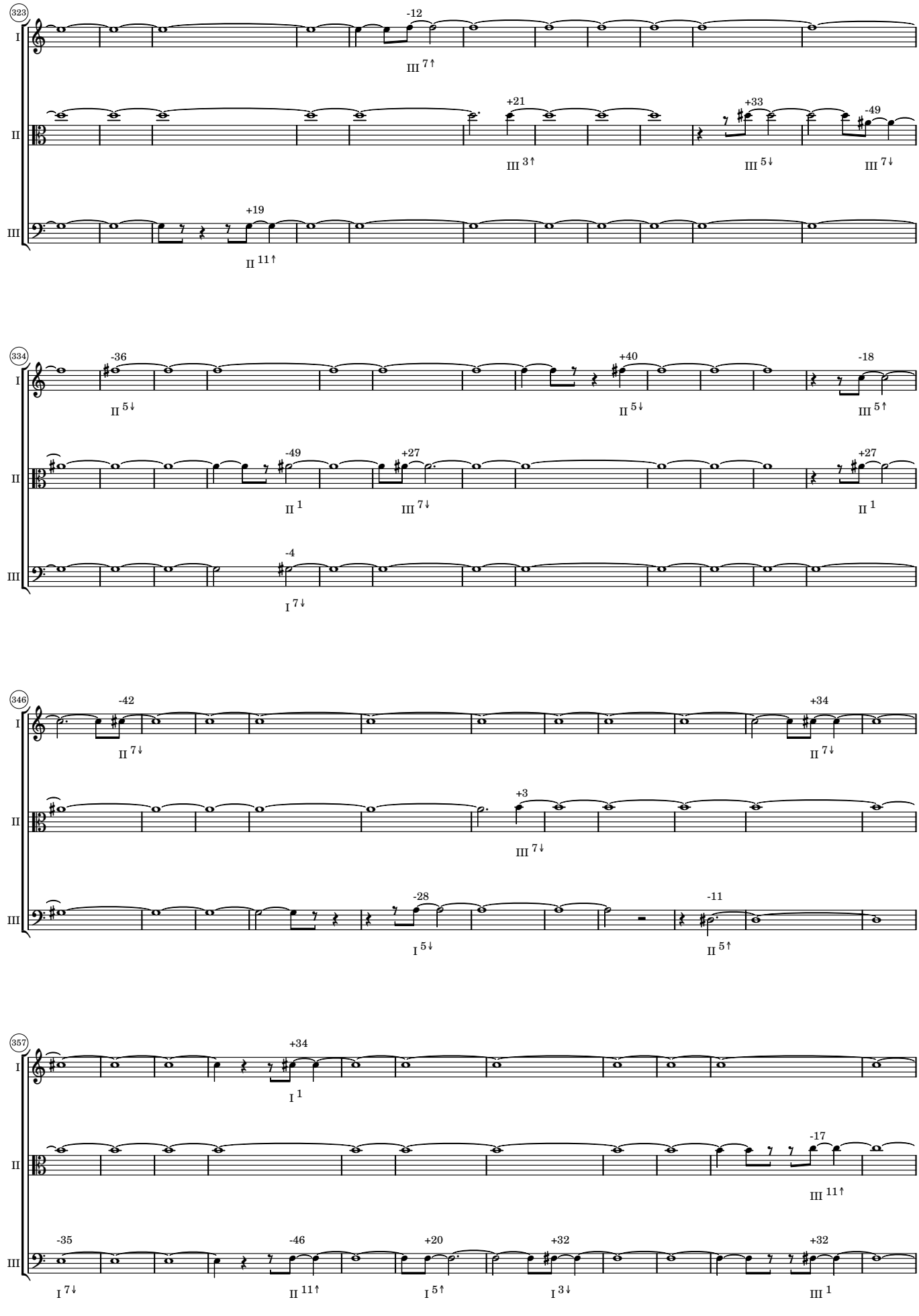

92
I
II
III
+29
III 3↓
-18
III 11↑
+14
I 7↑
+31
I 5↑
+16
II 3↑
103
+45
I 1
+14
II 1
+43
I 3↓
+27
II 5↓
-6
I 11↓
+47
I 3↑
+0
II 5↑
114
+45
I 1
+34
III 7↑
+3
I 7↑
-21
III 5↓
+12
II 3↓
-35
II 11↑
-35
III 1
125
+34
I 1
+32
I 3↓
-49
III 5↑
-17
I 11↓
+16
III 11↑
+48
I 5↓
-35
III 1

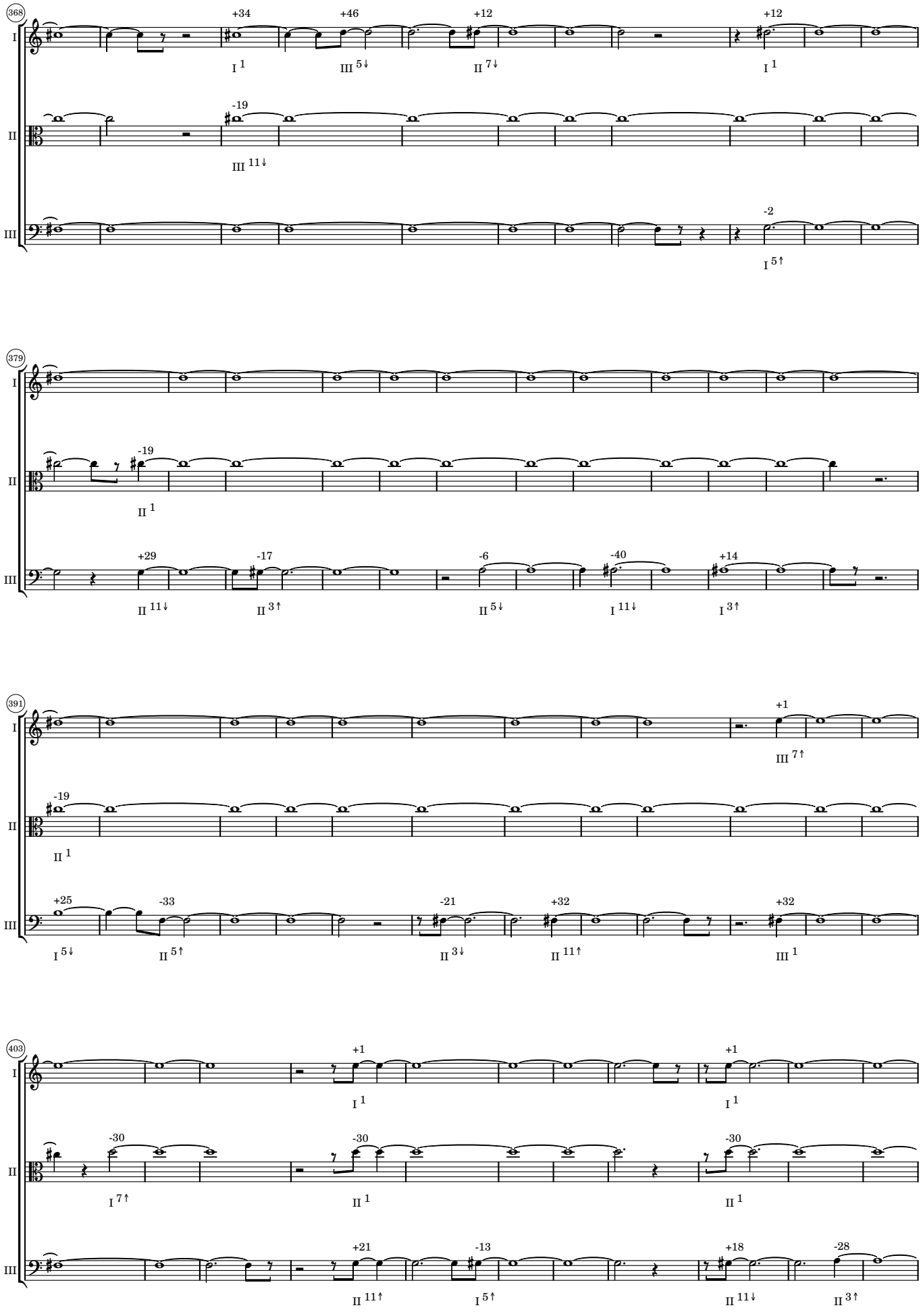

137
I
II
III
-49
III 5↑
+14
III 11↓
-33
III 3↑
+20
I 5↑
+20
II 1
+18
II 3↓
+38
I 5↑
149
+5
III 3↑
+20
II 1
-46
III 11↑
-31
II 11↓
+49
I 3↓
+3
I 11↑
+3
III 1
161
-42
III 3↑
-30
III 5↓
-30
I 1
-19
III 5↓
-46
II 1
-46
II 1
-44
II 3↑
-32
II 5↓
173
-48
II 5↑
-5
I 5↓
-5
II 1
-34
III 5↑
-21
I 3↓
-50
I 3↓
+35
II 7↑
-46
I 3↑

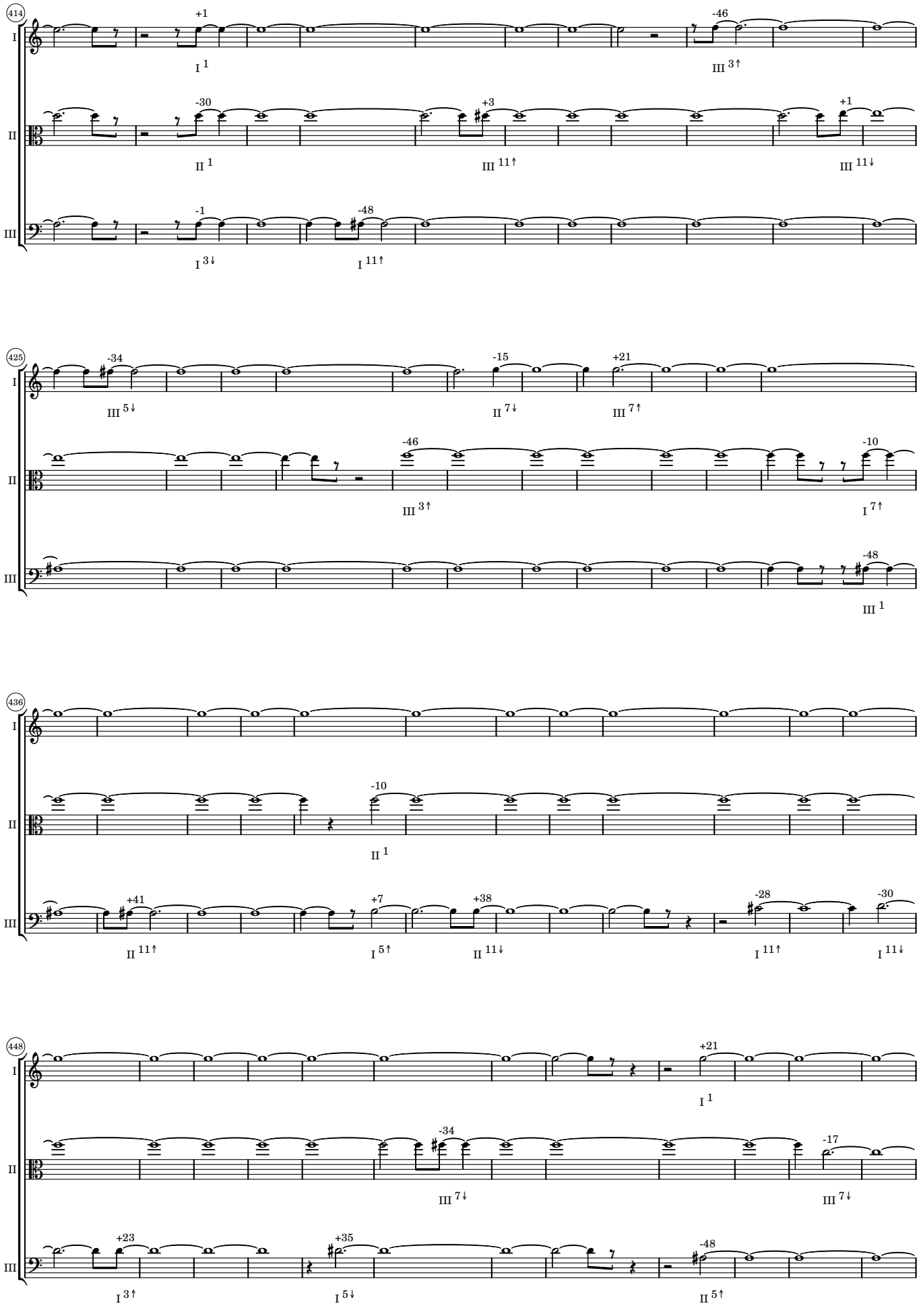

187
I
II
III
+5
III 11↑
-15
III 7↓
-26
I 7↑
+43
II 7↑
-40
II 5↑
198
+40
III 11↓
-6
III 3↑
+3
I 3↓
-28
II 3↓
-8
I 5↑
209
+39
II 11↑
+23
III 7↓
-46
I 11↓
-46
II 1
-12
III 7↓
+23
II 7↑
-43
I 11↑
219
+20
II 11↑
-12
II 1
-32
III 3↓
-10
II 3↑
-30
I 7↓
+17
II 11↓

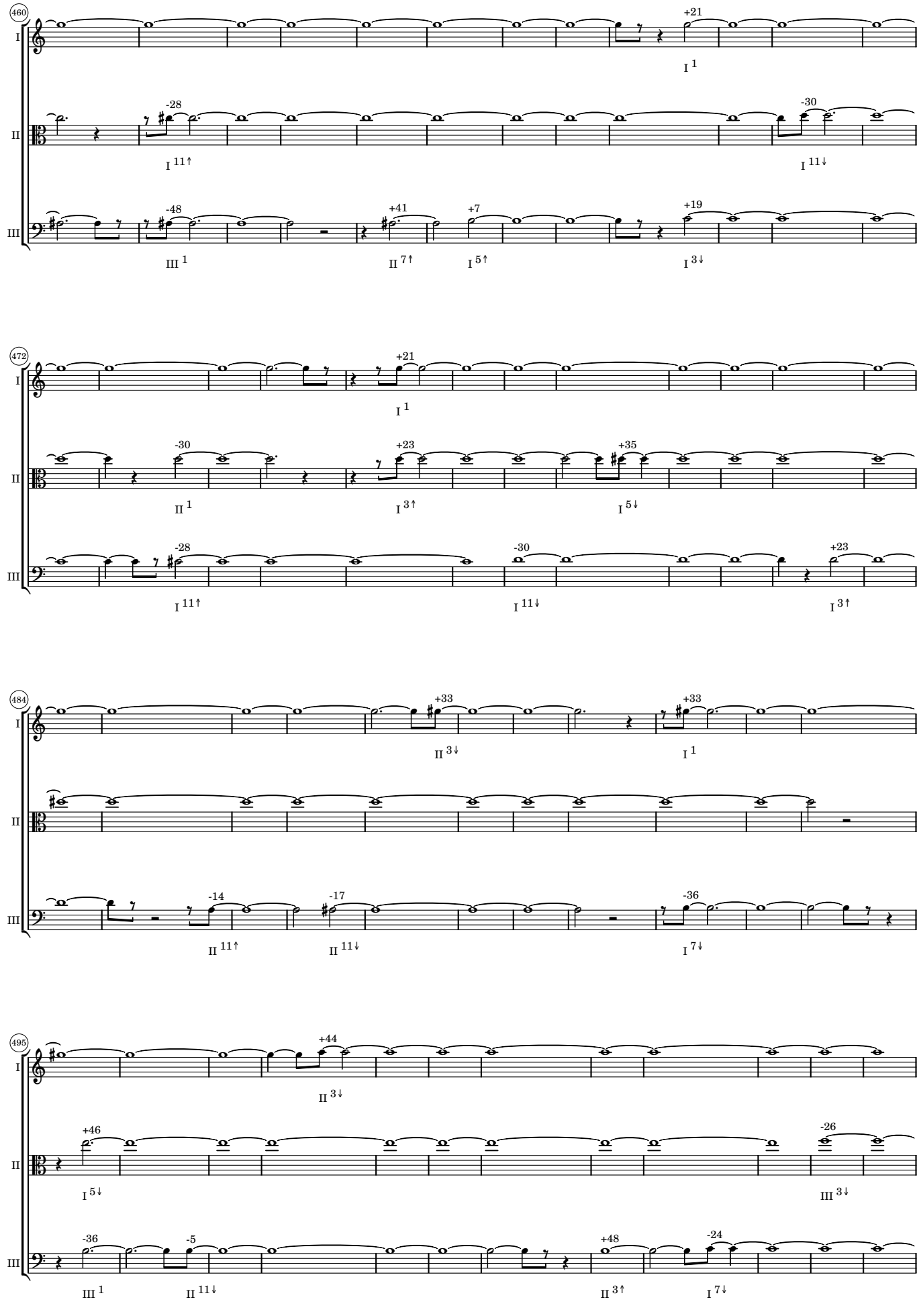

231
I
II
III
+20
I 1
+22
I 3↑
-49
I 7↓
-18
II 5↓
+6
I 5↑
243
+20
I 1
+33
I 5↓
-43
III 5↑
-31
III 3↓
-10
II 7↑
-29
I 11↑
255
-27
III 3↑
-15
III 5↓
-15
I 1
-45
II 5↑
-45
I 1
-31
II 1
+40
III 5↑
-17
II 5↓
-47
I 3↓
266
-17
II 7↓
-49
III 3↓
-49
II 1
-47
III 1
-35
II 5↓
+31
I 11↓

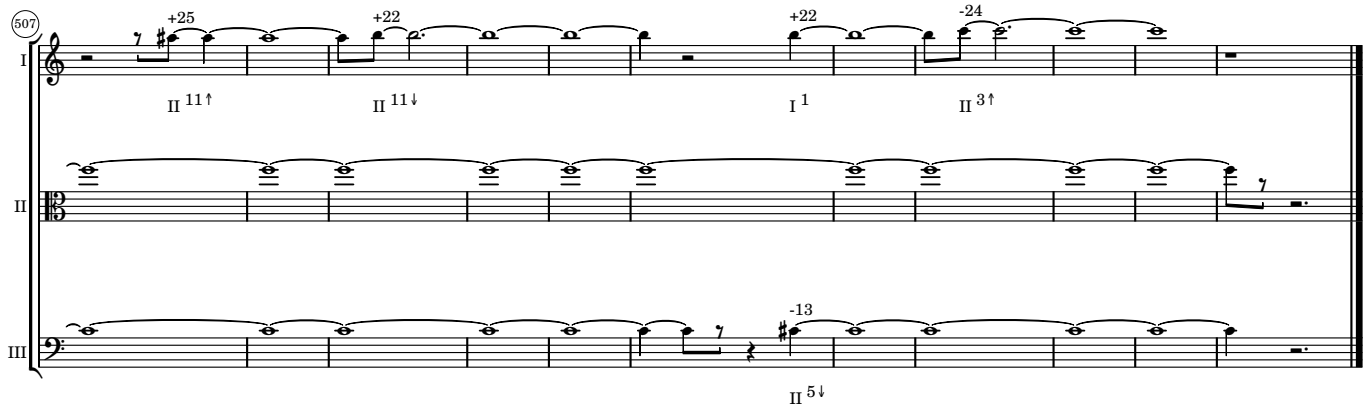

277
I
II
III
-17
-20
+33
-40
+18
+29
289
-40
+29
+49
-41
+43
+9
-38
300
-20
-20
-1
-32
+29
-18
+1
312
-32
-32
+37
+13
-46
-34


323
I
II
III
-12
III 7↑
+21
III 3↑
+33
III 5↓
-49
III 7↓
+19
II 11↑
334
-36
II 5↓
+40
II 5↓
-18
III 5↑
-49
II 1
+27
III 7↓
+27
II 1
-4
I 7↓
346
-42
II 7↓
+34
II 7↓
+3
III 7↓
-28
I 5↓
-11
II 5↑
357
+34
I 1
-17
III 11↑
-35
I 7↓
-46
II 11↑
+20
I 5↑
+32
I 3↓
+32
III 1


368
I
II
III
+34
+46
+12
+12
I 1
III 5↓
II 7↓
I 1
-19
III 11↓
-2
I 5↑
379
-19
II 1
+29
-17
-6
-40
+14
II 11↓
II 3↑
II 5↓
I 11↓
I 3↑
391
+1
III 7↑
-19
II 1
+25
-33
-21
+32
+32
I 5↓
II 5↑
II 3↓
II 11↑
III 1
403
+1
+1
I 1
I 1
-30
-30
-30
I 7↑
II 1
II 1
+21
-13
+18
-28
II 11↑
I 5↑
II 11↓
II 3↑


414
I
II
III
+1
-46
-30
+3
+1
-1
-48
425
-34
-15
+21
-46
-10
-48
436
-10
+41
+7
+38
-28
-30
448
+21
-34
-17
+23
+35
-48


460
I
II
III
+21
I 1
-28
I 11↑
-30
I 11↓
-48
III 1
+41
II 7↑
+7
I 5↑
+19
I 3↓
472
I
II
III
+21
I 1
-30
II 1
+23
I 3↑
+35
I 5↓
-28
I 11↑
-30
I 11↓
+23
I 3↑
484
I
II
III
+33
II 3↓
+33
I 1
-14
II 11↑
-17
II 11↓
-36
I 7↓
495
I
II
III
+44
II 3↓
+46
I 5↓
-26
III 3↓
-36
III 1
-5
II 11↓
+48
II 3↑
-24
I 7↓


507
I
II
III
+25
+22
+22
-24
-13
II 11↑
II 11↓
I 1
II 3↑
II 5↓