HEXAGONS: INTERSECTIONS OF SYMBOLISM AND GEOMETRY IN HARMONICS, PYTHAGOREANISM, AND QABALAH

by

KENNETH SCOTT EGGERT

(Under the Direction of Adrian P. Childs)

ABSTRACT

Hexagons, a cycle of ten chamber pieces composed by K. Scott Eggert, is the full expression of a modal system the composer discovered, along the lines of other systems such as Olivier Messiaen's Modes of Limited Transpositions. Eggert's system, called Hexagonal Mode Theory, has both historical precedent in the 20th century compositional paradigms of revived modality and symmetrical pitch-sets (as in the works of great composers such as Messiaen, Bartók, Ives, Stravinsky, and others), and philosophical roots that extend back to ancient concepts and disciplines such as sacred geometry, Pythagoreanism, and Qabalah. Eggert uses these philosophical concepts as inspiration for the chamber cycle, which acts both as a series of studies of each of the Hexagonal Modes, and as a musical experience modeled after the Tree of Life, a centuries-old metaphysical teaching pioneered by the Hebrews and adopted for use by Christian occultists.

Keywords: Bartók, Chamber Music, Hexagonal Mode Theory, Ives, Just Intonation, Messiaen, Microtonality, Modes, Stravinsky, Symmetrical Chromaticism

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The University of Georgia
May 2017

DEDICATION

I would like to dedicate this work to my father, Theodore P. Eggert, who passed away just a few weeks into my first semester at The University of Georgia. My father believed so very strongly in the value of education; I know it hurt him deeply when I left school at 21, and that he was greatly pleased by my return. Many times during my tenure here, I have wished that I could share this experience with him; I know it would have thrilled him to no end. When I am at last able to call myself Dr. Eggert, it is his face I will see in my mind, smiling and beaming with pride.

ACKNOWLEDGEMENTS

I would like to acknowledge the support of the three professors who guided me through the process of composing the cycle *Hexagons:* the late Dean Drummond, Leonard Ball, and Adrian Childs. Also, much thanks to all the professors I have studied with at The University of Georgia: Leonard Ball, Adrian Childs, Emily Frey, Emily Gertsch, Rebecca Simpson-Litke, and Peter Van Zandt Lane. My time here has been marvelous. Thanks to all of you for your contributions to it.

I would also acknowledge the love and support of the three most important women in my life: my daughter Gaia Eggert, my future wife Holly Blackford, and my mother Janice Eggert. No one accomplishes such a thing as this without help. Your help, and your love, is indispensible to me. I love you all very much.

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CHAPTER 1

INTRODUCTION

This document serves as the accompaniment to my cycle of chamber pieces, *Hexagons,* a work that began in 2006 after my initial conception of the idea for a system of musical modes—scales that serve as alternatives to the standard major/minor tonality of Western music, built as a series of intervals in specific relationship to a "root" pitch that anchors and defines the context of all harmonies around it. Furthermore, this system of modes has a unifying concept rooted in philosophical ideas drawn from antiquity. This includes specific choices as to the number of pitches in the mode (in this case, all *heptatonic* or seven-note modes); the manner of envisioning the mode as a geometric shape, a polygon created by placing the root pitch in the center and all other pitches as outer points connected by lines to the root and each other; and the manner of selecting the secondary pitches relative to the root, according to principles of *symmetry*—that is, any two pitches of the outer points, which align across from each other with the root between, must be of equivalent intervallic distance from the root. In post-tonal analytical terms (that shall serve as the dominant analytical language of this narrative), the secondary pitches have *inversional symmetry* across the *axis* of the root pitch. Thus the seven pitches of the mode are presented as forming hexagons, and the unifying principles of their construction are titled Hexagonal Mode Theory.

Investigation reveals that there are ten such modes possible within the twelve-pitch Western standard system. Four of them are easily recognizable as scales used in both Western music and the traditional music of other cultures, such as Hindu or Arabic. The

remaining six are of increasing oddness, due to large scalar steps of a minor third or larger, placed in such a manner as to disturb what would normally be seen as proper scalar step progression within a mode. Some theorists may prefer to think of them, for this reason, as *symmetrical pitch-class collections* (unordered) rather than modes (ordered) for this reason; but I still tend to approach them, in my role as a composer, as modes—with an emphasis on the centricity of a modal tonic, as well as melodic continuity, cadences, and smooth voice-leading wherever possible. Symmetry, already integral to the mode, is less of a compositional priority.

Immediately after discovering the modes, I began to use them in my compositions. At the time I was beginning to work on the music for my theatre company's adaptation of the epic of *Gilgamesh*, and so some of my first experiments with the more unusual Hexagonal Modes made their way into that score. Eventually I decided to do a cycle of pieces, with each piece being a study of one Hexagonal Mode. I initially chose the string quartet for my instrumentation, and began basing all compositions on the root pitch D (because using the root D, on both the piano keyboard and the written staff, allows for the symmetrical aspect of the modes to be easily visible, by way of the placement of accidentals). The first of these pieces to come to fruition were *Hexagon VII: Hijaz Kar* and *Hexagon VIII: Phrygionian*, both of which premiered during my master's degree studies at Montclair State University. Other pieces conceived during this time were brought to fruition during my doctoral studies at the University of Georgia, while studying with Dr. Leonard Ball and Dr. Adrian Childs. It was Dr. Childs who wisely suggested some variation in both the instrumental ensembles and the root pitch of the compositions.

The resulting series of pieces unfolded in this order: four string quartets based on the root pitch D; three saxophone quartets based on the root pitches F, C, and G; two pieces

using the ensemble configuration from Messiaen's *Quartet for the End of Time*—piano, clarinet, violin, and cello—based on the root pitches A and E; and a final piece for piano, soprano saxophone, viola, bass clarinet, chimes, prayer bowls, and timpani, based on the root pitch B. The opening string quartet pieces were based in the aforementioned four most recognizable modes, with the more eccentric modes to follow in the different ensemble configurations. The ordering of the pieces is the reverse of the numbering system I have devised for the modes, and this is deliberate (as will be discussed in Chapter 3).

Chapter 2 of this document is a full explanation of Hexagonal Mode Theory, including the manner of its discovery and the modes themselves, including visualization in the Hexagonal Grid, post-tonal analysis of the modes as pitch-class collections, the relation of the modes to the harmonic series, and the system of naming and numbering I have devised for them.

Chapter 3 of this document explores my compositional choices for the cycle *Hexagons*, beginning with an examination of the historical precedence for Hexagonal Mode Theory, the symbolism of the hexagon/hexagram, the symbolism of the numbering system of the modes, and the relationship of both system and cycle to the philosophies of sacred geometry, Pythagoreanism, and Qabalah.

Chapter 4 is a general analysis of the musical material of the cycle *Hexagons*. Appendices A, B, and C contain supplementary material for those willing to explore the Just Intonation aspects of Hexagonal Mode Theory. Appendix D contains the scores for the complete cycle.

CHAPTER 2

HEXAGONAL MODE THEORY

Discovery

In 1997 I had the occasion to learn the technique of overtone singing from an acquaintance at an artists' commune. I had previously heard the technique as a teenager, when my music teacher brought a member of David Hykes' Harmonic Choir to my school for a presentation.[1] My experiences with this singing technique, particularly in combination with other interests I pursued at the time (such as meditation and energy healing), led me to eventually release a CD titled *Akróasis: Harmonic Chants*. The intention of this music was for meditation and healing, and the artistic concept that drove it was the conception of a single tone as a *sphere*. I imagined the harmonic series of a fundamental as a web of points and lines extended ever outward and wrapping the listener in its embrace, weaving a world around the listening consciousness, "re-harmonizing" the body/mind with the natural laws of vibration and rhythm.

The artistic research question that drove me, following the conclusion of this project, involved the expansion from the realm of the single tone into the realm of *mode*. I had become fascinated with the 8-note mode made from the first 16 partials of the harmonic series, although there was no way within standard 12-tone tuning to exactly replicate the

[1] David Hykes was one of the first Western composers to travel to the countries in Asia where the technique of overtone singing emerged (Tuva, Tibet, Mongolia), to learn directly from master singers and form artistic partnerships. In the 1970s he formed a group called the Harmonic Choir, which recorded extended pieces for overtone singing in great cathedrals across Europe. His music has been featured in several movie soundtracks, and he continues his work today with The Harmonic Presence Foundation, which he also founded. http://www.harmonicworld.com/

pitches (the 7th, 11th, and 13th partials deviate significantly). Not yet being aware of the modal experimentations of Debussy, Bartók, and Messiaen, I tried to imagine a music based on the principles of natural order (as laid out within the harmonic series, a phenomenon independent of human ideas), as opposed to the "gerrymandered" approach to tuning adopted by the West so as to make all semitones equal in size.

The discovery that gave direction to my thinking came from an "alternative" book of music theory, *Harmonic Experince* by W.A. Mathieu. Mathieu started his book with the harmonic series and worked his way up to a concept he called the *harmonic lattice* (see Figure 1), which, as I later discovered, was simply a version of the Neo-Riemannian *Tonnetz* (see Figure 2), a matrix of pitches that had been originally based in Just Intonation in the treatises of Arthur von Oettingen and Hugo Riemann, but had been adapted into 12-tone equal temperament by Brian Hyer for the purposes of charting cycles of harmonic "transformations."[2]

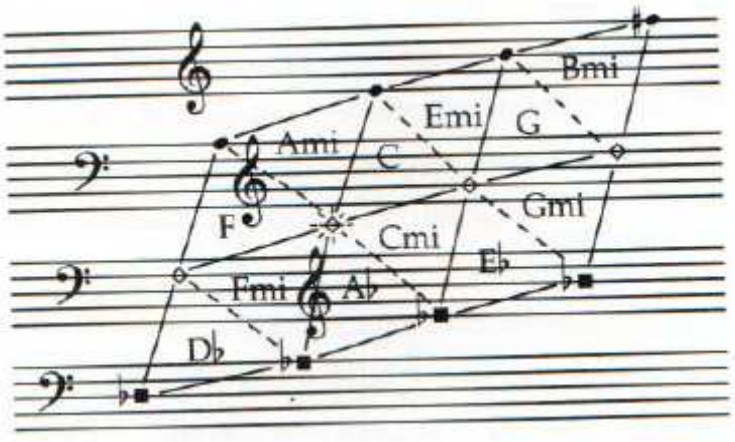

Figure 1. An example of the "Harmonic Lattice" from Matheiu's *Harmonic Experience* (1997, 157)

[2] Cohn, Richard. 1998. "Introduction to Neo-Riemannian Theory: A Survey and Historical Perspective." *Journal of Music Theory,* Vol. 42, No. 2, Oxford University Press, 171.

As it turned out, it was the image of a musical mode as a hexagonal grid which had the most impact upon me. I was fascinated by the conception of mode as a two-dimensional grid rather than the usual stepwise ladder we are shown in traditional books of harmony and theory, and by the idea of a repeating matrix of tones forming an endless web (as I had previously envisioned the harmonic series). Also intriguing was the particular group of tones that formed this mode, which repeats in the same configuration based on any particular tone as a central point. In scalar formation, the mode was 1—♯2—3—4—5—♭6—♭♭7.[3] The limitations that this mode would impose in terms of harmonic sonorities also presented a compositional challenge, especially if one were to take the approach of disallowing modulation.

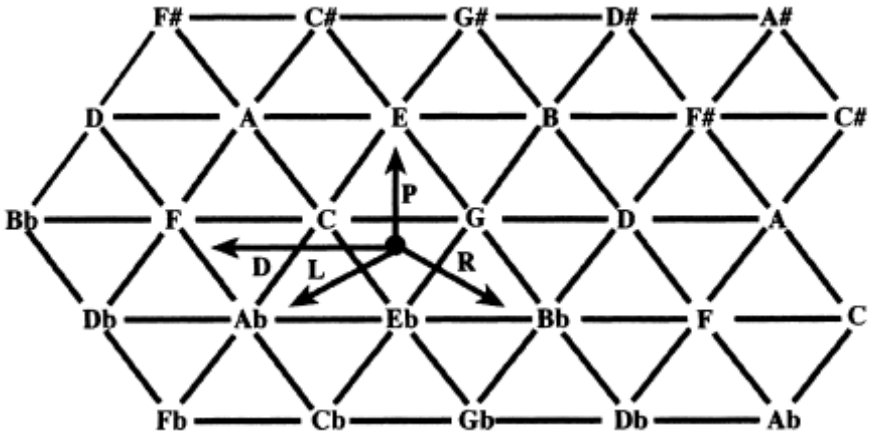

Figure 2. An example of a Neo-Riemmanian *Tonnetz*.[4]

Thus began my investigation into the Hexagonal Grid as a mode-forming mechanism. If I retained the basic rule of any two secondary pitches, across from each other

[3] This numbering does use the major scale as a reference point.
[4] Cohn, 1998, 172. Borrowed from Brian Hyer's 1989 dissertation.

on the grid with the primary or "generating" pitch between, having the same intervallic distance from the root/generative pitch, then how many different modes would be possible in our 12-tone system? There turned out to be ten, and one of them was a diatonic mode: Dorian.

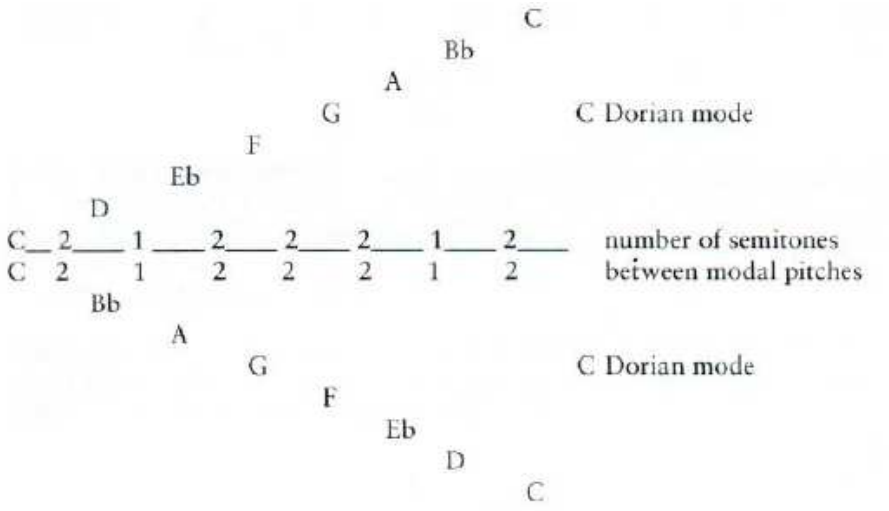

Figure 3: A demonstration of the symmetry of Dorian mode.

Figure 3 is from page 96 of *Music and Twentieth-Century Tonality* by Paolo Susanni and Elliott Antokoletz (2012). It demonstrates one aspect of the scalar version of the Hexagonal Mode, which I will call the *semitonal formula,* a palindrome series of intervals that shall remain constant in either ascending or descending scalar motion.

As part of detailing the ten Hexagonal Modes on the following pages, besides the name and numbering system of my own devising, I will include several different methods of visualization and analysis in my various representations, and some of these will bear some explanation beforehand. The two primary representations shall be 1) in the Hexagonal Grid using pitch-class (PC) numbers (i.e., the post-tonal analysis method of Allen Forte and

others; see Figure 4), and 2) in standard notation on the staff. The Hexagonal Grid representation shall assume "movable 0."

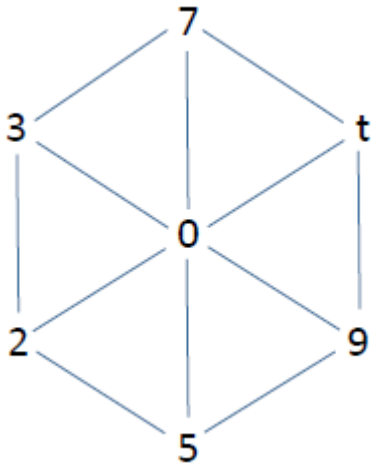

Figure 4. An example of the Hexagonal Grid representation (Dorian).

The standard notation shall always use the root pitch D, because doing so causes the symmetry within the pitch set to be reflected in the accidentals.[5] These shall be followed by a *scalar formula* along the lines of how the "Lattice Mode" was displayed on page 5, and a *semitonal formula* as discussed in the previous paragraph. The *semitonal formula* shall also be represented visually as what I call a *spatial glyph,* where the intervals are pictured as stacks of blocks, proportional to the spaces between scalar degrees, piled from left to right. Visualizing the modes in this way helped me to form associations that inspired the names that I chose for them.

[5] To clarify: although for the purposes of the Hexagonal Grids I claim "movable 0," for the purposes of representation on the staff, 0 = D. I chose D as the root pitch for all modes in this section, although I use other pitches as the roots of my pieces in the cycle *Hexagons,* because viewing them in D on the staff provides a good visual representation of the symmetry between the disjunct tetrachords; this is reflected in the balance of accidentals between the two "halves" of the mode. In any other representation involving PC numbers, 0 stands for any pitch serving as the modal tonic and the axis of symmetry for the collection.

The Hexagram Formation

This form of visualizing the modes, which I discovered during my master's studies at Montclair (where I did extensive work with the Just Intonation tuning theories of Harry Partch), involves representing each secondary pitch as either an overtone or undertone of the "generating fundamental." I feel it important to include this for several reasons: first, it gives Hexagonal Mode Theory (HMT) a context in either standard tuning or Just Intonation; second, it demonstrates the linkage between the system and my earlier work with tone and the research that followed; third, it allows for another layer of symbolism made applicable to the use of HMT. This and the symbolism of the hexagon shall be discussed at length in Chapter 3 of this document.

The hexagram, as opposed to the regular polygon of the hexagon, is a six-pointed star formed by the superimposition of two equilateral triangles, one pointing upward and one downward. In the Hexagram Formation (see Figure 5), a Hexagonal Mode may be seen as composed of a central point (the generative fundamental), a trichord of three upper partials of the fundamental (the upward-pointing triangle), and a trichord of the three corresponding "lower partials" (the downward-pointing triangle).[6] For example, if we take the mode Dorian based on root D, we see a correspondence between A, E, and B as the upper partials of D (3, 9, and 27, respectively). The 3rd, 9th, and 27th lower partials would then be G, C, and F.[7] See Appendix B for a staff representation of the ascending and descending harmonic series up to the 27th partial.

[6] For those who object to the term "lower partials" on the basis of acoustics, I offer the following video by Anna-Maria Hefele on the technique of overtone singing: https://www.youtube.com/watch?v=vC9Qh709gas. At 0:27, Hefele demonstrates the technique of holding an upper partial steady while moving the fundamental tone produced by the vocal cords. This, in my opinion, shows the validity of the "undertone series" as a theoretical and compositional concept, regardless of the inability of acousticians to find evidence in nature for their existence.

[7] Put differently, D is the 3rd, 9th, and 27th upper partial to the generating tones G, C, and F.

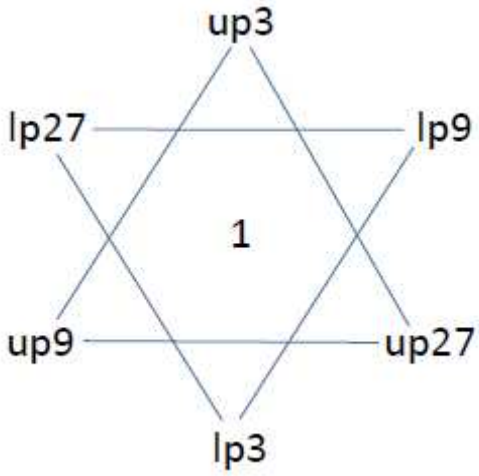

Figure 5. An example of the Hexagram Formation. "up" = upper partial. "lp" = lower partial.

Granted, this manner of tuning may not be acceptable to Just Intonation purists, who would prefer the 6/5 ratio of tuning for a minor third, but the 32/27 ratio (which is what this tuning would be) is actually closer to an equal tempered minor third, and has precedent in the tuning championed by Pythagoras, which works better for monophonic music (like melody over drone, more typical of Hindu and other indigenous traditional styles) than for the polyphonic music of the West. For readers interested in further expansion of HMT in Just Intonation, I have included Appendix A with drawings of Hexagonal Modes with proper just ratios, along with a 19-tone system based on the same principles.[8]

Post-Tonal Analysis of the Hexagonal Modes

In his book *The Technique of my Musical Language,* Olivier Messiaen discusses his own system of *modes of limited transpositions* and *non-retrogradable rhythms* in the following manner:

[8] For those who require more background to understand Just Intonation, I recommend my paper "Musica Universalis: From the Lambdoma of Pythagoras to the Tonality Diamond of Harry Partch," available online at www.academia.edu.

> These modes cannot be transposed because they are—without polytonality—in the modal atmosphere of several keys at once and contain in themselves small transpositions; these rhythms cannot be retrograded because they contain in themselves small retrogradations. These modes are divisible into symmetrical groups; these rhythms, also, with this difference: the symmetry of the rhythmic groups is a retrograde symmetry. Finally, the last note of each group of these modes is always *common* with the first of the following group; and the groups of these rhythms frame a central value *common* to each group.[9]

This conception of Messiaen's modes can be explained as the mode being *generated* by a repeating set-class subset of the complete pitch-class collection. For example, in the case of Messiaen's Mode 2, also known as the octatonic collection, it is the prime form trichord (013) that repeats in the manner described in the above quote—where the last note of each group is the first note of the subsequent grouping.

Hexagonal Modes can also be perceived in this way, but with certain differences. Upon examining the disjunct tetrachords of the scalar version of any Hexagonal Mode, it becomes apparent that the same prime form appears on both sides of the divide; for instance, in the example of D Dorian, both tetrachords (D-E-F-G and A-B-C-D) have prime form (0235). Thus it can be said that each Hexagonal Mode is generated by a prime form tetrachord. If the prime form tetrachord is itself a symmetrical set, such as (0235), it will generate one Hexagonal Mode, with the lower disjunct tetrachord transposed exactly to the 5th scale degree (which will be pitch class 7, 8, or 9, still assuming movable 0) for the upper tetrachord. If the prime form tetrachord is not symmetrical—for example, (0135)—then it will generate *two* Hexagonal Modes, each having the upper tetrachord as the perfect inversion (T$_0$I) of the pitch classes of the lower tetrachord.

Thus, in the following pages, the ten Hexagonal Modes shall be detailed as such:

1) Representation in the Hexagonal Grid, with moveable-0 pitch-class numbers.

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[9] Messiaen, Olivier. 1956. *The Technique of my Musical Language*. Paris, France: A. Leduc, 18.

2) Representation in standard notation based on root pitch D.

3) Representation as a scalar formula (referencing the major scale).

4) Representation as a semitonal formula, including the spatial glyph.

5) Representation in the Hexagram Formation, as upper and lower partials of the modal tonic.

6) Representation on the pitch-class clock, including:

a) Prime form of the complete heptachord.

b) Interval-class vector for the complete heptachord.

c) Prime form of the generating tetrachord.

7) A brief explanation of the names I have chosen for the modes.

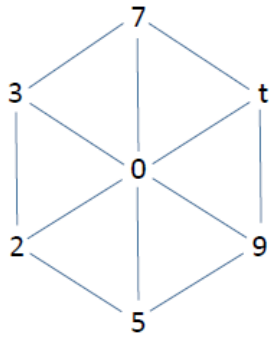
The modes shall be presented in reverse order of their numbering, for reasons that will become clearer in Chapter 3 of this document.

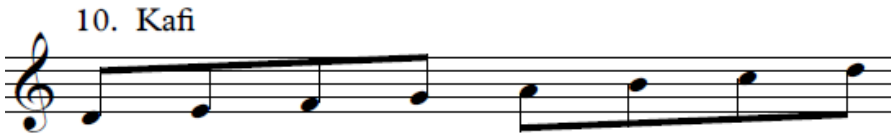
Hexagonal Mode 10: Kafi (Dorian)

Kafi is the Hindu name for Dorian, which was originally Phrygian to the ancient Greeks (as modern Phrygian was actually Dorian). Plato stated in his dialogue *Republic* that Phrygian and Dorian were the two modes truly suitable for the ideal society; he believed that Lydian mode (the modern major scale) was lascivious in character and would lead society to ruin.[10] The axis of symmetry for the diatonic collection is the modal tonic of Dorian. Norman Carey and David Clampitt, as part of defining their concept of the *well-formed scale,* describe a diatonic collection as a pitch set generated by an interval cycle of perfect fifths—a conception shared by Susanni and Antokoletz.[11]

[10] https://www.britannica.com/art/mode-music (accessed 3/3/17)
[11] Carey, Norman and Clampitt, David. 1989. "Aspects of Well-Formed Scales." *Music Theory Spectrum,* Vol. 11, No. 2, Oxford University Press, 188.

Hexagonal Mode 10: Kafi

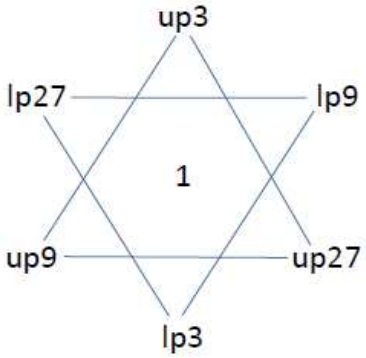


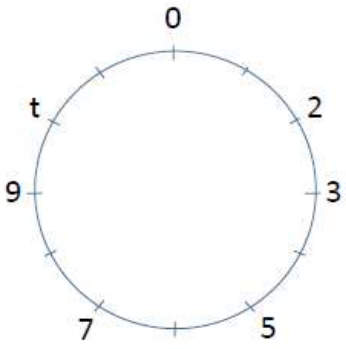


Scalar Formula: 1—2—♭3—4—5—6—♭7

Semitonal Formula: 2-1-2-2-2-1-2

Spatial Glyph:





Prime Form: (013568t)

Interval-Class Vector: <254361>

Generating Tetrachord: (0235)

Plate 1. Hexagonal Mode 10, Kafi (Dorian).

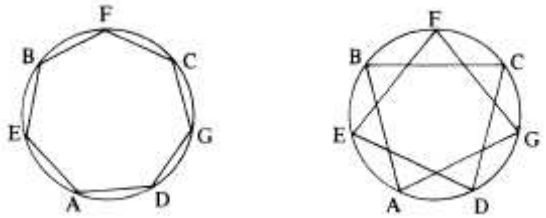


Figure 6. Geometric Representation of the Diatonic Scale as a Cycle of Fifths.

Looking at Figure 6 (from Carey/Clampitt), we can see that even in the cycling of fifths to obtain the diatonic collection, it is D that acts as the central axis of symmetry, since the pattern of the cycle is broken at the tritone between B and F.

Another way of viewing Dorian is through the concept of *modal rotation,* as described by Susanni and Antokoletz.[12] If we picture the primary form of the diatonic collection as Ionian mode (or the major scale) based on the tonic pitch C, then Dorian is Rotation 2. This is a quality that HM 10 shares with HM 9. Dorian is also catalogued as no. 1041 in Nicolas Slominsky's *Thesaurus of Scales and Melodic Patterns.*

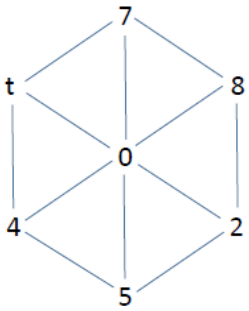
Hexagonal Mode 9: Promethean

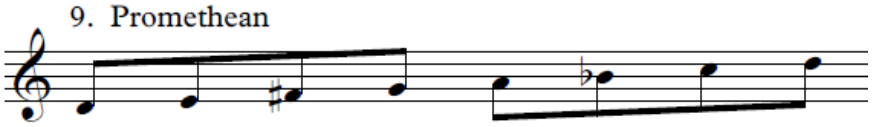
HM9, Promethean, gets its name from the piece *Prometheus: The Poem of Fire* by Russian composer Aleksandr Scriabin, which contains Scriabin's famous "mystic chord," a six-note quartal harmony whose pitches are all present in Promethean, based on modal tonic D (see Figure 7). The term "mystic" connects this chord to specific ideas held by Scriabin which originate from Theosophy, an esoteric religion founded by the Russian occultist and spirit medium H. P. Blavatsky.[13]

[12] Susanni/Antokoletz, 2012, 91.

[13] https://www.britannica.com/biography/Aleksandr-Scriabin (accessed 4/23/17)

Hexagonal Mode 9: Promethean

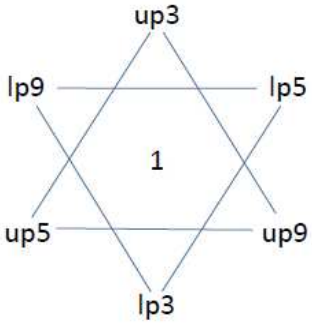


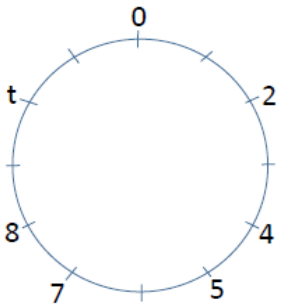


Scalar Formula: 1—2—3—4—5—♭6—♭7

Semitonal Formula: 2-2-1-2-1-2-2

Spatial Glyph:





Prime Form: (013468t)

Interval-Class Vector: <254442>

Generating Tetrachord: (0135)

Plate 2. Hexagonal Mode 9, Promethean.

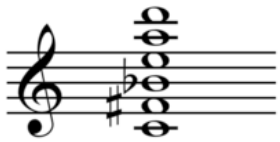


Figure 7. The Mystic Chord.[14]

The mode has other names; it is sometimes referred to as "Mixolydian Flat Sixth" or "Hindu," and is also understood to be Rotation 2 of the Acoustic Scale, otherwise known as the Rumanian Non-Diatonic or the Lydian/Mixolydian Hybrid Scale.[15] It can also be seen as as a hybrid of Ionian and Phrygian, since the lower tetrachord is identical to Ionian and the upper tetrachord is that of Phrygian. These two modes are actually inversionally related, as can be seen in Figure 8, also from Susanni and Antokoletz.[16] Maurice Ravel exploited this inversional relationship to great effect in his beloved *Bolero.* HM 9 can be found catalogued in the Slominsky at No. 1043.

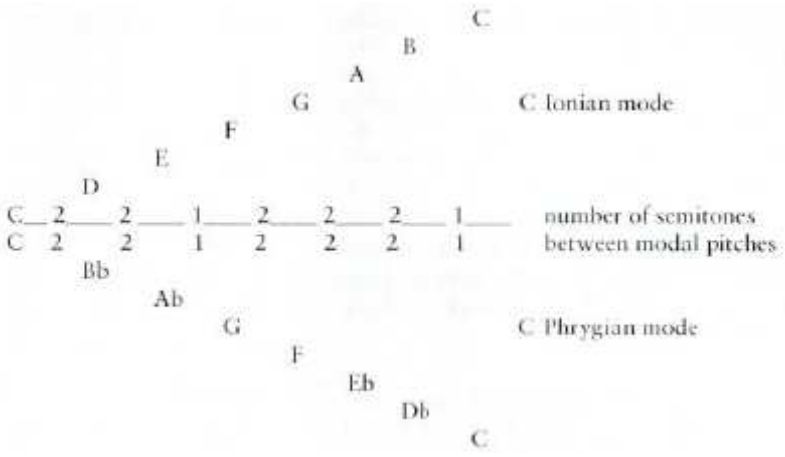
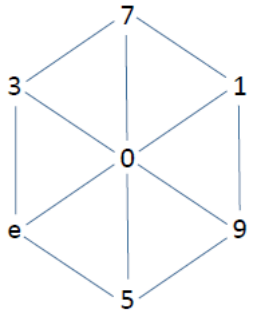
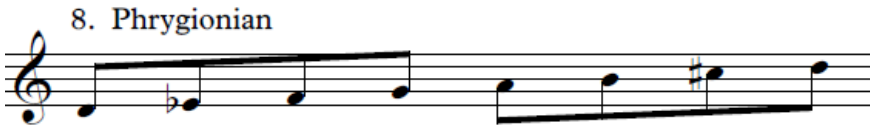


Figure 8. Representation of the Inversional Relationship of the Ionian and Phrygian Modes.

[14] Samson, Jim. 1977. *Music in Transition: A Study of Tonal Expansion and Atonality, 1900-1920.* New York: W.W. Norton, 156.
[15] Susanni/Antokoletz, 2012, 97.
[16] Susanni/Antokoletz, 2012, 95.

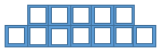
Hexagonal Mode 8: Phrygionian

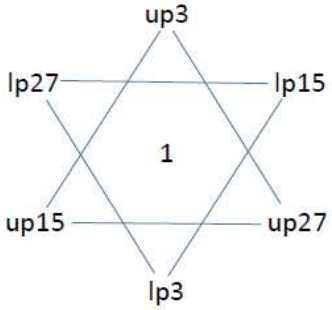


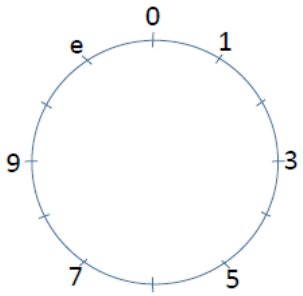


Scalar Formula: 1—♭2—♭3—4—5—6—7

Semitonal Formula: 1-2-2-2-2-2-1

Spatial Glyph: 





Prime Form: (012468t)

Interval-Class Vector: <262623>

Generating Tetrachord: (0135)

Plate 3. Hexagonal Mode 8, Phrygionian.

Hexagonal Mode 8: Phrygionian

HM8, Phrygionian, is so named for its nature as a Phrygian/Ionian hybrid, essentially the opposite hybridization of HM 9. Note that they share the same prime form generative tetrachord (0135). Another appropriate name is Phrygian Melodic Minor.

Viewed as a pitch collection, it has also been called Whole Tone Plus, since it is effectively the Whole Tone Scale plus one alien pitch class. One example of its use is in Charles Ives' *Concord Sonata,* in the movement "The Alcotts." This could be interpreted as the 2nd rotation of HM 8 (Figure 9, from beat 1 to the *cresc.* mark).

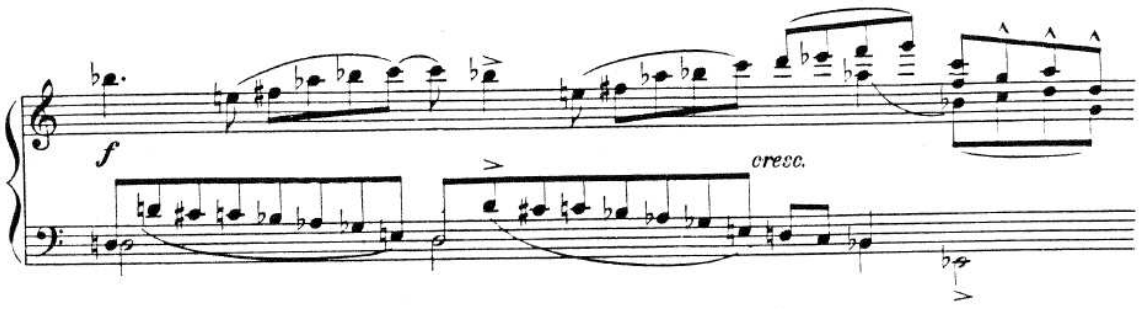
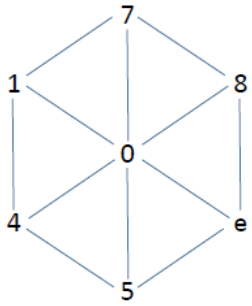


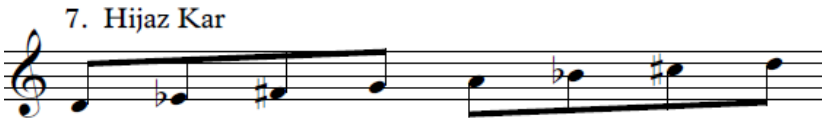
Figure 9. Ives, *Concord Sonata,* Movement 3, "The Alcotts." 18th stanza.[17]

There is a substantial difference in the sonorities produced when the alien pitch class is used as the modal tonic. In spite of the similarities between Phrygionian and Promethean, the marked contrast between the lower and upper tetrachords seems far more pronounced in Phrygionian. It is also the first of the modes whose contruction disallows most major/minor triadic chord structures. Only one minor and one major chord are formed from its scale degrees; its harmonic world is dominated by whole-tone scale sonorities. HM 8 is No. 1038 in Slominsky.

[17] http://ems.music.illinois.edu/courses/tipei/M202/Notes/alcotts.pdf (accessed 1/25/17)

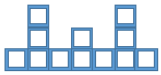
Hexagonal Mode 7: Hijaz Kar

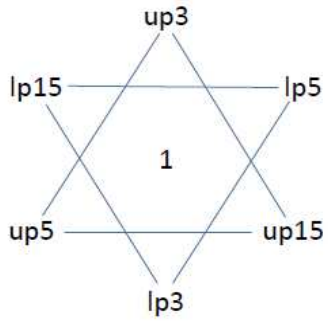


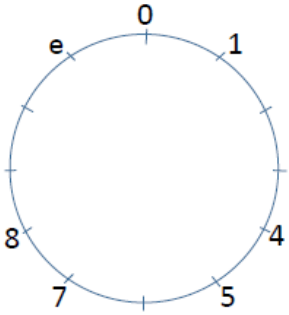


Scalar Formula: 1—♭2—3—4—5—♭6—7

Semitonal Formula: 1-3-1-2-1-3-1

Spatial Glyph: 





Prime Form: (0125689)

Interval-Class Vector: <424542>

Generating Tetrachord: (0145)

Plate 4. Hexagonal Mode 7, Hijaz Kar.

Hexagonal Mode 7: Hijaz Kar

HM7, Hijaz Kar, has the Arabic name for this mode, which is also called Bhairav in the Hindu system. It is at this point that we begin to depart from the more familiar ground of church modes and hybrids thereof, because of the presence of augmented 2nds in the scale. Susanni and Antokoletz point out an example of this collection in an excerpt from Ives' *Psalm XXIV* (see Figure 10), referring to it as a rotation of a Gypsy mode,[18] but later in the book speak of *the* Gypsy mode in the singular—and it is a significantly different pitch set. It is possible that they were referring to the 4th rotation of HM 7, which is essentially a harmonic minor scale with an augmented 4th degree—a scale I have heard called Hungarian Minor. Slonimsky catalogues this mode as No. 1082.

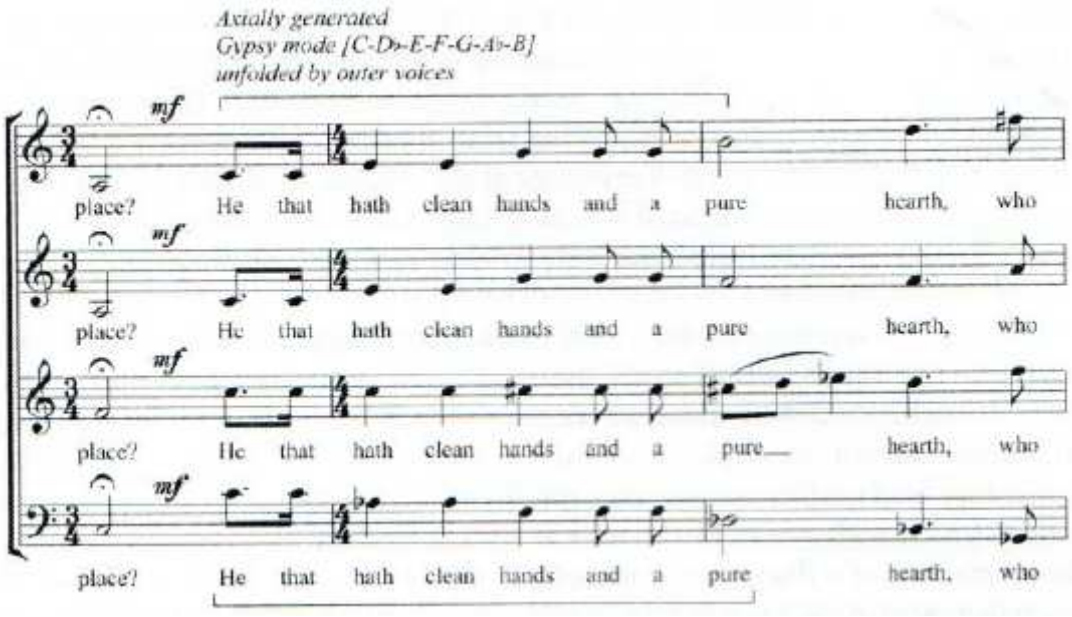
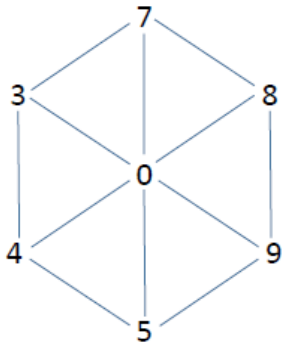
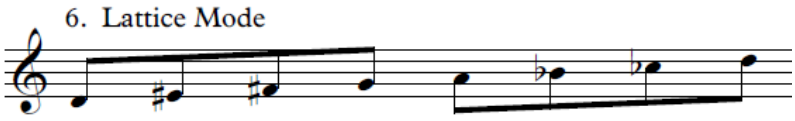


Figure 10. Ives' *Psalm XXIV*.[19]

[18] Susanni/Antokoletz, 2012, 74.
[19] Ibid., 2012, 75.

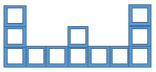
Hexagonal Mode 6: Lattice Mode

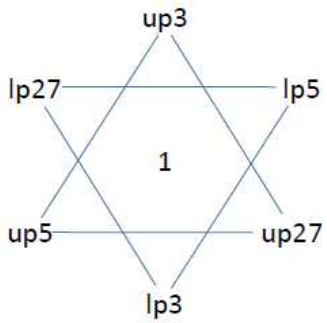


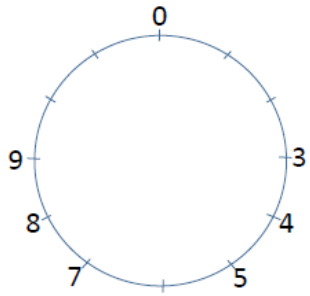


Scalar Formula: 1—♯2—3—4—5—♭6—♭♭7

Semitonal Formula: 3-1-1-2-1-1-3

Spatial Glyph: 





Prime Form: (0124569)

Interval-Class Vector: <434541>

Generating Tetrachord: (0125)

Plate 5. Hexagonal Mode 6, Lattice Mode.

Hexagonal Mode 6: Lattice Mode

It is starting with HM6 that the system incorporates pitch sets of greater and greater "eccentricity." None of the rest of the HMs are catalogued in Slominsky, most likely because when viewed as scales they either have large gaps in the middle (HMs 5, 4, and 2 have the gap of a major 3rd; HM 1 has a tritone gap) or augmented 2nds placed in an unusual manner (HM 6 and 3).

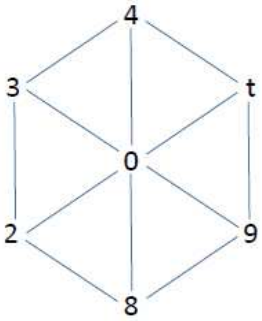
This mode is named for the "Harmonic Lattice" from W. A. Mathieu's *Harmonic Experience*, the original inspiration for Hexagonal Mode Theory, which is really the Neo-Riemannian *Tonnetz*. The prime form heptachord is Z-related to HM 4, and this mode also shares its asymmetrical generating prime form tetrachord with HM 3.

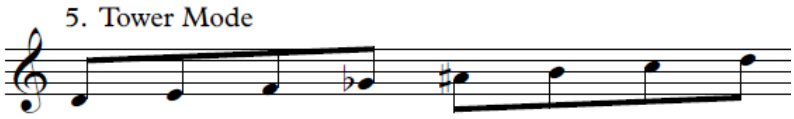
This is also the last of the modes that creates a harmonic world dominated by standard major and minor triads. Observing the combinations of pitch classes, there are six possible (037) constructions available—3 major and 3 minor chords, to be exact, just as in a diatonic key—and yet the capacity for the harmonic functionality of diatonicism is not present, due to the lack of a leading tone.

Hexagonal Mode 5: Tower Mode

HM5, Tower Mode, got its name because of the Spatial Glyph, which reminded me of a fortified tower. It is the first of the modes which contains the large gap of a major third between the 4th and 5th scale degrees, making it impossible to construct a diatonic triad from the root pitch. For this reason I also personally associate the mode with the Tower Card of the Tarot Deck, which alternately symbolizes war, destruction, ruin, or freedom from

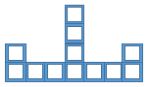
Hexagonal Mode 5: Tower Mode

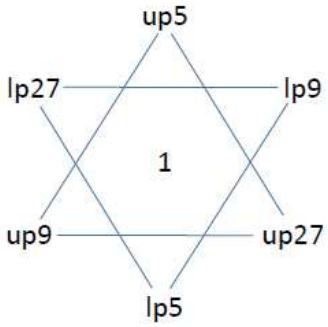


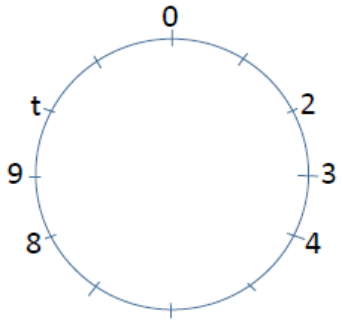


Scalar Formula: 1—2—♭3—♭4—♯5—6—♭7

Semitonal Formula: 2-1-1-4-1-1-2

Spatial Glyph: 





Prime Form: (0124678)

Interval-Class Vector: <442443>

Generating Tetrachord: (0124)

Plate 6. Hexagonal Mode 5, Tower Mode.

bondage,[20] perhaps because this is the first mode that makes any standard sense of tonicity nearly impossible. There are two possible (037) constructions, one major and one minor, but neither are based on the modal tonic as a root. In comparing the interval-class vectors of HM5 and HM8, we see that they share an interesting commonality that distinguishes them from other HMs; 3 of IC6. In HM8 this is connected to the strong presence of the Whole Tone scale, but in HM5 it is much less so.

The generating prime form tetrachord of this mode is shared with Mode 2.

Hexagonal Mode 4: Mikrokosmik

HM4, Mikrokosmik, is named for Béla Bartók's *Mikrokosmos,* a series of piano pieces that contains many perfect examples of inversional symmetry used as the basis for a composition. The idea came from the generating tetrachord, which matches the lower tetrachord of the Octatonic Scale, a favorite of Bartók's. More explicitly, this octatonic fragment (0134) is employed by Bartók as a symmetrical pitch construction around a central pitch axis in No. 140, "Free Variations," from *Mikrokosmos* (see Figure 11).

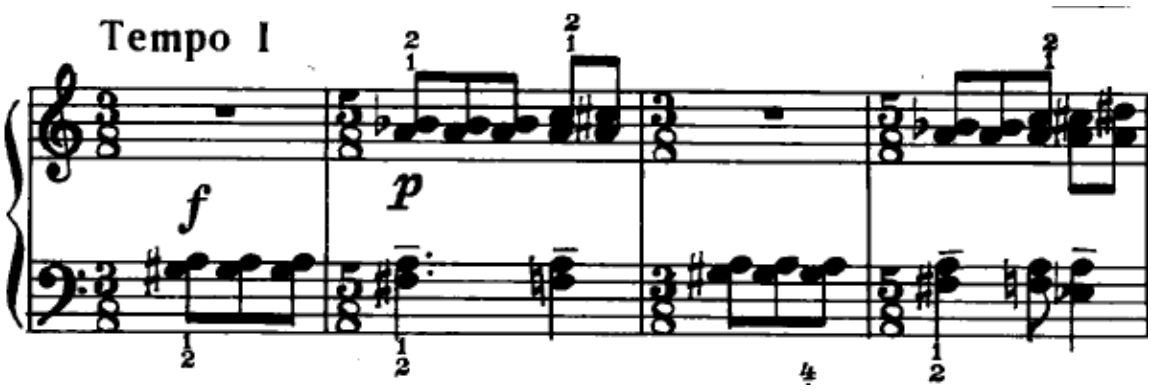
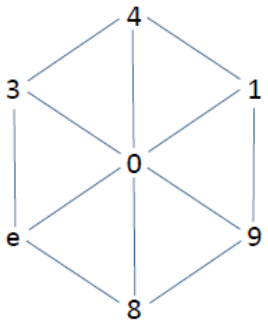
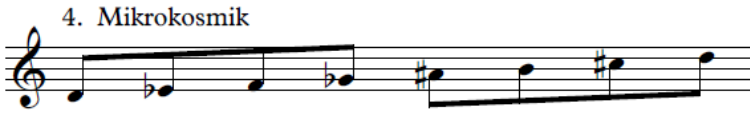


Figure 11. Measures 65-68 of Bartók's *Mikrokosmos* No. 140, "Free Variations."[21]

[20] Hulse, David Allen. 1996. *The Key of it All: An Encyclopedic Guide to the Sacred Languages & Magickal Systems of the World, Book Two: The Western Mysteries.* St. Paul, MN: Llewellyn Publications, 291.
[21] http://imslp.eu/files/imglnks/euimg/2/2d/IMSLP01559-Bartok_-_Mikrokosmos_Book_6.pdf (accessed 3/2/17)

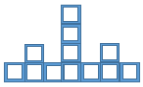
Hexagonal Mode 4: Mikrokosmik

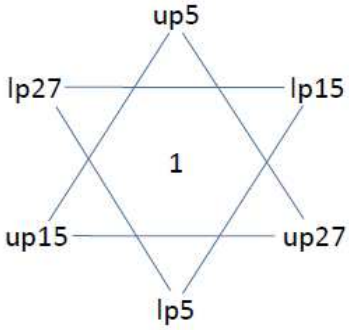


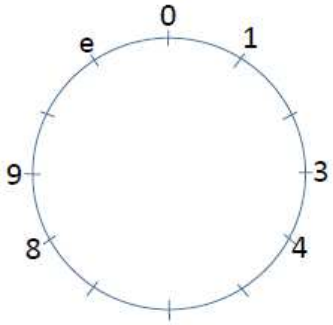


Scalar Formula: 1—♭2—♭3—♭4—♯5—6—7

Semitonal Formula: 1-2-1-4-1-2-1

Spatial Glyph: 





Prime Form: (0134578)

Interval-Class Vector: <434541>

Generating Tetrachord: (0134)

Plate 7. Hexagonal Mode 4, Mikrokosmik.

Another commonality shared between HM4 and HM10, HM7, and HM1 is the symmetrical nature of the prime form generating tetrachord. As mentioned earlier, a symmetrical tetrachord will only generate one HM, while an asymmetrical tetrachord will generate two. However, another interesting phenomenon with these particular HMs is the dual nature of the relationship between the tetrachords, because the upper one is both an inversion and a transposition of the lower tetrachord. In HM4, the transformation from the lower (0134) to the upper (0134) can either be T_0I or T_8, depending on your perspective.[22]

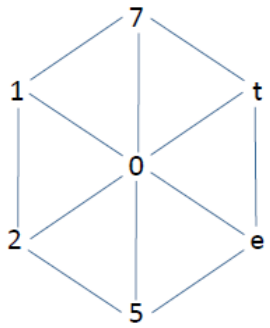
Another interesting aspect of this mode is that traditional harmony can actually rear up from within it, because its 2nd rotation bears strong similarity to a minor scale. With modal tonic D as on the previous page, if we rotate to tonic E♭ and substitute the appropriate enharmonic equivalents, we then have a scale E♭—F—G♭—B♭—C♭—D♭—D—E♭. Although it is missing a fourth degree, enough of the natural/harmonic minor mode is present here to effectively modulate back and forth from diatonic tonality to symmetrical chromaticism! The prime form heptachord is Z-related to the heptachord of Mode 6.

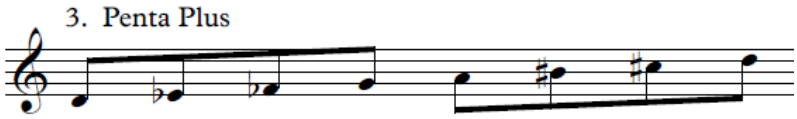
Hexagonal Mode 3: Penta-Plus

HM3, Penta-Plus, is so named because of the pentatonic scale which it contains, which would be enharmonically spelled D—E—G—A—C. I had heard this scale used in a recording by the Kronos Quartet, doing an arrangement by Steven Mackey of a traditional Tuvan song called "Kongerei," guest starring the Throat-Singers of Tuva.[23] I have heard other versions of this song that do not ground the pentatonic melody with that particular bass note; that may have been a decision by Mackey for this arrangement.

[22] To clarify, the index number 0 would still refer to movable 0, as the axial/central pitch of the mode.
[23] "Kongerei" is Track 1 on the Kronos Quartet's CD *Night Prayers* (1994).

Hexagonal Mode 3: Penta-Plus

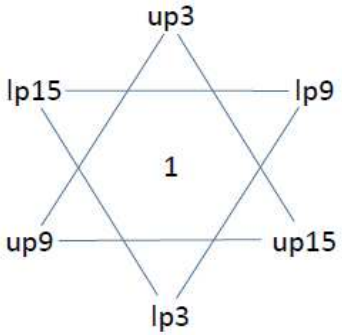


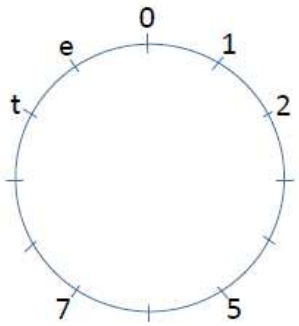


Scalar Formula: 1—♭2—♭♭3—4—5—♯6—7

Semitonal Formula: 1-1-3-2-3-1-1

Spatial Glyph:





Prime Form: (0123479)

Interval-Class Vector: <444342>

Generating Formula: (0125)

Plate 8. Hexagonal Mode 3, Penta-Plus.

I very much enjoyed the tonally ambiguous sound of the pentatonic scale arranged in this manner, and used it for a piece I wrote for the play *The New Earth* (2006), called "Dance of the Nine Muses." (See Figure 12) HM3 is that symmetrical pentatonic plus two extra pitch classes, hence the name Penta-Plus. This mode is generated by the same prime form tetrachord as Mode 6.

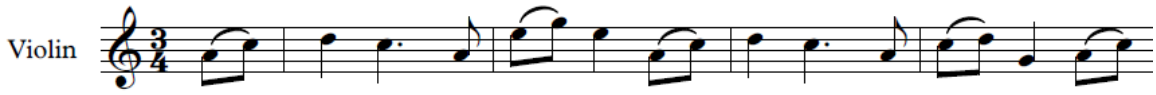


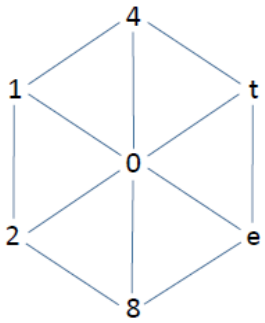
Figure 12. Melody for "Dance of the Nine Muses," by K. Scott Eggert, © 2006.

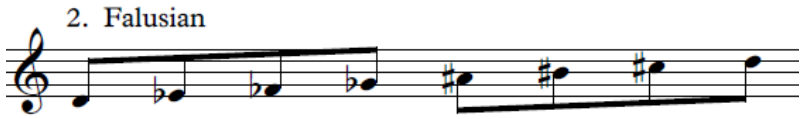
Hexagonal Mode 2: Falusian

The name for this form also came from the Spatial Glyph, which, to be frank, reminded me of the male sex organ (phallus). But this symbolism ended up being perfectly appropriate with regard to the connection I established between the modal system and Qabalah (see Chapter 3), as did the Spatial Glyph of the previous mode Penta-Plus—which can be seen as a representation of female sex organs (from the perspective of a view from above the labial hood).

This mode is generated by the same prime form tetrachord as Mode 5. Also, HM2, much like HM4 and HM5, cannot produce a proper tonic triad. Its interval vector shows a strong whole-tone scale presence. One major and one minor chord are possible. The closest one may come to a more standard modal sound from this pitch set is at Rotations 2 and 4, each of which begins with the aforementioned triads.

Hexagonal Mode 2: Falusian

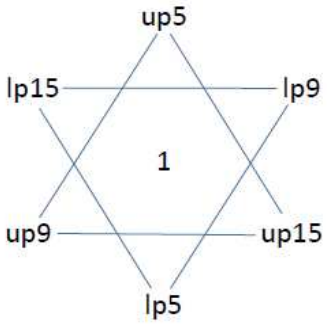


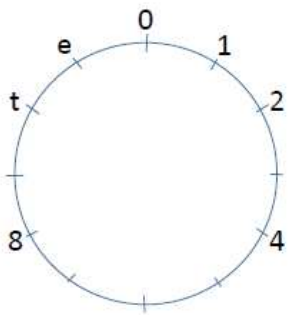


Scalar Formula: 1—♭2—♭♭3—♭4—♯5—♯6—7

Semitonal Formula: 1-1-2-4-2-1-1

Spatial Glyph:





Prime Form: (0234568)

Interval-Class Vector: <454422>

Generating Tetrachord: (0124)

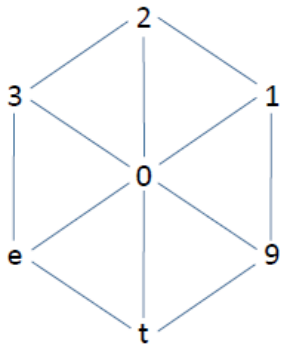
Plate 9. Hexagonal Mode 2, Falusian.

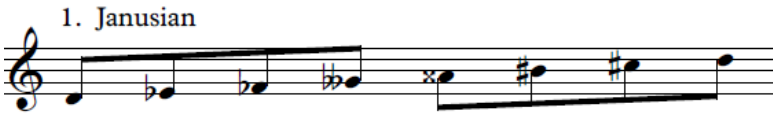
Hexagonal Mode 1: Janusian

The inspiration for this mode's name came from the unbelievably large gap in the middle (a tritone) between scale degrees 4 and 5. I likened it to a window or doorway, and thus chose a name based on Janus, the Roman two-faced god of doorways. Rotation 5 of this mode reveals that it is merely a chromatic progression of seven tones. As the most tightly compressed pitch set of all the modes, this one offers the least in terms of triadic harmonies, forcing some restraints upon the composer; one must keep more confined to melodic lines, intervals, and cluster harmonies.

In the next chapter I will discuss the historical precedent for the use of symmetrical pitch-class sets, and the symbolic associations I established which shaped both the modal system and the cycle of pieces I composed to demonstrate the system.

Hexagonal Mode 1: Janusian

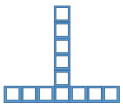


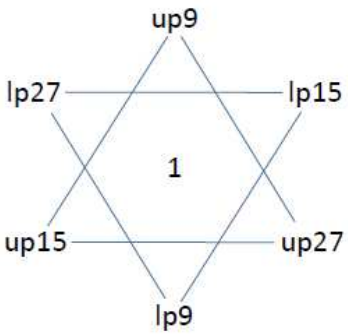


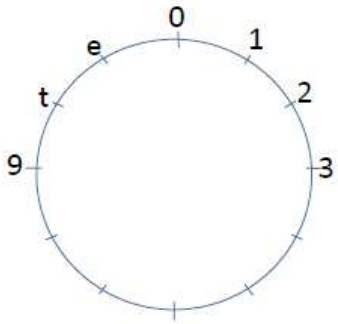
Scalar Formula: 1—♭2—♭♭3—♭♭4—×5—♯6—7

Semitonal Formula: 1-1-1-6-1-1-1

Spatial Glyph:







Prime Form: (0123456)

Inverval-Class Vector: <654321>

Generating Tetrachord: (0123)

Plate 10. Hexagonal Mode 1, Janusian.

CHAPTER 3

PHILOSOPHICAL AND SYMBOLIC RESONANCES

Historical Connections

In this section I shall discuss the various ideas that underlie Hexagonal Mode Theory, and that ultimately gave shape to the cycle *Hexagons*.

I have long held a fascination with Western esoteric and occult writings on music, which I was first exposed to through the writings of Joscelyn Godwin (*Harmonies of Heaven and Earth, Cosmic Music, The Harmony of the Spheres*), a professor of musicology at Colgate University. His books introduced me to threads of philosophical thought, regarding music, that stretch all the way back to Pythagoras himself. Music theory was not something that emerged of pure scientific observation; those who taught the first adepts and penned the first treatises perceived the laws of harmony in relationship to *ideas* they held about the universe. The concept of *the music of the spheres* drove their quest to learn harmony's laws. This was the belief that a cosmic music was being produced by the rotations of the celestial bodies, and that earthly music must attune to the music of the heavens in order to be in harmony with the universe and, ultimately, the Divine.

I became personally fascinated with the thought that an idea, a philosophy, would be the driving force behind the creation of a musical system; that the basic tools of crafting music could be imbued with intention. It was only perhaps five or six years ago that I was introduced to the work of Olivier Messiaen and his treatise, *The Technique of my Musical Language*. In Chapter 1 of *The Technique* Messiaen makes it clear that his modes and rhythms,

and the symmetries that define their nature and use, have a strong philosophical resonance for him.

> One point will attract our attention at the outset: *the charm of impossibilities*. It is a glistening music we seek, giving to the aural sense voluptuously refined pleasures. At the same time, this music should be able to express some noble sentiments (and especially the most noble of all, the religious sentiments exalted by the theology and the truths of our Catholic faith). This charm, at once voluptuous and contemplative, resides particularly in certain mathematical impossibilities of the modal and rhythmic domains. Modes which cannot be transposed beyond a certain number of transpositions, because one always falls again into the same notes; rhythms which cannot be used in retrograde, because in such a case one finds the same order of values again—these are two striking impossibilities.[24]

Thus Messiaen makes it clear that his system of Modes of Limited Transpositions and Non-Retrogradable Rhythms was not contrived merely for the purpose of a new and unusual approach to composition; the *system itself* was an expression of Christian concepts of eternal and enduring truth. I also believe that Hexagonal Mode Theory is built upon a philosophy—not a religious philosophy per se, but a metaphysical and spiritual one nonetheless—and that the music which results from its use is an expression thereof.

The Dance of Polar Opposites

In his lectures at Harvard University from 1939-1940, Igor Stravinsky, when discussing the modern currents of musical thought, the breakdown of diatonic tonality and the emergent paradigm of *symmetrical chromaticsm,* happened to speak of a metaphor at the heart of music that transcends the various musical languages and formulates the new systems as the old ones pass out of supremacy. This metaphor resonates quite well with the basic structures of HMT:

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[24] Messiaen, 1956, 8.

> We thus no longer find ourselves in the framework of classical tonality in the scholastic sense of the word. It is not we who have created this state of affairs, and it is not our fault if we find ourselves confronted with a new logic of music that would have appeared unthinkable to the masters of the past. And this new logic has opened our eyes to riches whose existence we never suspected…Having reached this point, it is no less indispensable to obey, not new idols, but the eternal necessity of affirming the axis of our music and to recognize the existence of certain poles of attraction. Diatonic tonality is only one means of orienting music toward these poles. The function of tonality is completely subordinated to the force of attraction of the pole of sonority. All music is nothing more than a succession of impulses that converge toward a definite point of repose…This general law of attraction is satisfied in only a limited way by the traditional diatonic system, for that system possesses no absolute value.[25]

> So our chief concern here is not so much what is known as tonality as what one might term the polar attraction of sound, or an interval, or even of a complex of tones. The sounding tone constitutes in a way the essential axis of music. Musical form would be unimaginable in the absence of elements of attraction which make up every musical organism and which are bound up with its psychology. The articulations of musical discourse betray a hidden correlation between the *tempo* and the interplay of tones. All music being nothing but a succession of impulses and repose, it is easy to see that the drawing together and separation of poles of attraction in a way determine the respiration of music…In view of the fact that our poles of attraction are no longer within the closed system which was the diatonic system, we can bring the poles together without being compelled to conform to the exigencies of tonality.[26]

The concept of a "dance of polar opposites" (to borrow from George Rochberg[27]) resonates quite well with the concepts belying Hexagonal Mode Theory. If we refer to the Plates of Chapter 2 of this document, we will see this balance of opposites in every visual representation of each Hexagonal Mode, but perhaps finding clearest expression in the Hexagram Formation, with each of the two superimposed triangles representing positive and negative poles (overtones and undertones, respectively). A Hexagonal Mode embodies this

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[25] Stravinsky, Igor. 1959. *Poetics of Music in the Form of Six Lessons.* New York: Vintage Books, Inc., 37.
[26] Stravinsky, 1959, 38.
[27] Rochberg, George. 2004. *The Aesthetics of Survival: A Composer's View of Twentieth-Century Music,* rev. ed. Ann Arbor: University of Michigan Press, 250. Chosen by Jeremy Gill as the title of a posthumous collection of Rochberg's writings, which he edited.

idea of a dance, a balance, symmetry, a force of attraction between contrasting forms of energy.

It could be said that the symbol of the hexagon is representative of one of the most important new compositional techniques to emerge in the early 20th century—axial symmetry. Susanni and Antokoletz track the historical basis of theoretical observation of axial symmetry to have begun with the German theorists Bernhard Ziehn and Georg Capellen. As they struggled to find a basis for analysis of the new harmonic language emerging in the late 19th century, Ziehn also did studies on Renaissance polyphony, and observed a technique of contrapuntal inversion. This led him to "a new notion of tonal centricity based on an axis of symmetry" that was perfectly applicable to contemporary art music.[28]

In tracing the history of symmetrical chromaticism as a technique of composition, one finds it to have emerged almost simultaneously as the product of two differing schools of thought and investigation. In one, the Second Viennese School, the propensity for work with symmetrical pitch-class sets came as a by-product of the evolution of German chromaticism. In the other, we find such ideas inextricably linked with another propensity of the early modernists—that of *modality*. There is no doubt that these two schools of thought fell under each other's influence, but the primary difference is the attitude toward pitch centricity. Schoenberg's conception of serial composition is based around the idea of there being no tonal center to ground the harmonies, while other composers who took a modal approach retained the concept of centricity, either as a standard modal tonic or as an axis around which symmetrical pitch-sets could revolve.

[28] Susanni/Antokoletz, 2012, xiv.

It is well known that Hungarian composer Béla Bartók (1881-1945) did extensive field studies on the folk modes of Eastern Europe, along with his good friend, fellow composer Zoltán Kodály (1882-1967). Elliott Antokoletz, in his book *The Music of Béla Bartók,* tracks the evolution of Bartók's musical language as a path trod through both the folk modes of old and the late Romantic/early Modernist tropes of his day:

> Bartók's musical language may be approached from either of two points of view—one in which the concepts and terminology are derived from folk-music sources, and the other in which the concepts and analytical tools are derived from certain currents in contemporary art music…the assumptions underlying *both* approaches are essential in understanding the evolution of Bartók's musical language and that fundamental relationships exist between the diatonic folk modes and various abstract pitch formations commonly found in contemporary compositions.[29]

Antokoletz acknowledges the influence of Germanic serialism on Bartók, but quickly moves to trace a lineage of musicality more rooted in the practices of Russian nationalism and French impressionism:

> While the atonal and twelve-tone works of the Viennese composers and certain works of Bartók have a common origin in the extended chromatic tonal relations of late Romantic music, Bartók's music also has its origins in sources that are largely removed from the Germanic tradition of the atonalists. Reaction against the ultra-chromaticism of the Wagner-Strauss period led Bartók in two new directions. With an increased demand for a national Hungarian art, Bartók turned to the exploration of authentic folk music from Eastern Europe. At the same time, as Hungarian cultural life, after a long tradition of Germanic influences, was becoming reoriented toward that of France, Bartók found a new source for his musical language in the works of Debussy.[30]

> Bartók was surprised to find in Debussy's work "pentatonic phrases" similar to those in Hungarian peasant music. He attributed this to influences of folk music from

[29] Antokoletz, Elliott. 1984. *The Music of Bela Bartok: A Study of Tonality and Progression in Twentieth-Century Music.* Berkeley, CA: University of California Press, 1.
[30] Antokoletz, 1984, 2.

> Eastern Europe, particularly Russia, and felt that similar Russian folk influences could be traced in the work of Stravinsky. Bartók's suggestion that the development of his own works sprang from sources similar to those of Debussy and Stravinsky (although they developed largely independently of one another) brings to our attention a larger historical framework within which his personal musical language emerged. Mussorgsky is a major forerunner of the tendency toward assimilation of folk music, and there is evidence that Debussy acquired certain features of folk music primarily from Mussorgsky. Similarly, in works by Stravinsky such as *Le sacre du printemps,* we find an extension of those Russian folk elements that had already appeared in the works of the Russian nationalists. Thus, in the music of the Russian nationalists, French impressionists, and Hungarian composers (Kodály as well as Bartók) there is a common bond in the inclination toward the pentatonic and modal constructions of folk music, such constructions forming a nonfunctional basis on which a new kind of tonality (or sense of pitch-class priority) is established.[31]

Thus we have a picture of a tree of lineage, supposedly originating with Mussorgsky's original experiments with incorporation of folk elements, passing down through Debussy, Bartók, and Stravinsky, while similar ideas in a different context find expression in the music of Schoenberg, Berg, and Webern. George Rochberg, however, offers a slightly different take on these traceries through the history of composition:

> In order to understand how musical language transforms itself slowly, over time, in what follows I trace the story of the emergence of symmetrical chromaticism from its asymmetrical tonal sources. Chiefly, I am guided by a biological analogy that views stages of the evolution of organic, chromatic functions as similar to stages in the morphology, that is, growth and development, of living, organic form and substance. Rather than the standard linear view, which tends to consider the development of historic styles to be determined by individual composers' contributions, I prefer the view that considers this development to be determined by significant nodal points in the overall growth process that lead to equally significant plateaus of maturation, where structural-organic coherence is brought to maximum realization through the collective efforts of generations of composers. The perfection of a particular tendency, form, or style of musical expression has often been slow, hard work, and its shapers are rarely conscious that they are part of a larger process. Because of its breadth and multiplicity of vision, this view permits us to see virtually everything significant in the last two centuries in a more integrated, comprehensive light.[32]

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[31] Antokoletz, 1984, 3.

[32] Rochberg, George. 2012. *A Dance of Polar Opposites: The Continuing Transformation of our Musical Language.* Jeremy Gill, ed. Rochester, NY: University of Rochester Press, 9.

Perhaps it follows, then, that symmetry would inevitably rise to prominence as a new method of tonal organization, or that the "dance of polar opposites"—which Jeremy Gill alludes to in the title of his book of Rochberg's writings—would, with the abandonment of diatonicism, move from the realm of major/minor or consonance/dissonance into deeper layers of musical organization, from the macro to the micro, changing the parameters of scalar and harmonic construction.

So as to examine how this principle of the balance of polarities is embodied within the philosophy and structure of HMT, let us consider some of the particular symbolism historically associated with the geometric figures of the hexagon and hexagram. In preface to this I will concede that my sources are not all peer-reviewed work, and perhaps their full authenticity or scholarly veracity may be subject to debate, but the material served as sources for me because of ideas and concepts that inspired and resonated with me, first and foremost, as an artist. As they informed my approach to the cycle *Hexagons,* they are therefore relevant to a discussion of what those pieces represent to me.

Hexagonal Symbolism

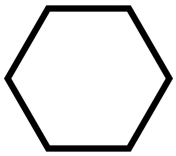

Figure 13. The Hexagon.

The hexagon (see Figure 13) is the geometric representation of the *hexad,* the grouping of the number 6, which had particular significance to the Pythagoreans and Neopythagoreans, the philosophers and mathematicians who revere numbers as other

philosopher-priests of various cultures revere gods and spirits. The Syrian philosopher Iamblichus (ca. 245—ca. 325), the author of the first biography of Pythagoras, wrote of the hexad in *The Theology of Arithmetic:*

> The hexad is the first perfect number, for it is counted by its own parts, as containing a sixth, a third, and a half…It arises out of the first even and first odd numbers, male and female, as a product and by multiplication; hence it is called 'androgynous.' It is also called 'marriage,' in the strict sense that it arises not by addition, as the pentad does, but by multiplication. Moreover, it is called 'marriage' because it is equal to its own parts, and it is the function of marriage to make offspring similar to parents…After the pentad, they used naturally to praise the number 6 in very vivid eulogies, concluding from unequivocal evidence that the universe is ensouled and harmonized by it and, thanks to it, comes by both wholeness and permanence, and perfect health, as regards both living creatures and plants in their intercourse and increase, and beauty and excellence…if the soul gives articulation and composition to the body, just as the soul at large does to formless matter, and if no number whatsoever can be more suited to the soul than the hexad, then no other number could be said to be the articulation of the universe, since the hexad is found stably to be maker of soul and causer of the condition of life (hence the word 'hexad').[33]

The hexagon appears within nature in several places, including the honeycomb, the snowflake, the scutes of a turtle's carapace, and the structure of crystals. For more grand examples, there is the hexagonal structure of DNA codons (which gives the hexagon a direct connection to the source of organic life), the Giant's Causeway in Ireland, and the hexagon-shaped cloud observed at the southern pole of the planet Saturn. Its occurrence as a natural phenomenon no doubt added to its mysticism for the Pythagoreans.

The hexagon is also the basic structure of oppositional tension and balance behind the well-known hexagram (see Figure 14). Most people are aware of the six-pointed star as the symbol of the Jewish people, who know it as the Magen Dawid[34] and use it on the flag of

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[33] Waterfield, Robin, trans. 1988. *The Theology of Arithmetic: On the Mystical, Mathematical and Cosmological Symbolism of the First Ten Numbers.* (attributed to Iamblichus) Grand Rapids, MI: Phanes Press, 75-77.

[34] http://www.jewishencyclopedia.com/articles/10257-magen-dawid (accessed 2/13/17)

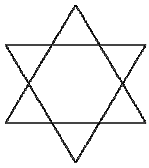

Figure 14. The Hexagram.

Israel (see Figure 15). This is the particular form of the six-point star as a pair of superimposed or interlocking triangles, one pointing skyward and the other toward earth. The geometric structure itself gestures to two planes of being, secular and spiritual, that exist both in balance and in tension, much as harmonies enjoy relative meaning in a structure of musical sounds.

Figure 15. The Flag of Israel.

Although this is a commonly held identification of this symbol, it is hardly the only one that exists. Many other cultures and groups have ascribed their own meanings to the hexagram. Here are some potent examples, all of which demonstrate the unity of oppositions evident in the structure that balances distinct elements.

The Hindus use the hexagram to represent the Anahata, the "unstruck sound," the symbol of the Heart Chakra (see Figure 16). In this context it symbolizes the union of Shiva and Shakti, the god-symbols of the masculine (represented by the upward pointing triangle) and feminine (represented by the downward pointing triangle) energies. The hexagram

within the twelve-petal lotus represents the union and balance of these two opposing forces.[35]

Figure 16. A visual representation of the Heart Chakra, containing the hexagram.[36]

In Western Occultism, the hexagram is associated with the central *sephirah* on the Tree of Life (see Figure 17), called *Tiphareth* ("Beauty"). Christian Qabalists associate the symbol with love, healing, the Sun, and Christ as the Son of God. Practitioners of Hermetics associate the symbol with the Hermetic axiom "As Above, So Below," a statement also known as the Principle of Correspondence, which relates all physical phenomena of the Earth plane as reflections of divine or Heavenly phenomena.[37]

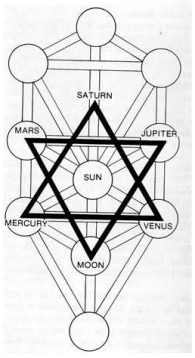

Figure 17. The Tree of Life, from Qabalah, and the central Hexagram representing the Seven Planets of ancient alchemy.[38]

[35] http://www.tantra-kundalini.com/anahata.htm (accessed 2/13/17)
[36] http://www.chakra-anatomy.com/heart-chakra.html (accessed 3/3/17)
[37] Three Initiates. 1940. *The Kybalion: A Study of the Hermetic Philosophy of Ancient Egypt and Greece.* Chicago: Yogi Publicatiion Society, 28.
[38] http://mysteriouswritings.com/the-skull-on-the-tomb-the-rose-on-the-cross/ (accessed 2/13/17)

In the modern religion of Wicca (Witchcraft), the hexagram is used as a talisman and for the conjuring of spirits, often in *unicursal* form (see Figure 18). Amongst some practitioners it is said to stand for the seven planets of ancient astrology, while other claim it to stand either for the unification of the elements of Fire and Water; or for the unification of all four elements, since visually it contains the symbols of each (Fire—upward triangle, Water—downward triangle, Air—bisected upward triangle, Earth—bisected downward triangle).[39]

Figure 18. The Unicursal Hexagram, used in Wicca and occult practice.[40]

Throughout the world, ambulances are marked with a blue six-pointed symbol known as the Star of Life (Figure 19), based on the hexagram, with a Rod of Asclepius in the center. The six points symbolize the six primary tasks of first responders: Detection, Reporting, Response, On-Scene Care, Care in Transit, and Transfer to Definitive Care.[41]

Figure 19. The Star of Life, a worldwide symbol of medicine, based on the Hexagram.

[39] Melville, Francis. 2003. *The Secrets of High Magic.* Hauppauge, NY: Barron's Educational Series, Inc., 26.
[40] http://symboldictionary.net/?p=1367 (accessed 3/3/17)
[41] http://www.alamance-nc.com/ems/about-us/star-of-life/ (accessed 2/13/17)

The legend of the Seal of Solomon (Figure 20) is a staple of Arabic lore. The legend tells that King Solomon himself had a signet ring bearing the seal, which he could use to control demons. The seal was also traditionally engraved on the bottoms of drinking cups, and the famous *Arabian Nights* tells the story of how Sindbad presented such a cup to Harun Al-Rashid.[42]

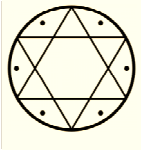

Figure 20. The Seal of Solomon.

Albert Mackey wrote in his book *Encyclopedia of Freemasonry* regarding the Seal of Solomon:

> …a hexagonal figure consisting of two interlaced triangles, thus forming the outlines of a six-pointed star. Upon it was inscribed one of the sacred names of God, from which inscription it was supposed principally to derive its talismanic powers. These powers were very extensive, for it was believed that it would extinguish fire, prevent wounds in a conflict, and perform many other wonders…The two triangles were said sometimes to be symbols of fire and water, sometimes of prayer and remission, sometimes of creation and redemption, or of life and death, or of resurrection and judgment. But at length the ecclesiologists seem to have settled on the idea that the figure should be considered as representing the two natures of our Lord—his Divine and his human.[43]

Thus Hexagram and Hexagon both are conceptually linked to many esoteric meanings: love, sex, healing, unification, communication, beauty, harmony, balance, protection, conjoining, equality, and perfection. There is probably no symbol more appropriate for representation of "the dance of polar opposites."

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[42] http://www.jewishencyclopedia.com/articles/13843-solomon-seal-of (accessed 3/3/17)

[43] Mackey, Albert G. 1921. *An Encyclopaedia of Freemasonry and its Kindred Sciences Comprising the Whole Range of Arts, Sciences, and Literature as Connected with the Institution, Vol. II.* New York: The Masonic History Company, 674.

The Qabalah Connection

The basis for the numbering system of the Hexagonal Modes, and the ordering of the cycle *Hexagons,* is the ancient system of Qabalah and the glyph known as the *Tree of Life:*

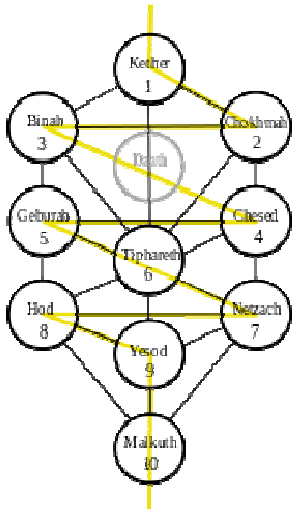

Figure 21. The Tree of Life.[44]

Qabalah is originally an esoteric Jewish system of mystical interpretation of scripture, which was detailed in the Hebrew tract *Sefer Yetzirah* and was co-opted by medieval and Renaissance Christians, eventually existing in a form used by Hermetic philosophers and forming the basis of the spiritual practices of groups such as the Freemasons, Rosicrucians, and the Order of the Golden Dawn. It also inspired the modern Tarot deck, a tool of divination. Qabalah regards the manifest universe as a series of emanations from the mind of God, and the Tree of Life pictured above is considered to be a map of those emanations, which are divided into ten *sephiroth,* or "numbers." Meditation on each individual *sephirah* is used by Qabalists to journey from the material world through the divine emanations, with the purpose of unifying the consciousness of man with the Divine Presence. The yellow line

[44] http://www.tokenrock.com/explain-tree-of-life-160.html (accessed 2/13/17)

running through the above picture shows the Lightning Flash, the path by which the energy of God travels through creation and manifests the material universe.[45] The consciousness of man, by means of study and meditation, can travel back up this pathway in reverse, to experience the universe in its true form and unlock Creation's mysteries.

The numbering system of HMT is based upon this model, so that each mode is made to represent a *sephirah*. Thus the reverse-order numbering of the modes reflects the reverse pathway of the Lightning Flash from 10 to 1, representing a journey where each mode invokes the energy of number and emanation.

Each of the *sephiroth* also have Hebrew names, as can be seen in the Tree of Life, and have various correspondences with celestial bodies, colors, elements (in the sense of the four-element system of ancient alchemy—earth, air, fire, and water), body parts, and perfumes. The following is not intended as a comprehensive list of these correspondences, because Qabalah is a complex study, and there are myriad differences between Hebrew and Hermetic Qabalah teachings, but it should serve to impart a basic understanding of a complex subject. All the material here is culled together from various sources which I shall list in a footnote at the end.

The 10th sephirah is named *Malkuth,* which means "Kingdom." It represents the Earth, the material universe, the ground upon which we walk; it is associated with all four elements and a tetrad of colors—Citrine, Olive, Russet Brown, and Black.

The 9th sephirah is *Yesod,* which means "Foundation." It represents the *astral light*, the Moon, and is associated with the generative organs, the color violet, the element of air, the perfume of jasmine, and is symbolized by the perfume censer and sandals.

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[45] Halevi, Z'ev ben Shimon. 1979. *Kabbalah: Tradition of Hidden Knowledge.* New York: Thames and Hudson, 7.

The 8th sephirah is *Hod,* which translates to both "Reverberation" and "Splendor." It represents the planet Mercury, the reasoning mind, science and language; its color is orange, its element is water, its perfume is storax, and is symbolized by the Masonic apron.

The 7th sephirah is *Netzach,* which translates to "Victory" and "Eternity." It represents the planet Venus, love and the instinctual self, nature; its color is emerald, its element is fire, its perfume is rose, and it is symbolized by the rose and the lamp.

The 6th sephirah is *Tiphareth,* which means "Beauty." It represents the Sun, the Higher Self, sacrifice, healing, the heart, and harmony; its color is gold, its element is air, its perfume is olibanum, and it is symbolized by the cube and the phoenix.

The 5th sephirah is *Geburah,* which means "Severity." It represents the planet Mars, judgment, strength, and the warrior spirit; its color is red, its perfume is tobacco, and its symbols are the pentagon and the sword.

The 4th sephirah is *Chesed,* which means "Mercy." It represents the planet Jupiter, the sheltering sky, and the kindly shepherd; its color is blue, its perfume is cedar, and it is symbolized by the square, the scepter and the unicorn.

Between the 3rd and 4th sephiroth is the "hidden" or "invisible" sephirah, *Daath,* which means "Knowledge." It is associated with the throat, but is not given a number, and its essence is a mystery; it represents an abyss that must be crossed before reaching the final triad of sephiroth, Atziluth, the archetypal world, the highest aspirations of the soul.

The 3rd sephirah is *Binah,* which means "Understanding." It represents the planet Saturn, the Divine Feminine, and the Will to Form; its color is black, its perfume is myrrh, and it is symbolized by the triangle, the yoni (vagina), and the cup.

The 2nd sephirah is *Chokhmah,* which means "Wisdom." It represents the Zodiac, the Divine Masculine, and dynamic outpouring energy; its color is grey, its perfume is musk, and its symbols are the line and the phallus.

The 1st sephirah is *Kether,* which means "Crown." It represents the Godhead, the first motion, the All That Is; its color is brilliant white, its perfume is ambergris, and its symbols are the point and the crown.[46]

There are also, in this philosophy, different groupings of the sephiroth. *Malkuth* stands alone at the bottom as *Assiah,* the Active World. This is the world of physical manifestation and sensation, along with the "unseen energies of matter." The trinity of *Yesod, Hod,* and *Netzach* is called the Astral Triangle, also known as *Yetzirah,* the Formative World. This is the world of "subtle and fleeting patterns behind matter." The next trinity of *Tiphareth, Geburah,* and *Chesed* is known as the Ethical Triangle, or *Briah,* the Creative World. This is considered to be the world of pure intellect, and the Archangels. The final trinity of *Binah, Chokhmah,* and *Kether* is called the Supernal Triangle, or *Atziluth,* the Archetypal World. This trinity is the realm of pure spirit, the splitting of the Godhead into male and female aspects, which births all other worlds below it.[47]

It is also worth noting that the glyph of the Tree of Life is of itself a work of hexagonal geometry, particularly if one observes the configuration of the first through the sixth sephiroth.

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[46] Sources: Halevi (1979), Hulse (1996), Melville (2003), Wang (1983). See Bibliography.
[47] Wang, Robert. 1983. *The Qabalistic Tarot: A Textbook of Mystical Philosophy.* York Beach, ME: Samuel Weiser, Inc., 39.

Correspondences between the Hexagonal Modes and the Tree of Life

Determining the correspondences between each mode of HMT and the Tree of Life occurred in several ways. I attempted to avoid determining any correspondences by way of subjective musical qualities (such as a personal perception of the "character" of a mode), and instead focused on either the history or basic construction of the pitch-class collection and how this could be connected in some way to the specific attributes of the sephiroth, as they were defined in my source material. I did not always succeed in doing so, however.

The first and easiest choice was the designation of Dorian as Mode 10, for reasons I believe should be obvious given the long history of Dorian's use in the music of various cultures and societies throughout humankind's history, and its place as the only diatonic collection in the series, thus giving it the strongest correspondence with mundane reality. In this framework Dorian is the "Earth mode" and was thus a perfect fit for *Malkuth*.

The other three modes syncretized with the "Astral Triangle" were chosen because their scalar progressions involve steps no bigger than IC3, and thus their functionality is the most like a standard musical mode, as opposed to the other pitch collections that contain large gaps. My determination for each individual numbering went according to an examination of the disjunct tetrachords in correspondence with a symbolic rendering of the other four alchemical elements (air, water, fire) as described in Frances Melville's *The Secrets of High Magic*.

According to Melville, the symbol for air is a horizontally bisected, upward-pointing triangle. The triangle points upward because the nature of air is ascending, and the line running across it shows that its power to ascend goes no further than the atmosphere (as opposed to fire, which may ascend into the heavens).[48] In looking at the tetrachords of

[48] Melville, 2003, 26.

Promethean, I viewed the lower Ionian tetrachord as representing "ascending" motion (connected to its predominantly "major" character), and the upper Phrygian tetrachord as representing "descending" motion (due to its predominantly "minor" character); thus the scale begins with ascending motion that meets a barrier as it rises, and this seemed a good fit for the 9th sephirah *Yesod.* I also thought that Promethean's link with the Acoustic Collection (and the harmonic series) made for an interesting connection as well, since *Yesod* is the first "astral" sephiroth and the Moon is so visible from Earth; thus this pitch collection has "heavenly" and "earthy" associations in nearly equal measure.

Melville describes the element of water as "descending," since water falls from the sky and seeps deep into the earth; but I noted that water also has the power to ascend (evaporation). So with Phrygionian's tetrachord, arranged in the opposite of Promethean, having a "descending" motion in the lower half and "ascending" in the upper, I felt this mode a good fit for the watery character of *Hod,* with the descending motion of its lower half being of "primary" influence. I also have always felt the whole tone scale to have a somewhat "floating, dreamy" quality that I could easily associate with water.

The connection between Hijaz Kar and the element of fire was, for me, entirely based on my own perceptions of the energies of the mode. Such Gypsy modes I have only heard as the basis for joyous, energetic dance; the exotic character of the lowered 2nd degree combined with the major 3rd seems, in my own experience, to impart a fiery character to the music, rarely being used for anything of a more meditative or somber nature. Thus Hijaz Kar was perfect for the 7th sephirah, *Netzach.*

The Lattice Mode holds a special place in its relation to the source inspiration for the idea which generated the entire system, but it also has a particular relationship to the number

6. In the treatises of Gioseffo Zarlino[49] and Jean-Phillippe Rameau,[50] the source of the entire Western system of musical tuning is revealed as the *senario,* the first six numbers and partials of the overtone series (although Rameau's theories on the matter differed from Zarlino's), because it is within those partials that one finds the intervals of the perfect 5th (3rd partial) and the major 3rd (5th partial), and the minor 3rd is revealed as the interval between partials 5 and 6. If these three intervals are balanced by their complements (P5/P4, M3/m6, and m3/M6) and all these intervals are used to form a pitch set around a tonic, you have Lattice Mode. Thus Lattice Mode holds its rightful place as HM6, the heart of HMT, just as *Tiphareth* is associated with the human heart.

Tower Mode came to be associated with *Geburah* for the same reason as it got its name from the Tower Card of the Tarot Deck—because its *spatial glyph* reminded me of a fortified tower. Besides the warlike implications of this image, I also felt the interval-class vector presented a connection here, given that HM5 contains 6 of IC6, or the tritone (and is the only mode to have it so besides HM8). A mode that is so rich in the presence of the *diabolus en musica* seemed like a natural fit for the sephirah associated with the Roman god of war.

Mikrokosmik, as stated in part one, got its name from its lower tetrachord (0134) and the connection with the Octatonic Scale and, ultimately Béla Bartók. *Chesed* is associated with a quality of benevolent fatherhood, and so it occurred to me to associate this sephirah with Bartók envisioned as a wise father figure. Also, there is the connection between the tetrachord and the number 4.

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[49] Wienpahl, Robert W. "Zarlino, the Senario, and Tonality." *Journal of the American Musicological Society,* Vol. 12, No. 1 (Spring, 1959), pp. 27-41, 30.

[50] Rameau, Jean-Philippe. 1971. *Treatise on Harmony.* New York: Dover Publications, 6.

With the mode Penta-Plus, I already had an association with feminine energy thanks to the aforementioned "Dance of the Nine Muses" from my soundtrack *The New Earth,* along with my observed connection between pentatonic scales and the music of indigenous cultures, which are often matriarchal. It was finally the *spatial glyph* that clinched the connection with *Binah,* the Queen Mother, with its distinctly vaginal imagery; it was the same for Falusian and *Chokhmah.* The phallus is the symbol of the penetrative, dynamic outpouring of energy that *Chokhmah* represents.

Finally, there is the association between Janusian and *Kether.* Besides the fact that it is the only one of the modes named for a deity, it made the most logical sense for Janusian to be Mode 1, as its pitches are all clustered about the tonic, and this easily symbolizes a point of contraction at the opposite end of the spectrum from HM10…as God's energy expands outward through the universe, all the way to *Malkuth*, and all energy traveling back to its source contracts down to a single point, a simultaneity. I also had observed that many melodies I knew for sacred chant, like the intoning of the Torah or Sanskrit mantras, could all be found within that tightly compressed pitch space. And as the most difficult of the modes to work with in a larger compositional sense, Janusian belongs in the sphere of *Kether.*

The next chapter shall be concerned with the *Hexagons* cycle, and the compositional process that integrated these ideas into a musical journey.

CHAPTER 4

THE *HEXAGONS* CYCLE

Modal Composition

In keeping with the original inspiration of Pythagoras and the "music of the spheres," the central concept behind HMT is that of a system of tuning and modality that is the direct expression of a greater philosophy. Therefore my starting place for *Hexagons* was that the pitch set, in and of itself, expressed the meaning of the piece. So my original choice was for each piece to be a study of one mode, and the piece would only use the pitches of that mode, so that each piece would be a full unadulterated experience of the "modal sphere." I am reminded of another statement that Stravinsky made in *Poetics:*

> …my freedom will be so much the greater and more meaningful the more narrowly I limit my field of action and the more I surround myself with obstacles. Whatever diminishes constraint diminishes strength. The more constraints one imposes, the more one frees one's self of the chains that shackle the spirit.[51]

From my own experiences with Native American music and culture, which are extensive, I know that among such people the gift of musical composition is seen as a form of visionary spiritual experience. Songs are not seen as things we human beings make; they are believed to be gifts from the realm of Spirit, and we are merely the conduits by which these gifts are brought out for the benefit of others. Concepts such as ownership or

[51] Stravinsky, 1959, 68.

authorship of a piece of music are anathema. With this in mind, I set out with the intention that each movement of *Hexagons* be composed from an intuitive place; I did not begin with sketches that reflected the associations between the modes and Qabalah, for instance, since I regarded those associations to already be encoded within the pitch sets. Rather, I set out to find what each mode wanted to express; I sought to hear whatever music naturally flowed from within the limitations that each pitch-class set imposed upon my musical consciousness, maintaining a strong sense of the modal tonic throughout.

Of course, given a very active musical imagination, I found it rather difficult at times to restrain my ideas in this manner, and settled upon certain means of allowing for slight deviations from the modes where I felt justified in doing so. Still, in 8 out of the 10 pieces, I managed to keep my planned constraints constant throughout, only allowing deviant pitches on rare occasions and usually as brief events such as passing tones or appoggiaturas. *Hexagon X* and *Hexagon I* are the only pieces that contain anything in the way of extended modulation from the harmonic world of the mode in which they are based; as the Alpha and Omega of the cycle this made sense to me as a structural conceit.

In my studies of HMT in its Just Intonation context, I found a way to use my "hexagonal doctrine" to enlarge my octave to 19 unequal divisions (see Appendix B). I ultimately decided, however, that for the purposes of the cycle I would not insist upon Just Intonation as a basis for tuning, and so I would temper any pitches within my 19 system that fell between the standard pitches to approximations as quarter tones. Of course one of the quirks of HMT is that there is never a tritone above the tonic in any of the modes; so in the 19 system there were 11 standard pitches and 8 quarter tones. Using post-tonal analysis, and again assuming "movable 0," the quarter tones would appear: between 0 and 1; between 2

and 3; between 4 and 5; a quarter tone above 5; a quarter tone below 7; between 7 and 8; between 9 and 10; and, finally, between 11 and 0.

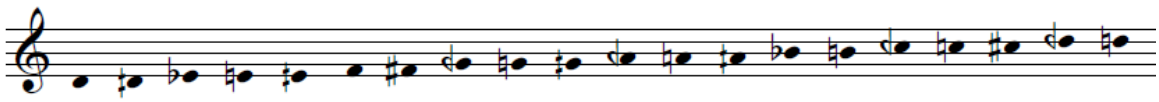

Figure 22. The 19-tone octave based on D.

Figure 22 shows one full octave of all the available pitches of my 19-tone "Hexagonal Temperament" based on D. In the musical examples (beginning on page 57) from the first four pieces of the cycle (all of which are string quartets based on modal tonic D), my use of quarter tone pitches (or other pitches alien to the declared mode) can be seen in their use as passing tones or other such ornamental use, while only the primary tones of the mode in question are given emphasis either by duration or rhythmic placement.

As before stated, the cycle of pieces goes in reverse order of the numbering, beginning at 10 and counting down to 1, so as to be concurrent with the "Lightning Path" or "Path of the Flaming Sword," as it is also called, moving in reverse so as to symbolize our journey upward through the sephiroth. The pieces are also grouped in a deliberate manner by instrumental configuration: the first four pieces are for string quartet; the next three are for saxophone quartet; the next two are for piano, clarinet, violin, and cello; the final piece is scored for piano, soprano saxophone, viola, bass clarinet, chimes, timpani, and crotales. The 4-3-2-1 grouping is reflective of another Pythagorean concept called the *tetraktys,* a triangular arrangement of the first four numbers, represented by dots and adding up to 10 (see Figure 23).[52]

[52] Waterfield, 1988, 10.

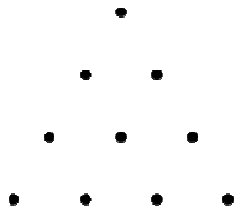

Figure 23. The Tetraktys.

When I began working on the first pieces of the cycle, my original plan was to do them all for string quartet and all based on a D modal tonic. It was later in the process that I saw the wisdom of varying the ensembles, in a manner that reflects both the aforementioned *tetraktys* as well as the divisions between *Yetzirah, Briah,* and *Atziluth* (see page 48). The progression of modal tonics, for *Hexagon VI* through *Hexagon I*, is also a reflection of the original Mode 10 and its two trichords of overtones and undertones, as in its hexagram configuration (see page 9 and Plate 1). The instrumentation of the third ensemble was also intended as a tribute to Olivier Messiaen, who used this quartet so wonderfully and historically in his *Quartet for the End of Time.*

Hexagon X: Kafi

Hexagon X: Kafi was finished in 2015, while I was studying with Leonard Ball. This was one of the more difficult of the pieces to write, perhaps because of the limitations of Dorian mode; I made my first attempt in 2010, and made new ones in 2012 while studying with the late Dean Drummond, and kept stopping and starting over. It was the decision to allow myself wide latitude in the middle section of the piece to leave Dorian and come back that finally allowed me the vision and peace of mind to finish and be done with diatonicism! One of the earlier drafts, conceived as a long-tone meditative etude, was condensed into a

shorter version as section A (mm. 24-53), which then opened up into a more melodic passage over the same harmonic sequence for section B (mm. 55-71).[53]

From section B into C (mm. 72-109), Dorian is gradually deconstructed by way of microtonal embellishment. A new melodic figure, shown below in Figure 24, starts off C with an incorporation of passing quarter tones, and also perhaps signaling the gradual disintegration of diatonicism by way of symmetrical chromaticism; the repeating figure uses D as a central axis and stretches out equally in both directions.

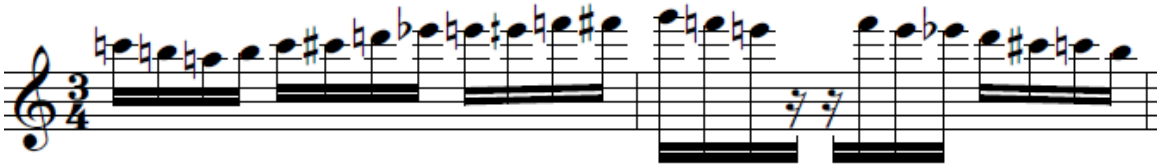

Figure 24. Microtonal violin theme from mm. 72-73 of *Hexagon X: Kafi.*

Section D (mm. 110-134; see Figure 25) introduces even more microtonal chromaticism, further blurring the mode and paving the way for a pseudo "modulation to V" which occurs in Section E (mm. 135-195), where the modal tonic appears to shift to A for a time, beginning with an Aeolian triadic theme that quickly opens into quartal harmonies, incorporating outlier pitches for more extended durations. There is also a shift to a completely new rhythmic texture, a polymetric interplay between 6/8 and 12/16, where the chords in the upper strings obey an eighth note pulse, while the cello juxtaposes a dotted eighth pulse against them.

[53] All scores are available in Appendix D.

Section E climaxes with a "Picardy Third" at mm. 185-6, which modulates and then recalls the microtone-heavy theme from D, but based on the ultimate alien G sharp, as a signal of return to D Dorian for Section F (mm. 196-231), beginning as a slow chorale, and then Violin I moves off in a countermelody, presenting echoes of earlier material from B and E, moving into a restrained cadenza at m. 219, and concluding the piece with a recap of A with the harmonic progression reversed. Ending as it began, with long tones in pianissimo, the piece finishes on a rather ambiguous "tonic" D minor chord in second inversion that seems to float out from behind the A minor (mm. 253-264).

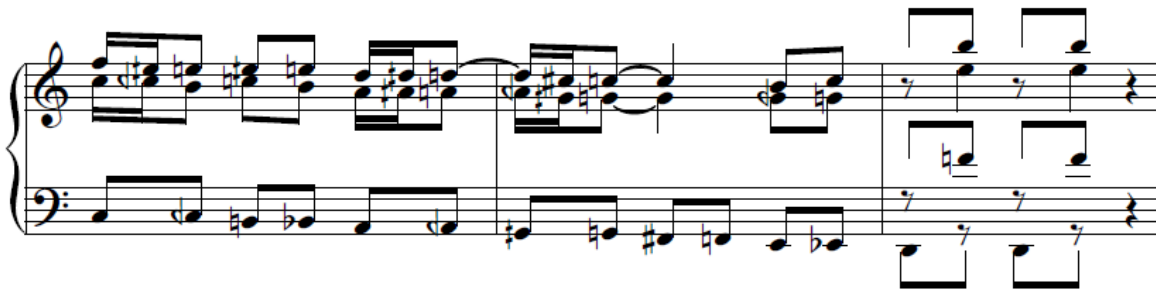

Figure 25. Reduction of ensemble theme from mm. 110-112 of *Hexagon X: Kafi.*

Hexagon IX: Promethean

The next movement began as a sketch in 2010, was initially finished in a rather unsatisfying and overly complicated form in 2012, restarted sometime in 2014, and then rewritten as a combination of the two earlier versions under the guidance of Adrian Childs in 2016. The initial idea that birthed the piece was a repeating symmetrical motif that exposes two pentatonic subsets of the larger mode, the first moving out to an ambiguous quartal harmony, and the second more reminiscent of whole-tone scale sonorities (see Figure 26).

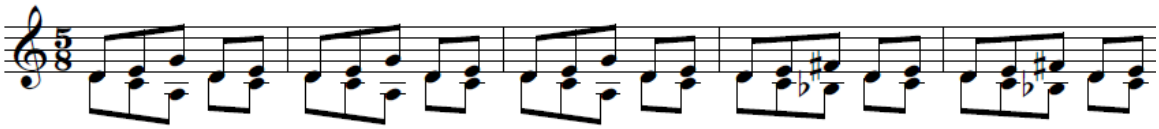

Figure 26. Two-violin theme first introduced at mm. 24-28 of *Hexagon IX: Promethean.*

My original plan was to use this idea as the starting point for a quasi-minimalist piece in odd number meter, with the instruments each moving through a progression of melodic "cells" that played against each other in complex rhythmic counterpoint. I retained large parts of the original finished draft of this concept to serve as the "B" section of the final version, which is constructed in an A-B-A' form. The A section consists of the main idea from my 2014 attempt at a rewrite, which is driven by a melodic idea reminiscent of old Irish folk music. The original symmetrical motif runs as a thread through all three large sections of the piece.

I would note also that Scriabin's "mystic chord," the inspiration for the mode's name, makes a powerful appearance (albeit in a slightly modified voicing) at mm. 161-163.

Hexagon VIII: Phrygionian

This piece was originally started in 2010 as well, and brought to bear under Dean Drummond's guidance, although he never got to hear the piece in its final form; I think he would have been pleased, for many things that he originally castigated me for were eventually resolved after a drastic rewrite in 2013. This piece unfolded rather organically in a unique form for this cycle—it presents as more of a tone poem, complete with prologue and epilogue. Some sounds and ideas that inspired me came from John Williams' end title theme for the film *Jaws* and the Steely Dan song "FM." The "prologue" in the finished version retains nothing of its original material; I found that after completing the middle sections the

prologue had to be completely changed. This is the first time I encountered, as a composer, a situation in which I had to write "in reverse" in this manner—but I am very proud of the final result, which has more of a felt narrative than any other piece in the cycle, in the manner of an epic poem of adventure on the high seas.

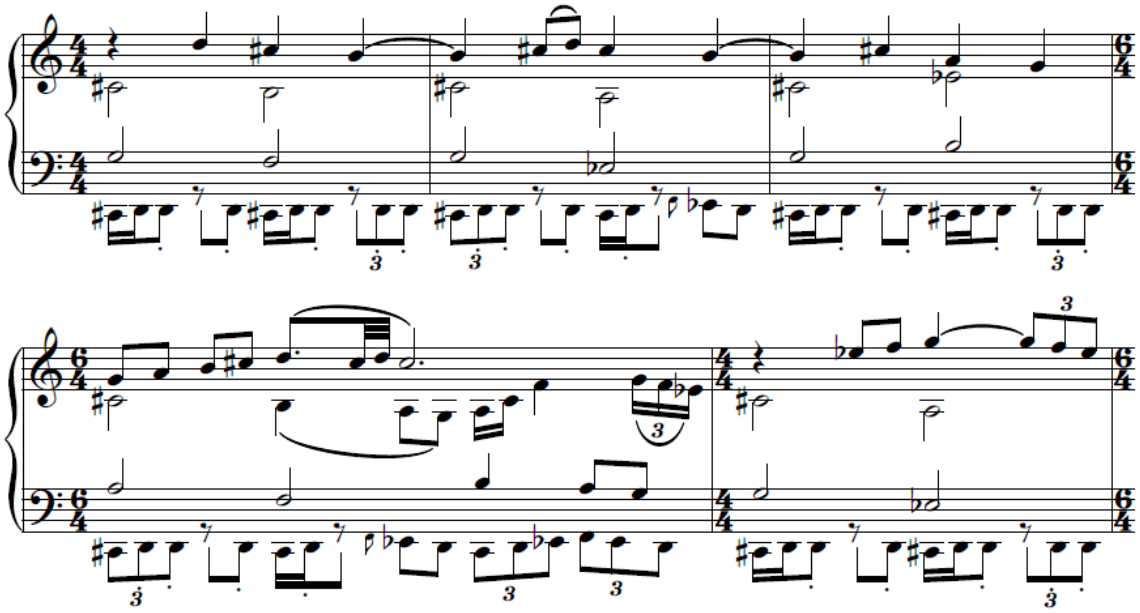

Figure 27. Reduction of mm. 33-37 of *Hexagon VIII: Phrygionian.*

The passage above (Figure 27), which begins the narrative in earnest, demonstrates some of what gives this mode a strong sense of dramatic tension; the whole-tone pitches contrasted against the tonic create a mix of marvelous dissonant harmonies, but also leave the opening for recognizable major and minor sonorities. When the melody returns at rehearsal mark C (m. 46) against the G bass, it calls forth a Lydian Dominant sound, a wonderful shift from the Phrygian and melodic minor flavor of the original passage. Even if

complete major chords cannot be produced based on scale degrees 2, 3, or 5, with the major 3rds available above it matters little.

This piece was debuted by the IconiQ String Quartet at my Master's Recital at Montclair State University in December of 2013, and played quite well at that.

Hexagon VII: Hijaz Kar

This was the first of the pieces that I finished, and had a woefully substandard performance at a student composers recital at Montclair in early 2012. The exotic Gypsy flavor of the mode, with its augmented 2nds between degrees 2-3 and 6-7, make for an energetic dance piece. It begins with a viola/cello rhythmic broken chord accompaniment, with two separate melodies overlaid by the violins in staggered entrances. Measures 19-60 (see Figure 28) offer a series of variations on the chord progression laid out in the first six measures, which are then deconstructed beginning at rehearsal mark D (mm. 61-76), leading into a new repeating progression at E (mm. 77-91) that acts as prelude to a jarring shift to a slower waltz rhythm at F (mm. 92-123), harmonically based in the 4th rotation of the mode.

The pizzicato waltz rhythm accompanies a melody so passionately overwrought it feels more like an improvised solo, and stands in stark contrast to the broken chords and stilted rhythms of the preceding sections. At G (mm. 124-138) we abruptly return to the motive from E in a sparser texture, repeating again with variations, with the viola melody shifted to the cello, and then at H (mm. 139-145) the violins take over with a short transitional passage leading to the climactic section of the dance, beginning at I (m. 146) with another repeating 5-measure rhythmic passage with predominantly static harmony, that builds gradually in texture and intensity all the way through J (m. 166) to peak at mm. 180-184. This is followed at K (mm. 185-194) by a codetta that serves as a brief recapitulation of

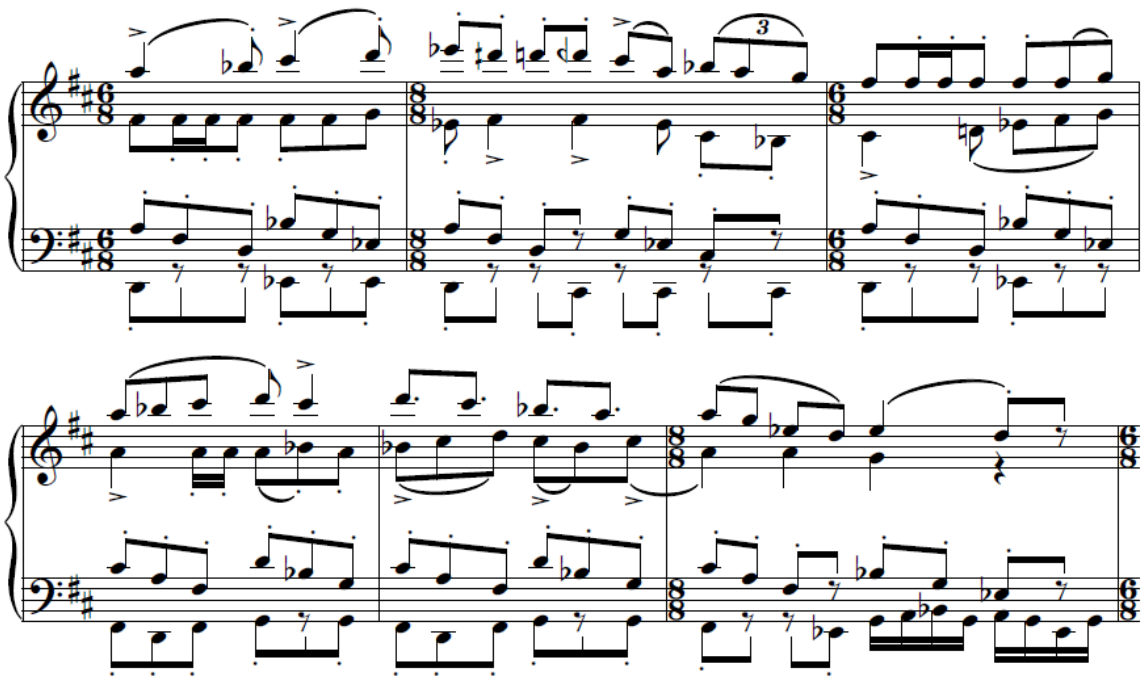

Figure 28. Reduction of mm. 19-24 of *Hexagon VII: Hijaz Kar.*

the original theme, before ending on an odd unresolved open fourth built on scale degree 7, perhaps signaling that although the first group of pieces is done, the journey is far from over.

Hexagon VI: Lattice Mode

This next piece was completed in its original version as a string quartet in 2010 in a radically different form than what it came to be. The basis of the piece was a sequence of triadic harmonies played as rapid broken chord patterns in a relentless and fast 16th note pattern, which as it evolved, moved into a more complex juxtaposition of major and minor triads against one another in a shifting counterpoint. The final version, which I wrote in 2016, retains the original harmonic sequence but adds more dimension to the rhythm, placing the voices of the ensemble in polyrhythmic counterpoint, establishing a kind of

"rhythmic lattice" to go along with the modal concept. This is also the first of the saxophone quartet pieces, and the first piece on a new modal tonic (F).

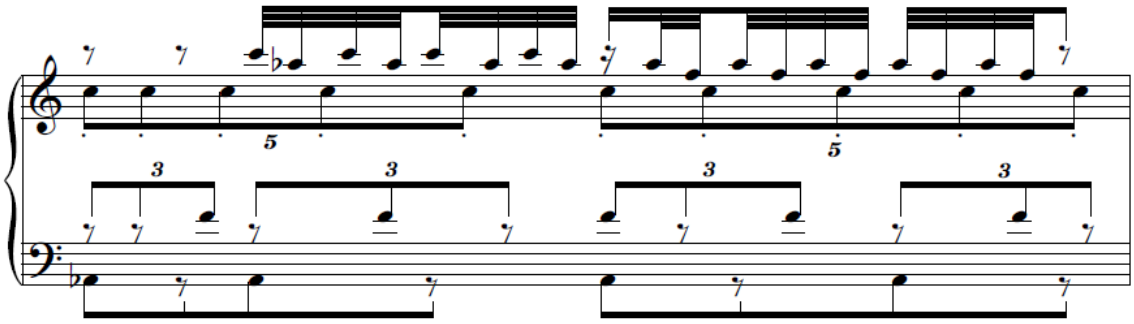

Figure 29. Reduction of m. 15 of *Hexagon VI: Lattice Mode.*

The measure above (Figure 29) shows the rhythmic counterpoint in full glory, with the three lower instruments in a 4:5:6 polyrhythm against one another, and the soprano adding ornamental trills above. This piece is quite unlike all the others, as I felt would befit the mode "at the heart" of system and cycle. It works in a minimalist style perhaps most resembling the work of Philip Glass, but with a bit more complexity and variation involved. There is no melodic material whatsoever, only a shifting successions of broken chords, repeating notes, and little 3-note chromatic figures. It begins with a sparse two-instrument texture and builds gradually, moving from the simple pulsing of single notes to the two-note patterns at B (mm 26-35), and then to the introduction of triadic patterns at C (mm. 36-54). After building to a climactic punctuation at m. 61, the piece reverts to the original texture from the beginning (m. 63) and rebuilds gradually with all motivic tools working from the get-go.

From the beginning, all parts are working in a sort of heterophonic texture; no one instrument plays anything that stands out as definitive, but each is vital to the overall sound. It is the collective that matters, like in a West African drum ensemble, where each instrument contributes an indispensible piece of the whole, and it is the combination of all sounds that makes the piece. This shifts somewhat at H (m. 113), where certain instruments take turns harmonizing with one another, building toward a texture with three saxophones harmonizing in a somewhat staggered broken chord pattern, and finally at I (m. 138) the baritone calls back a previously heard 16th note sextuplet figure (originally from G, mm. 98-112) that seems to serve as a clarion call to bring the piece to conclusion. The action rises to full peak at mm. 148-150, and then after an indefinite period of silence one lone voice quietly echoes the original repeating-note quintuplet from the beginning, before leading by *attaca* into the next piece.

As dictated by the mode, the harmonic palette of this piece is limited primarily to three major and three minor chords: F, Fm, B♭, B♭m, D♭, and Dm. It is the first four of these that are emphasized throughout, but they are thrown against each other in varying ways, sometimes with one instrument playing a broken chord of one harmony while the next instrument plays a different harmony against it, so that in spite of the simplicity and limitation of the triads there results a complex and even occasionally gritty interaction between them.

Hexagon V: Tower Mode

This piece was crafted on a similar timeline as the one before, beginning as a string quartet in 2010, and transposed to C and adapted to saxophone quartet in 2016, with only some minimal editing and reshaping.

Given the associations of this mode with the harsh and destructive energies of *Geburah* and the Tower Card, it should come as no surprise that it yielded music full of grating dissonances and spastic rhythms, with an air of sleazy, leering jazz/blues. Any sense of pulse is only intermittently felt until halfway through the piece, at rehearsal mark D (m. 98). The piece opens with a slow and sinister introduction that builds to a dramatic yet ominous fanfare (mm. 17-23). Some transitional music at A (mm. 24-40) sets up the cacophony of B (mm. 41-72), a seemingly ametric series of chaotic riffs and brief duets, like the yowling and chattering of a pack of unsavory predators gearing up for the hunt. The texture remains sparse, with frequently interrupted continuity and uneasy silences. After a recap and variation on the previous transitional passage at C (mm. 73-97), the baritone kicks off a groove with a slight swing, on the tonic of C, and the soprano answers with a spinning scalar figure (see Figure 30).

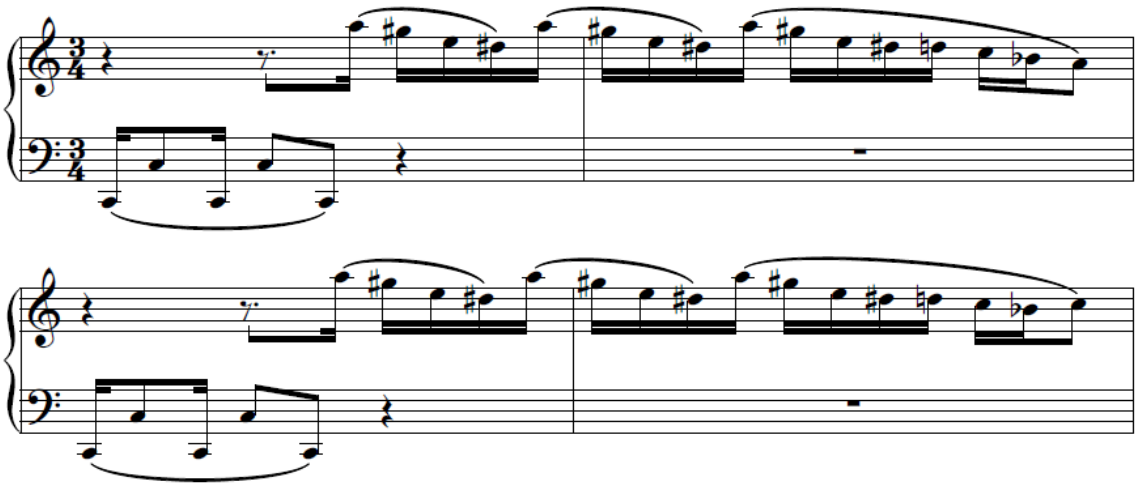

Figure 30. Reduction of mm. 102-105 of *Hexagon V: Tower Mode.*

The music lays out a melodic sequence over static harmony in an A-B-A-B-A format, with the texture building in intensity with every repeat of the A theme, until at m. 144 the

soprano meanders off into a theme that recalls the chaos of B, with the alto providing a canonic echo; the sound then stops short, all voices join together homophonically to bring the section to a close, with the baritone given the last word, just as it had the first. The final section G (mm. 159-178) is a slightly varied recap of the introduction, as if to signal the process is about to begin again. This is a theme I enjoy returning to, a circular form, where the ending is the beginning; the Alpha and Omega are one. It seems most appropriate for the pieces of this cycle, each of which represents archetypal forces that are eternal, cyclical, and unchanging.

Hexagon IV: Mikrokosmik

This piece was also originally finished as a string quartet in 2013, and was read by the Shanghai Quartet at Montclair that year. I adapted it to saxophone quartet and transposed it to G in 2016 along with the other saxophone pieces. This one also had very few changes in structure and content, other than some small adaptations for the new medium. It began as an idea for a melodic sequence that was originally 58 continuous eighth notes, inspired by some of Lou Harrison's American Gamelan pieces. Such a sequence was a bit long for a saxophone to play without breathing, so putting some gaps in the phrasing became necessary. It is fortuitous that the name of the mode, chosen for an association with a historic work, has a Greek inflection, because the rhythmic feel of this piece is based on a Greek circle dance called Kalamatianos (although it is in reverse form; Kalamatianos is in a 7-meter divided 3-2-2, while *Mikrokosmik* is mostly 2-2-3).

This piece is in an easily recognizable song form, with the sections laid out as A-B-A'-B'-A". Even the melody is in a recognizable classic format, with a long basic idea (See Figure 31) that repeats verbatim, goes to a contrasting secondary idea, and then returns to

the basic. An interesting twist comes as a consequence of the harmonic content of HM4; because the mode contains a minor 3rd and a diminished 4th above the tonic, and the augmented 5th makes a stable tonic harmony impossible in the traditional sense, the mode ends up sounding mostly like a harmonic minor tonality based on A♭. Therefore the basic idea (BI), presented as a dance melody above a droning bass, sounds in context like the dominant chord of A♭ minor in first inversion; with the melodic form of BI-BI-Contrasting Idea-BI, it ends up sounding like a classic diatonic melody with functional positions reversed (V-V-i-V).

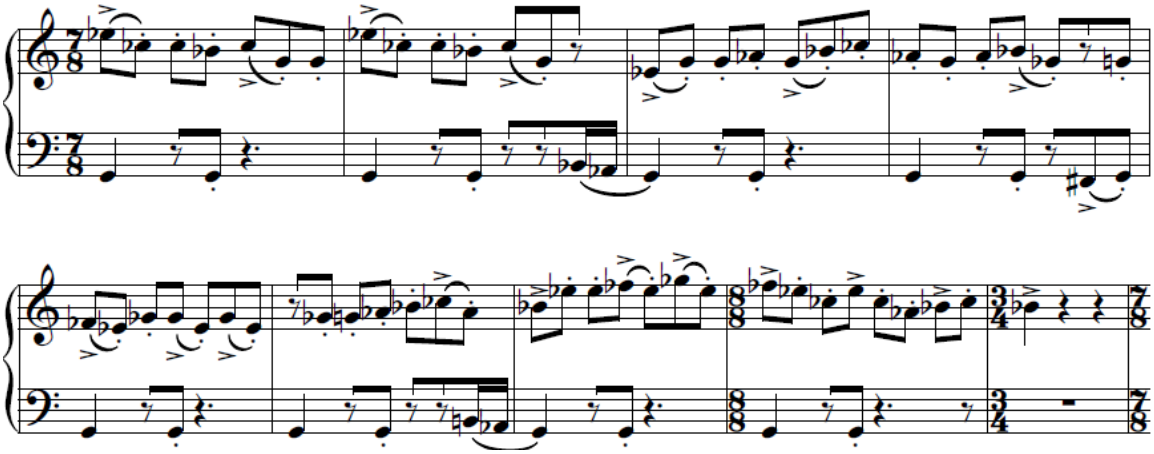

Figure 31. Reduction of mm. 1-9 of *Hexagon IV: Mikrokosmik*.

The original statement of the complete A theme comprises the beginning of the piece all the way to the measure before rehearsal mark E (mm.1-31). At m. 32 we enter the B theme, a sequence of chords in homophonic texture that fully exploits HM4's deceptively diatonic sound in its 2nd rotation. I recall being castigated by the cellist of the Shanghai Quartet for not simply writing the piece in E♭ minor (since the version he saw was based on

modal tonic D). I didn't have time to explain to him that technically it was not in that key at all, but this does point out some of the questions one struggles with in writing modal music with a notation system that was designed for diatonic music. I have attempted to resolve issues such as this with maximum consideration for the performers.

The return to the A theme (m. 62) only includes one statement of the BI before moving to the Contrasting Idea, and then presents a modified form of the BI in staccato homophony. The following return to the B theme at mark J (m. 90) presents a countermelody above the original harmonic sequence, and the final return to theme A at mark L (m. 126) works only with a sparse variation on the BI, and concludes with a dissonant harmonization that obscures all of the former diatonicism, and concludes in a similar manner to *Hexagon VII,* ending on the unresolved augmented 5th between scale degrees 1 and 5, perhaps again signaling a lack of true completion.

Hexagon III: Penta-Plus

This first of the two pieces with the piano/clarinet/violin/cello instrumentation, based on a modal tonic A, was written in its entirety during the fall of 2016 under the guidance of Adrian Childs, as were the other two final pieces of the cycle. This piece is more introspective and meditative than all the previous pieces, with a focus on harmony and timbre rather than melody. The primary idea centers on a slow, gentle sequence of chords given to the piano (see Figure 32).

The sections marked with A and B (mm. 1-36) amount to two full statements of the above sequence, with a modified conclusion on the second statement. At mark C (m.37) a new shorter harmonic sequence is introduced, which then goes through a series of variations, including a metric modulation (m. 60) that keeps a constant pulse in the piano

part while setting up a rhythmic disconnection with the other instruments (that focus primarily on playing quintuplet arpeggio patterns above the piano). The piano descends further and further down into darker variations on the harmonic sequence, until mark F (m. 75). Here a second metric modulation occurs, bringing the instruments back into synchronization, before the piano concludes the section with an alien chord based on C (m. 80), and then takes over with a long sequence of undulating arpeggios, that is concluded by two harmonized statements by the other 3 instruments (mm. 87-91 and 94-99) of a short melodic idea, originally introduced earlier in an understated manner by the violin (pizzicato at mm. 43-45).

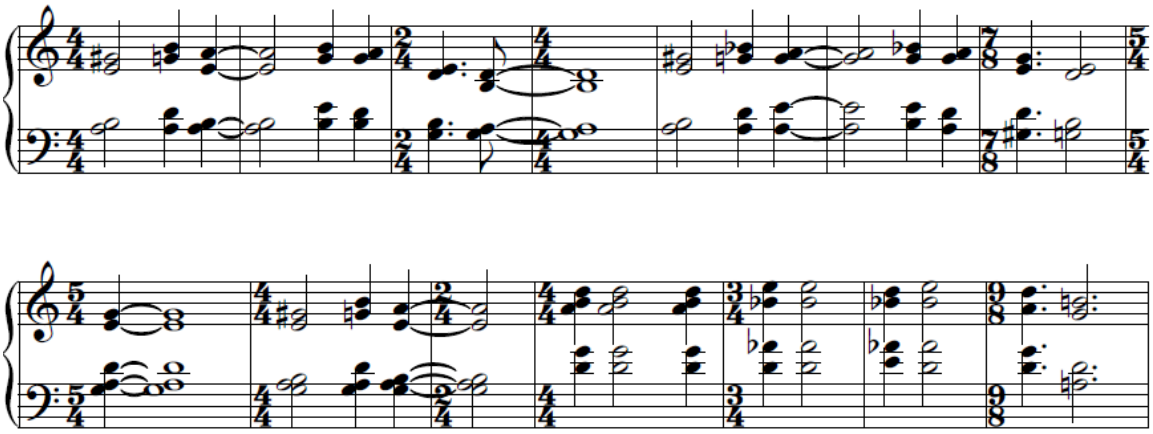

Figure 32. Piano chord sequence from mm. 1-14 of *Hexagon III: Penta-Plus*.

The piece concludes with a recap of the first section (mark I, mm. 99-122) with the original harmonic sequence given over to pizzicato strings and clarinet, while the piano plays a monophonic staccato pattern of repeating pitches. This leads to another unresolved and ambiguous ending.

Hexagon II: Falusian

Also written in 2016, *Falusian* (based on modal tonic E) stands as the most challenging yet joyous piece in the entire cycle, the polar opposite of *Penta-Plus*. While *Penta-Plus* is slow, dreamy, and intended to induce a meditative frame of mind, *Falusian* is fast, exciting, and designed to stir the primal energies and the fire in our souls. While *Penta-Plus* is harmony-driven, *Falusian* is melody driven, all the way. It begins with the ensemble in tutti unison, playing the melody together much in the manner of the "Seven Trumpets" movement from Messiaen's *Quartet for the End of Time*. It also has much of that movement's ametric feel.

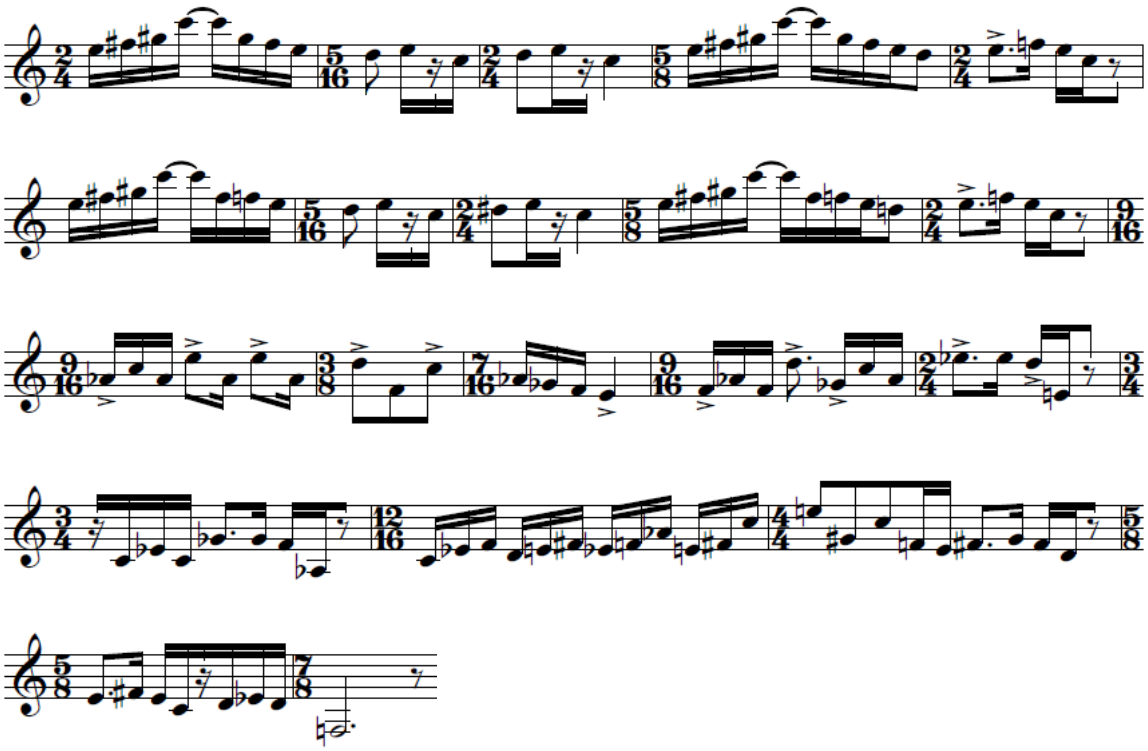

Figure 33. Melody from mm. 1-20 of *Hexagon II: Falusian.*

The unison passage comprises mm. 1-20 (Figure 33), and then at mark C the violin and clarinet take the melody, while the piano and cello run off in a rhythmic interplay of pizzicato and chords. This piece also makes use of one of Messiaen's favorite techniques in working with his own modes—*chordal planing*. I found it useful to study HM2 as a "harmonic system," viewing the triads built on the scale degrees 1-3-5, 2-4-6, 3-5-7, etc. These chords are put to great use in the piano part (see Figure 34).

The melody is fully repeated with the new accompaniments, and some small expansions of material here and there, before new material begins at mark E (m. 47) based on rhythms from the opening section; meter switches back and forth between 2/4 and 5/8, underlying a cycle of 16th note groupings (**1**-2-3-4-**1**-2-3-4-**1**-2-3-4-**1**-2-3-**1**-2-3). The transitional passage above leads us into a new groove that begins quietly, a 7/16 rhythm reminiscent of *Mikrokosmik* but at a much faster tempo (mark F, m. 66). This groove continues into mark G adding a countermelody (m. 89) which then takes over as the central melodic idea (m. 102) over a rollicking repeating ostinato in the piano. At mark H (m. 113) the clarinet, violin, and cello join together homophonically for a brief call-and-response between them and the piano, and then builds to a sustained shout at mm. 122-123.

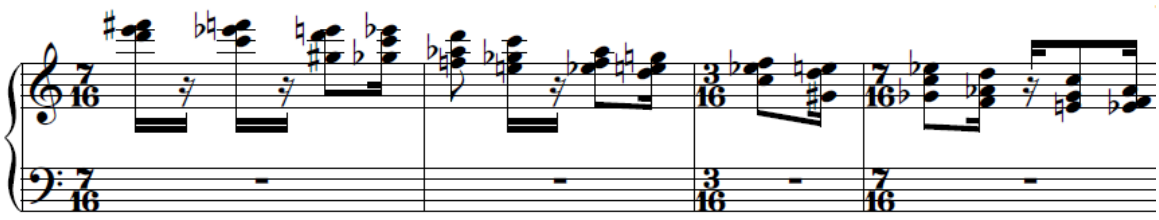

Figure 34. Sequence of piano chords from mm. 61-64 of *Hexagon II: Falusian.*

Following this, the original melody returns as a canon between the four instruments, leading to the second half of the melody played by the clarinet and cello over another planing of chords by the piano at mark J (mm. 137-140), which then returns to an extended version of material from D (mm. 40-43) before building up to a climactic return of the tutti unison (m. 151), which leads to a definitive yet deceptive cadence to scale degree 5, which happens to be the tonic of the final piece in the cycle.

Hexagon I: Janusian

This final piece was finished in December of 2016. As the climactic piece, and given the grand association with *Kether,* I felt its composition warranted a somewhat more mindful approach. One early decision I made was that a mixture of recognizable melodies from sacred music of multiple cultures would be woven into the piece in some fashion. Another was that I would give myself greater latitude in going "outside the box" of the mode, as I had in the first piece. I had sketched out an idea for a string quartet version of this mode a few years back, and that became incorporated as the opening segment of the finished piece—a passacaglia using a symmetrical four-note figure in the bass which transposes down a whole step so that it may finish on tonic, as it had begun.

This piece uses modal tonic B. Besides the symmetrical figure in the bass, the opening melody (see Figure 35) is a two-part figure emphasizing the "far ends" of the pitch set around the axis of the tonic—D and G♯. As the passage repeats, the figure goes through variations that sound almost improvisatory (mm. 15-34), while the piano flirts with outlier pitches as high octaves sounding a polyrhythm against the pulse. At m. 35, with a low bass octave the piano announces the presence of the added percussion—chimes, and two triads of prayer bowls amplified by timpani (the triads reflect the "hexagram" configuration of the

mode). The amplification creates an eerie, ethereal sustain for the prayer bowls that holds and dies off as the passacaglia returns one last time at mark C (m. 43).

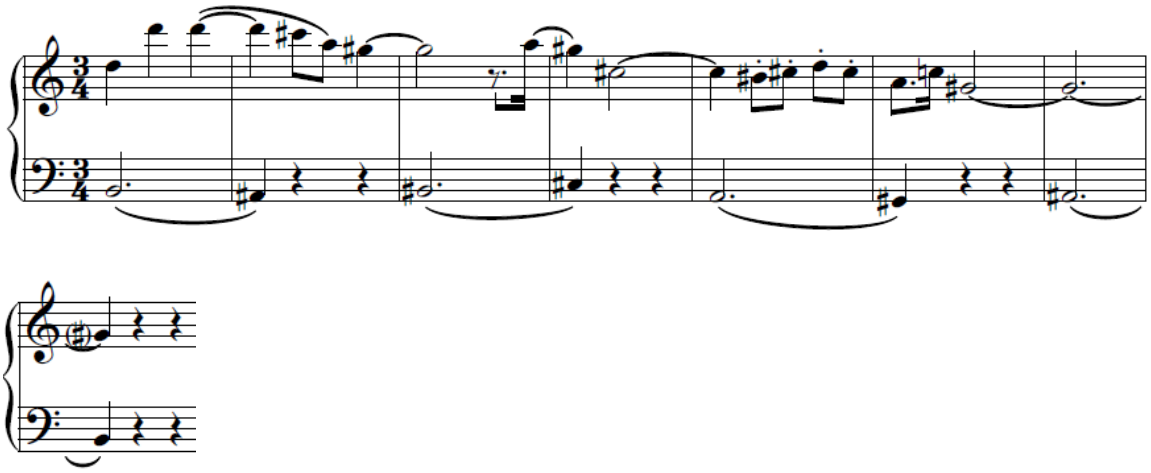

Figure 35. Passacaglia theme from mm. 9-16 of *Hexagon I: Janusian.*

The next entrance of the percussion at mark D (m. 56) introduces another recurrent motif, the lightly muted timpani playing a nonaccented pulse, emulating the beat of a Native American powwow drum. As I was taught in my days of playing music for Native ceremonies, the steady beat of the drum is the heartbeat of all Creation. The beating heart is also the symbol of what unifies all humanity; no matter our outward appearance we all have the little drummer who beats within our chests. From mm. 65 to 89, there is an interweaving of five different sacred melodies: a musical setting of The Lord's Prayer; a chant of the Rudra mantra, a verse of the Rigveda; the Hebrew song "Yerushelem Shel Zahav," or "Jerusalem of Gold;" the Adhan, or Muslim call to prayer; and a small snippet of a prayer song in Cherokee that I once sang for ceremony, which says "O my Creator, help me." While three of these melodies are thrown together somewhat randomly, I very purposely

wove the melodies of the Hebrews and Muslims together at mm. 77-81. That is my prayer for peace in the City of Peace.

The next section which begins at mark G (m. 102) is a weaving together of musical themes inspired by the teachings of Qabalah. All letters of the Hebrew alphabet also represent numbers, so any word can also be translated as a number. This is one of the methods of Biblical interpretation, known as *gematria*. The themes of this section are musical interpretations of the numbers associated with the Hebrew letters which spell three words or phrases central to Qabalah. The first is *Kether*. The second is *YHWH*, the Hebrew name of God transliterated into four letters. The third is the phrase *ain soph,* which translates to "limitless light." Each of these themes are initially presented in the context of HM1's pitch set, and then transposed to outside of the set.

Besides the interweaving of sacred words and melodies, another theme of this piece is number as expressed through interval. The recurring theme of descending major 2nds in the piano (mm. 113-143) is another expression of *duality,* as it is concurrently expressed through the aforementioned use of both the modal set and its transposition, both of which retain the tritone D-G♯, the symbolic "doorway" which inspired the name *Janusian*—as stated in Part 1, Janus was the two-faced Roman god of doorways. Thus as the sounds of this section fade away (mm. 141-151), a new theme emerges from the piano, based in minor 3rds, the same distance from the tonic to both D and G♯. This simple and somber melody leads to a chord of two superimposed 5ths (m. 162) which first expands (m. 163) and then contracts (mm. 165-167). At mark J (m. 169) a muted echo of a theme from *Hexagon X* plays in the violin over the piano's repeat—again, the Alpha in the Omega.

At m. 178 the piano's minor 3rd expands to a major 3rd—Picardy Third? A cadential moment? Perhaps—but following it we contract back down to the major 2nd, and at mark K

(m. 183) the drumbeat restarts, the prayer bowls sound for the last time, and as both fade away the piano begins a trill of two minor 2nds, beginning slowly and speeding to a peak before fading back down to a single note, the modal tonic, the point, the Primal Unity. We have returned to the One and thus the cycle is concluded.

CHAPTER 5

CONCLUSION

It is my hope that, beyond the lofty metaphysical symbolism that informs this work, the music serves to honor both the traditions of Western art music and the non-Western forms that have inspired me over the years. I am a fan of all forms of cultural expression, and have always loved the more drone-and-melody approach to modal writing that characterizes the music of India and Arabia, as well as the complex rhythmic counterpoint of African music and the odd-number rhythms of the Middle East and Greece, so I have worked to weave all these together in a tapestry of devotion, as well as a musical journey that serves an identical purpose as my CD *Akroasis*—the expansion of consciousness.

As to the Hexagonal Modes, I only hope that other musicians might benefit from their use, and be inspired by the geometric and Qabalah-related symbolism as well. As a composer it gives me tools that I can return to and experiment with in various ways; the modes, in their correspondences with the Tree of Life, serve as ways for me to weave a wealth of symbolic connections into my work. For other composers the Hexagonal Modes present different opportunities to cover new terrain in various styles of music—whether standard-tuning or Just Intonation-based art music, or jazz, or world music—and the choice can also be made to eschew the tonic-centered approach I have adhered to, and further exploit the symmetry by way of more twentieth-century style compositional paradigms. Also, the symmetrical template can be reduced to a pentatonic set, or perhaps expanded to enneatonic, losing the purely hexagonal shape but keeping the internal form of symmetry across the modal tonic axis.

If other composers gravitate toward the layers of symbolism, they may even decide that my system of correspondences with Qabalah does not work for them, and decide to syncretize the modes with the Tree of Life in an entirely new manner. But even if all that background is of no use to anyone else, it matters little. The modes are the thing, to paraphrase Shakespeare. Or, more simply, the music's the thing. May others enjoy the same inspiration.

KSE

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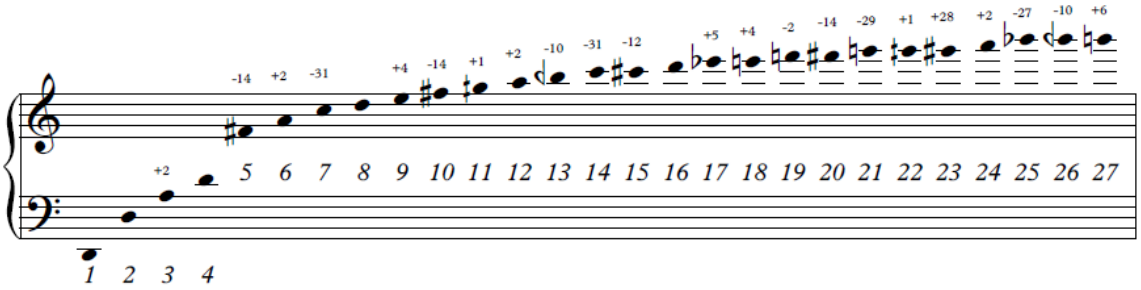
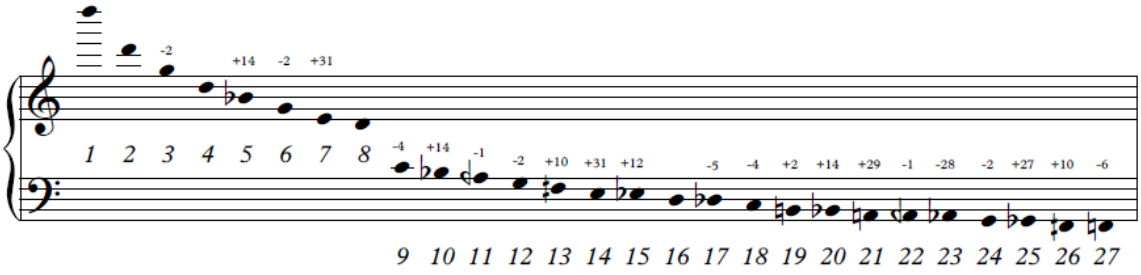
APPENDIX A

UPPER AND LOWER PARTIALS, TO 27

Upper Partials of D2



Lower Partials of D7

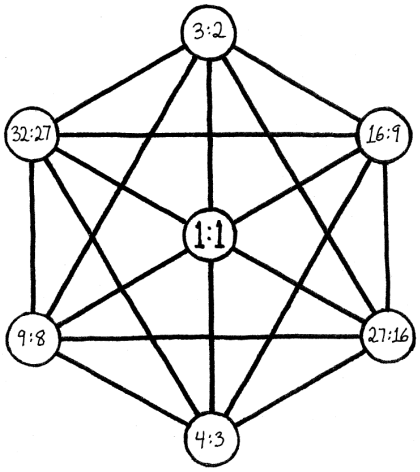


The smaller numbers above the notes represent the difference in cents (1 cent = 1/100th of an equal-tempered semitone) between the written pitch and the sounding pitch.

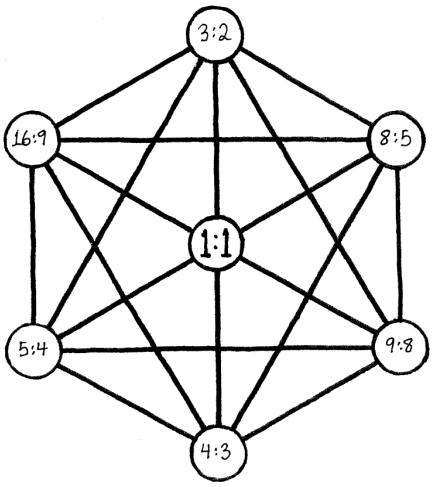
APPENDIX B

HEXAGONAL GRIDS FOR THE HEXAGONAL MODES IN JUST INTONATION

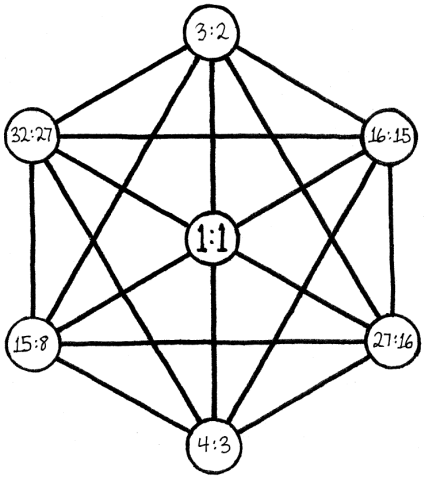
HM10: Kafi (Dorian)



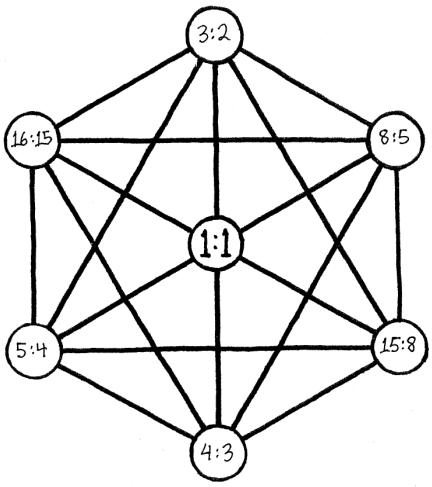
HM9: Promethean



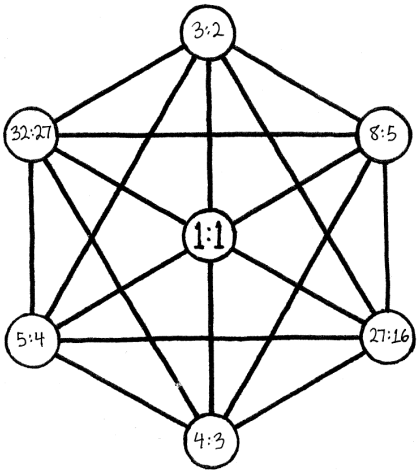
HM8: Phrygionian



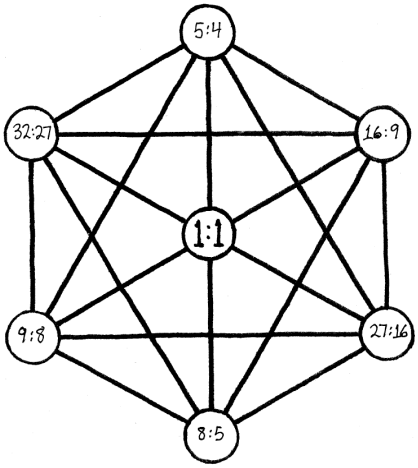
HM7: Hijaz Kar



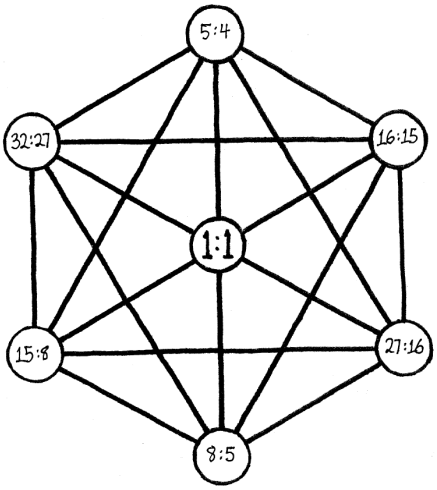
HM6: Lattice Mode



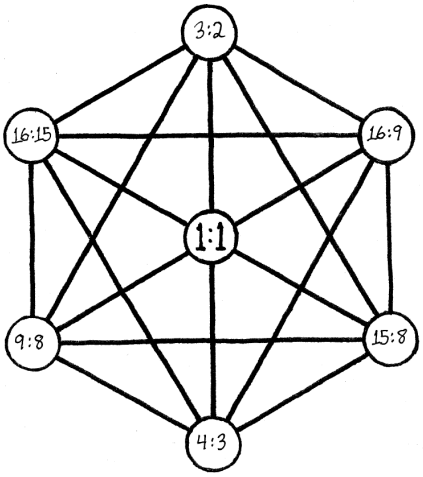
HM5: Tower Mode



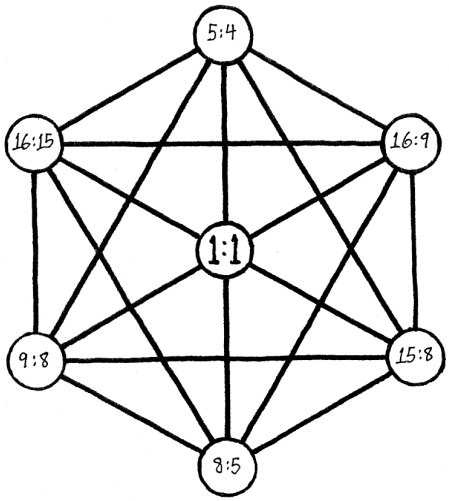
HM4: Mikrokosmik



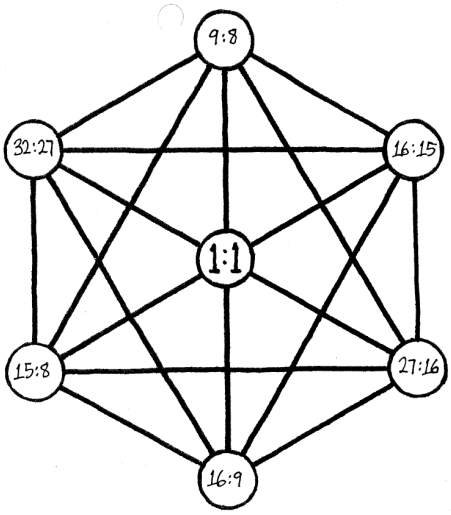
HM3: Penta-Plus



HM2: Falusian

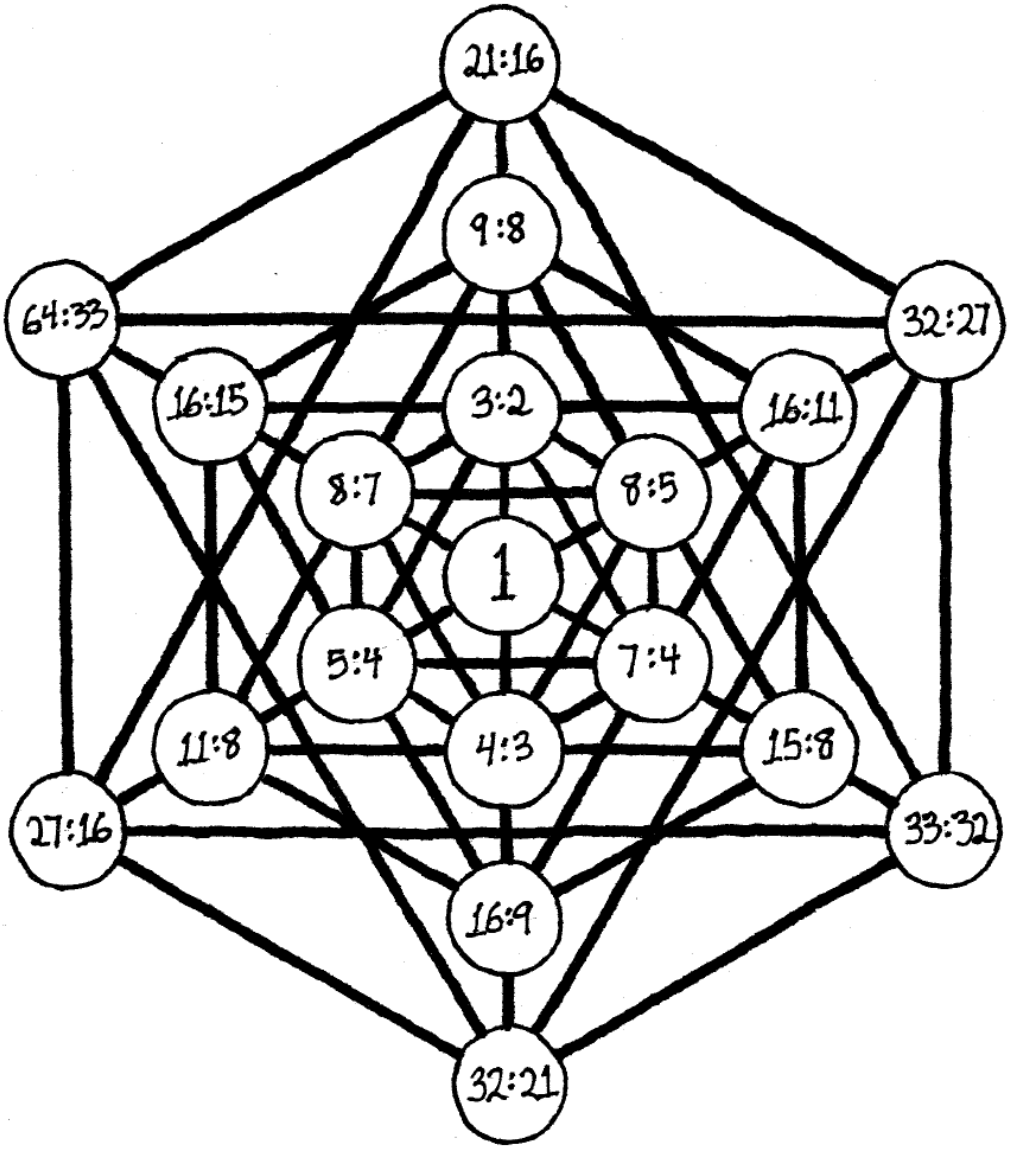


HM1: Janusian



APPENDIX C

3 LAYER HEXAGONAL GRID OF 19 TONE OCTAVE IN JUST INTONATION

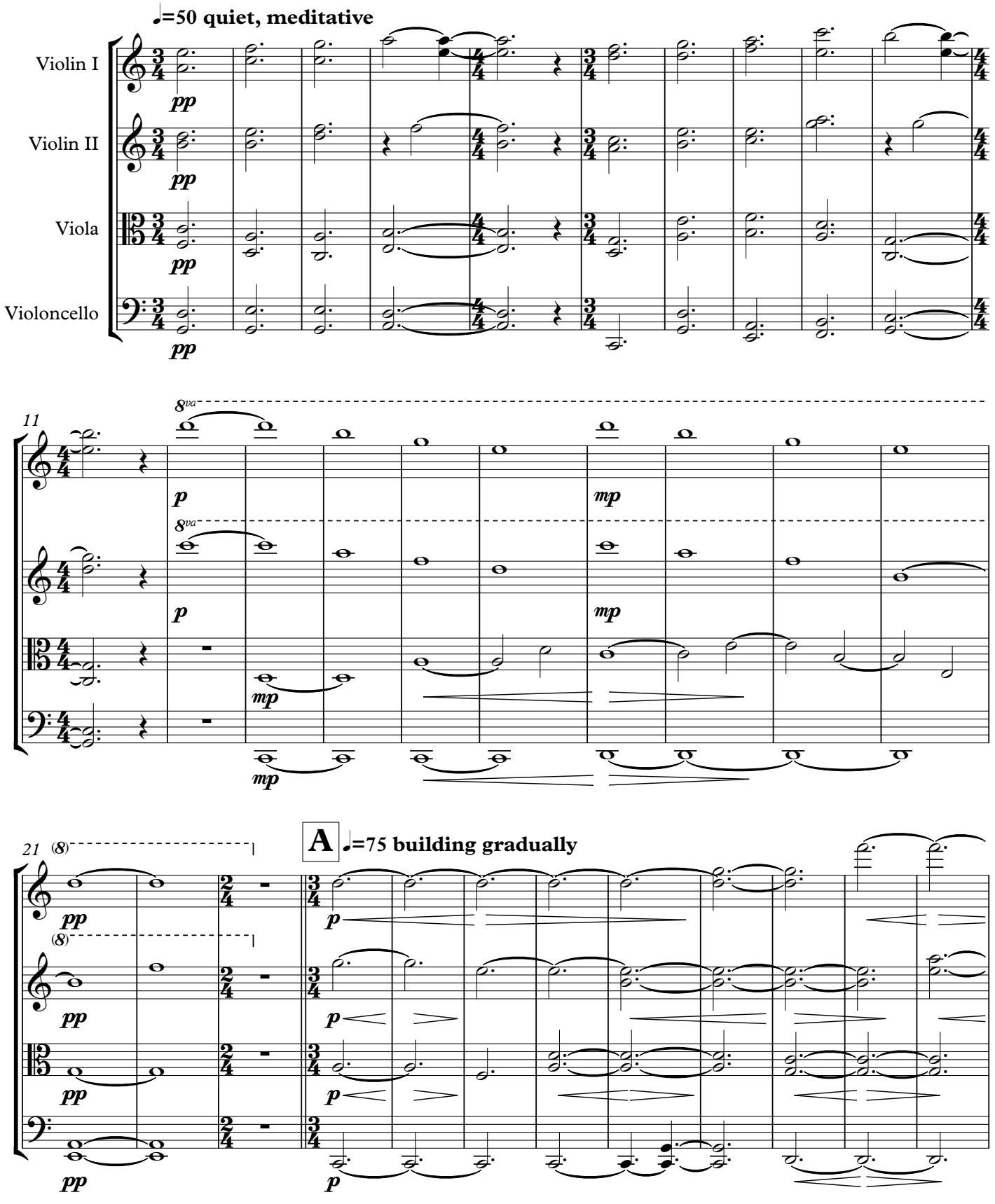


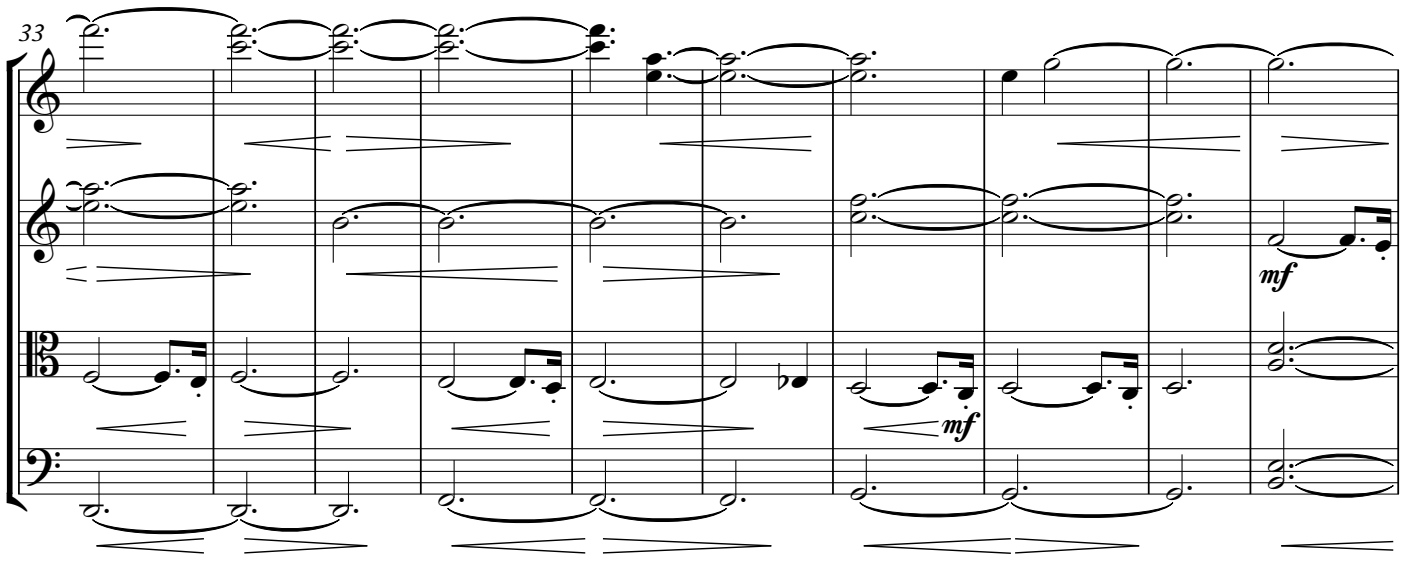
APPENDIX D

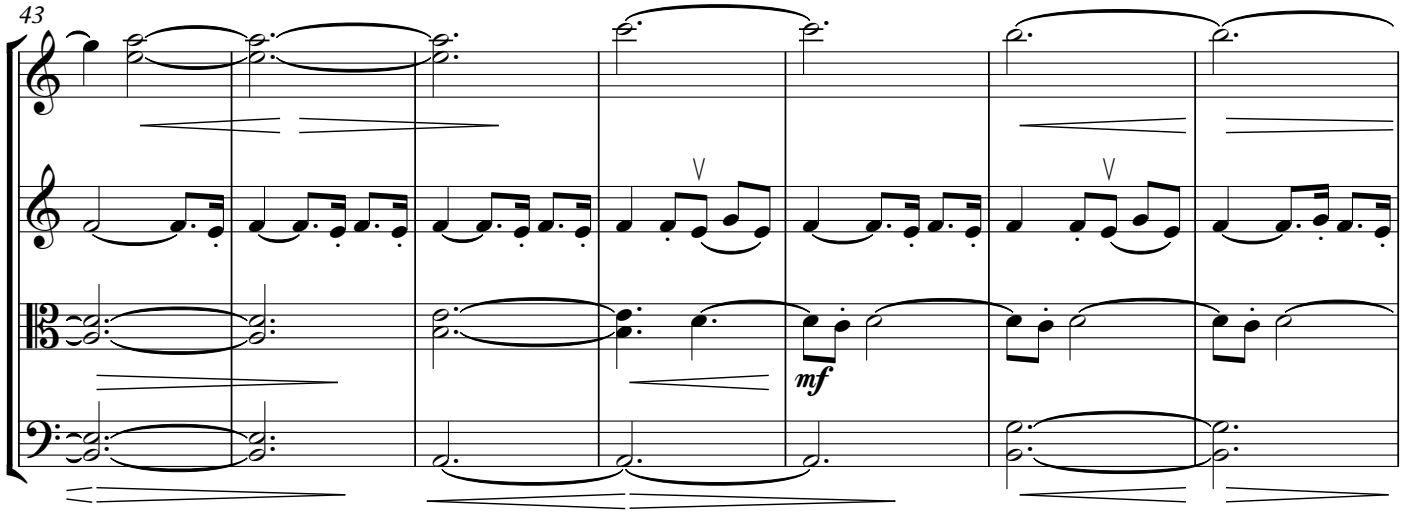
SCORES

Hexagon X: Kafi

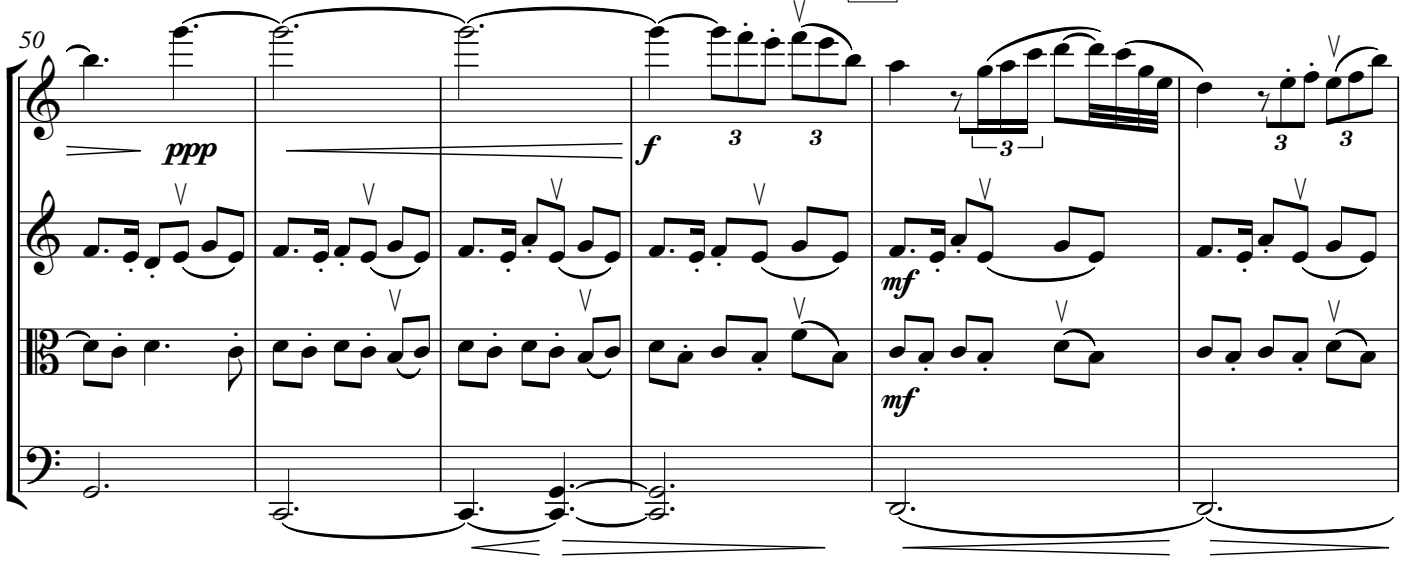
k. Scott Eggert

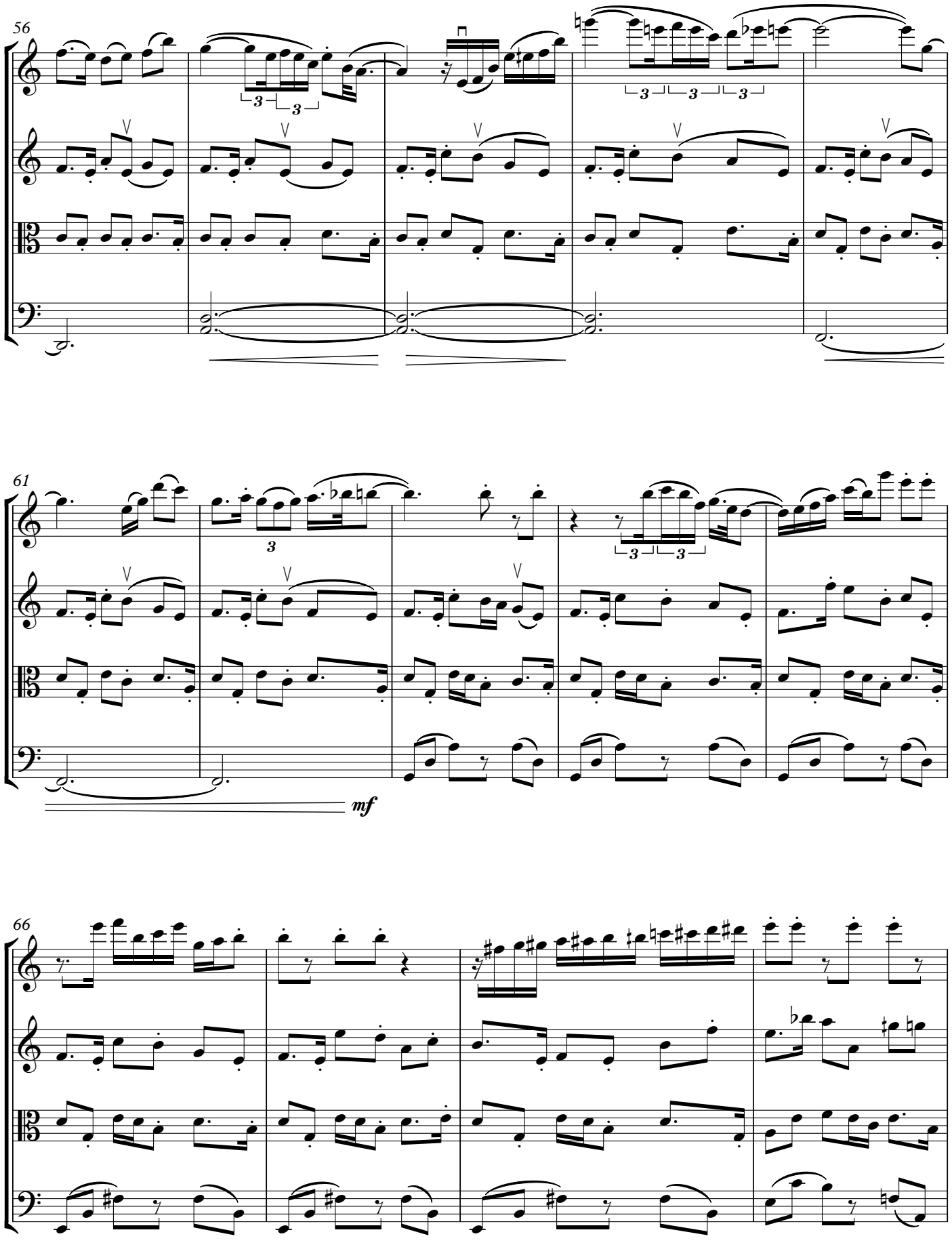






B **like emerging from a dream**




56
61
mf
66

C

70

3 3

74

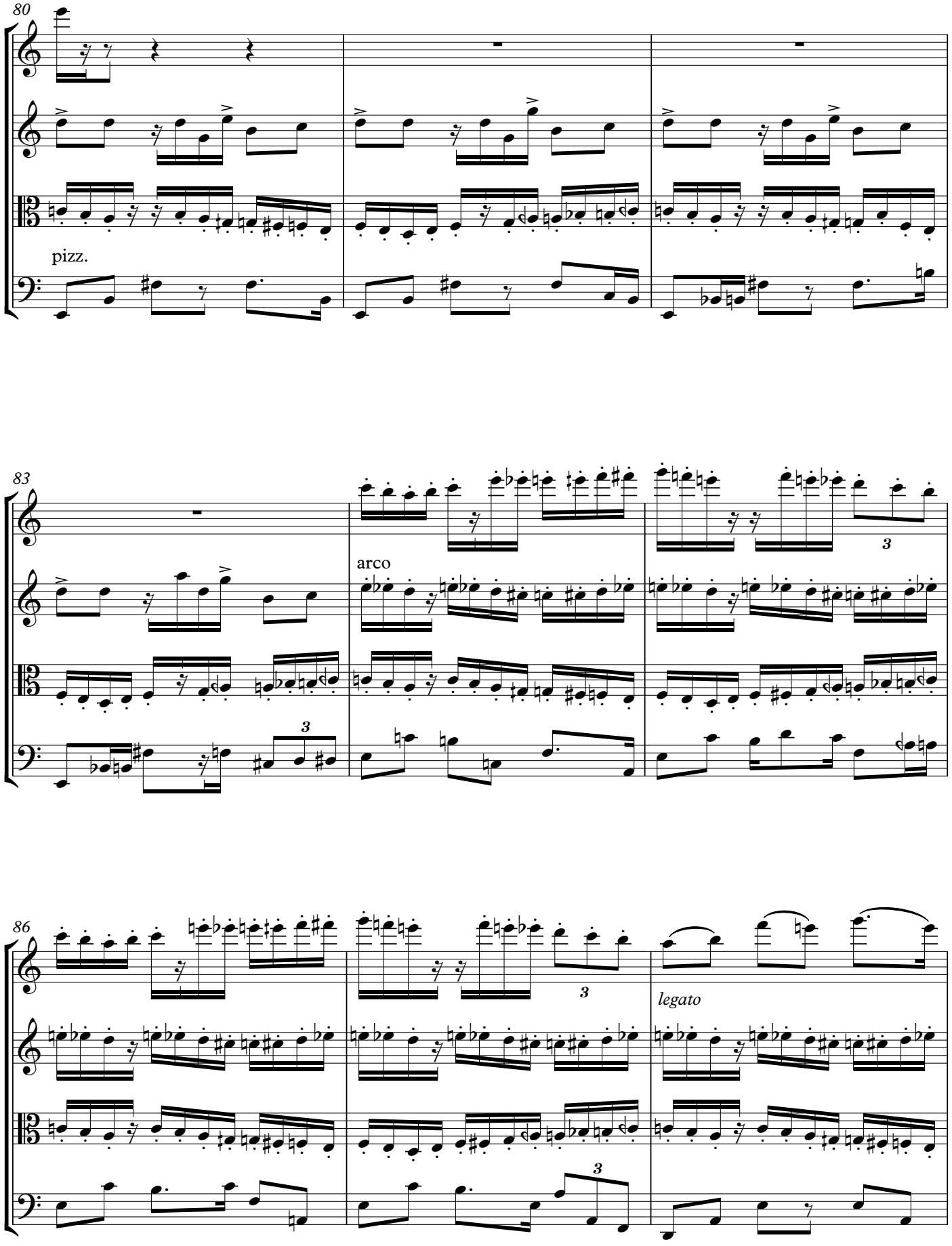
pizz.

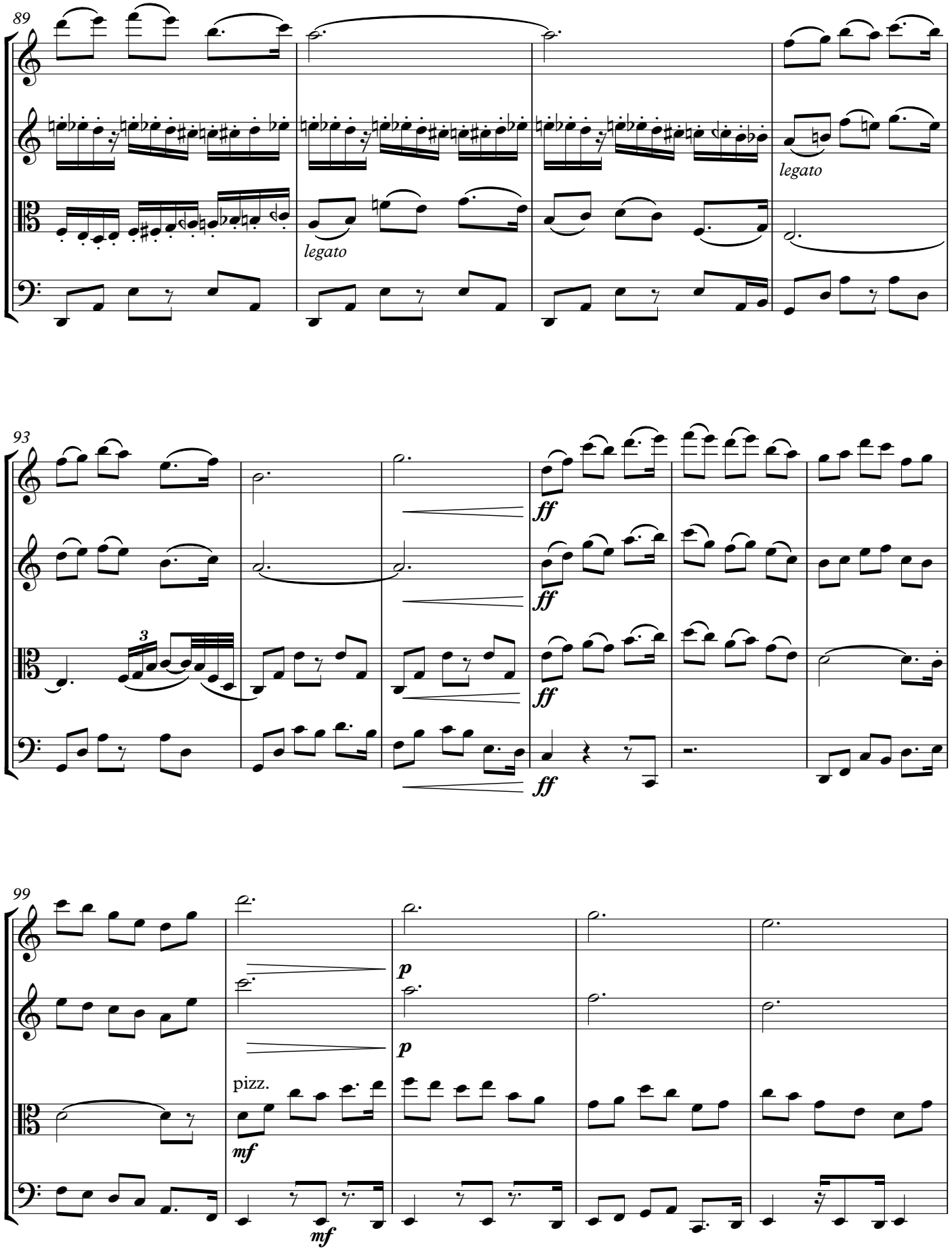
mf

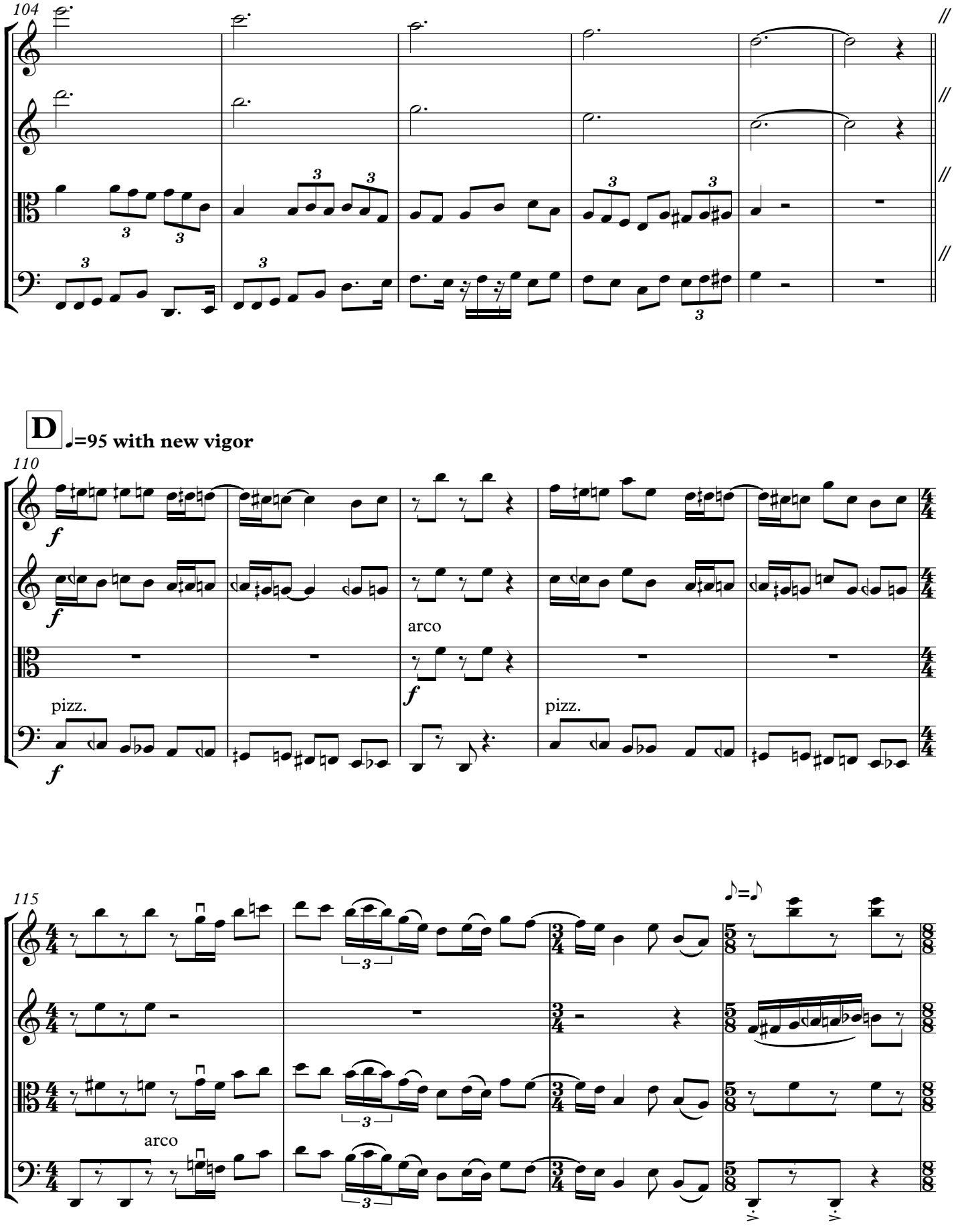
f

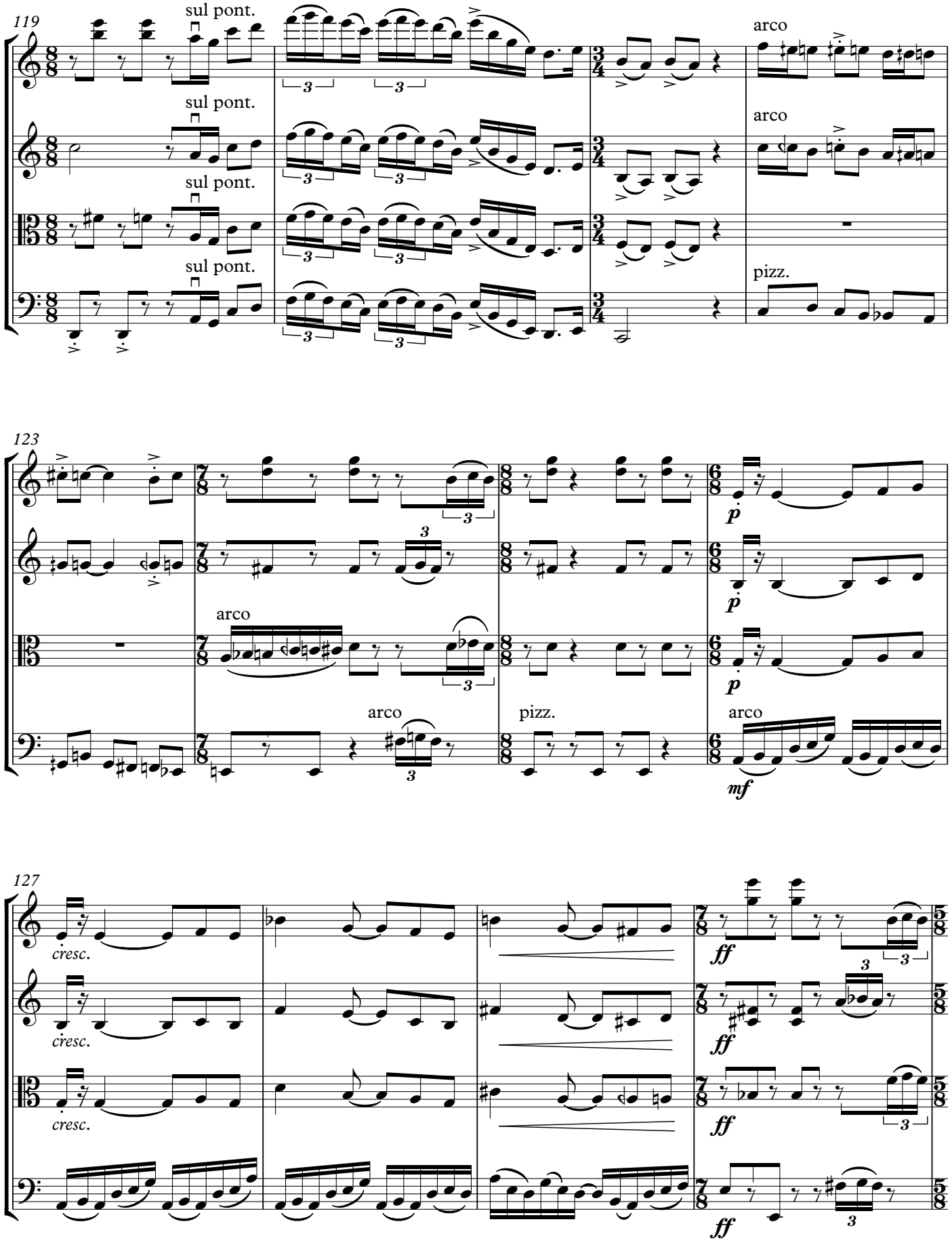
f

77


80
pizz.
83
arco
3
86
3
legato
3


89
legato
legato
93
3
ff
ff
ff
ff
99
p
p
pizz.
mf
mf

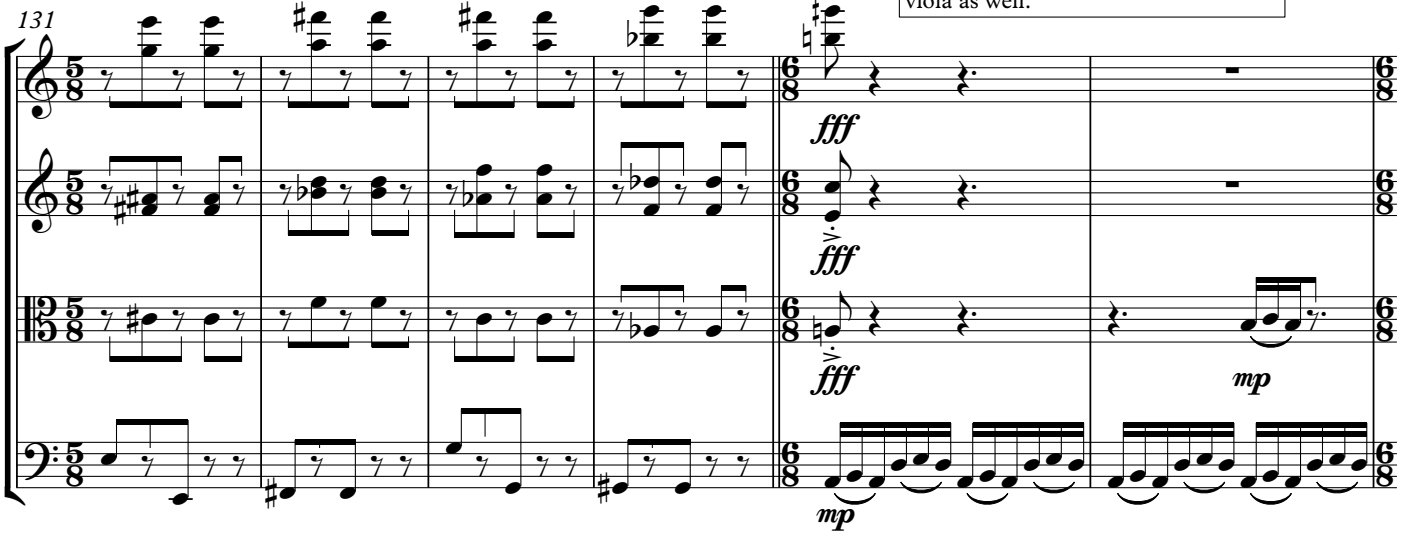

104
D
♩=95 with new vigor
110
f
pizz.
arco
115
♪=♪
arco


119
sul pont.
sul pont.
sul pont.
sul pont.
arco
arco
pizz.
123
arco
arco
pizz.
arco
p
p
p
mf
127
cresc.
cresc.
cresc.
ff
ff
ff
ff

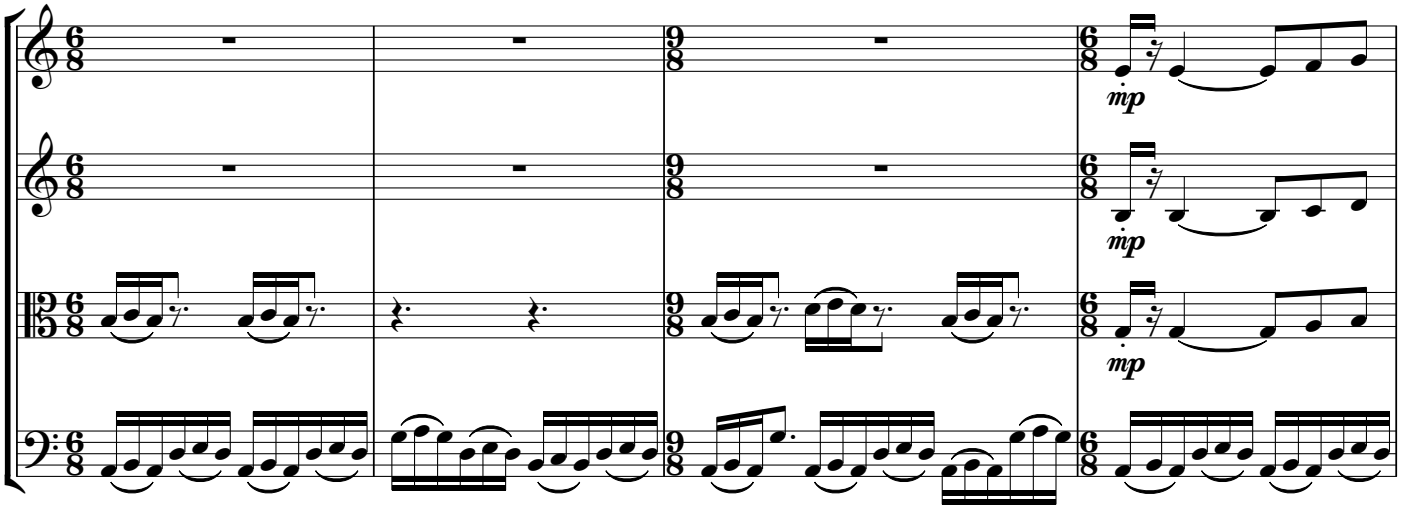
E

Note: Section E will feel like 12/16 in the cello part, and occasionally in the viola as well.

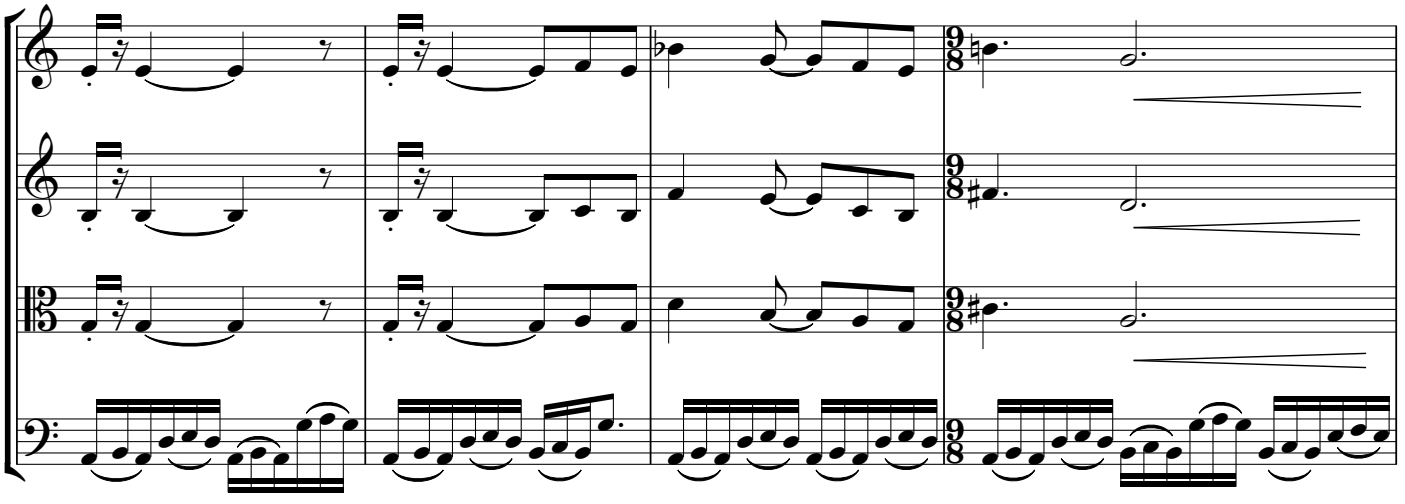
131

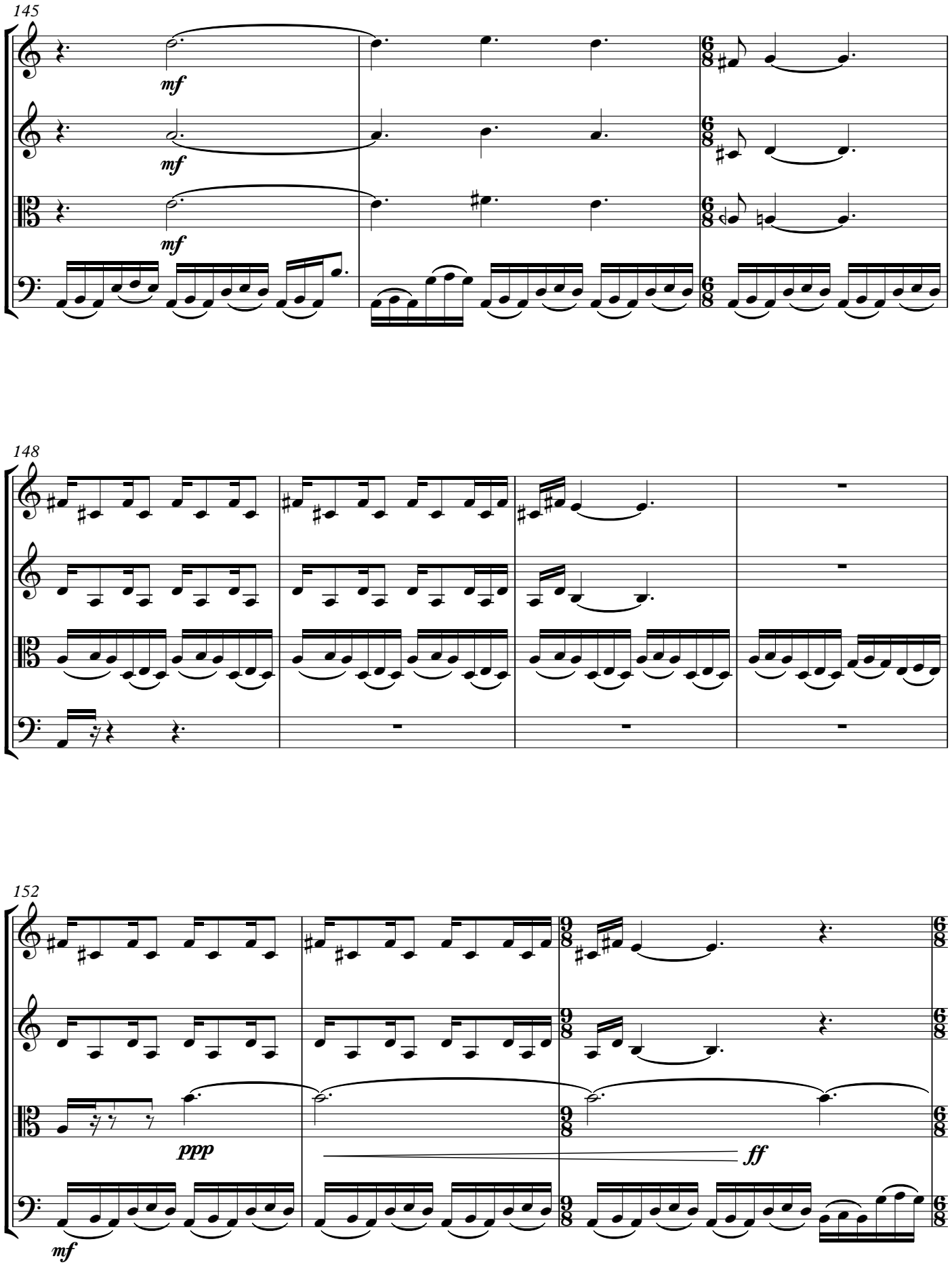


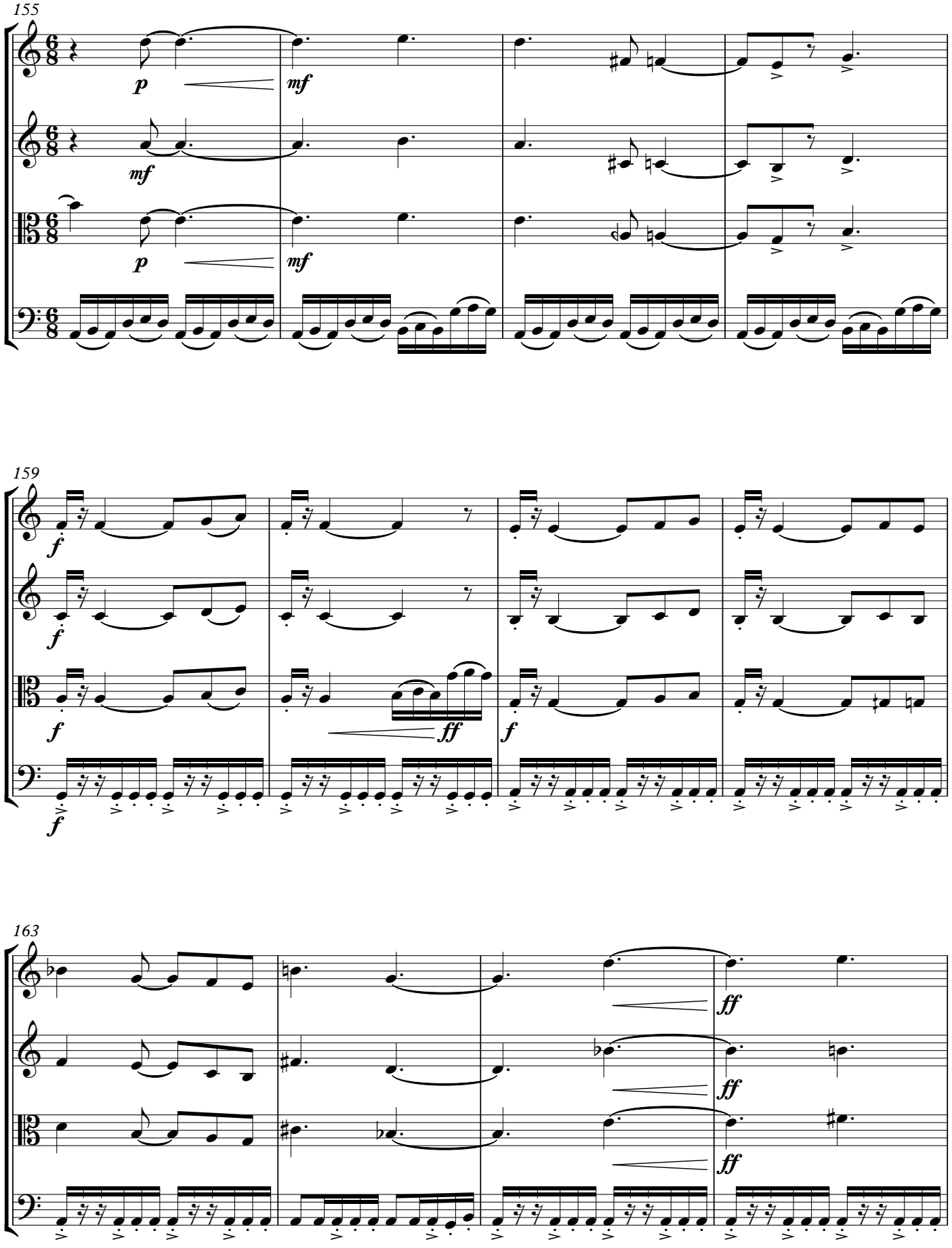
137

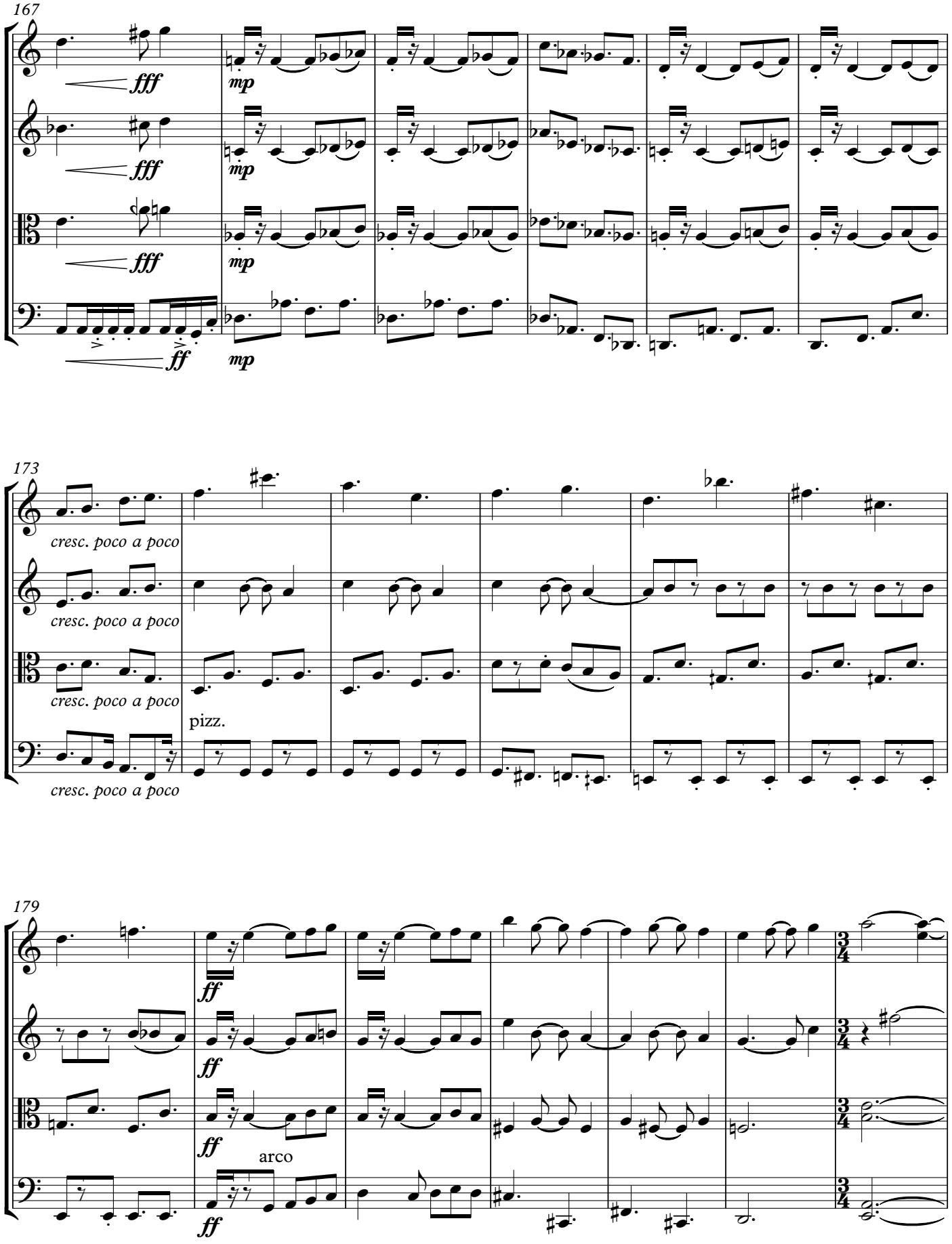


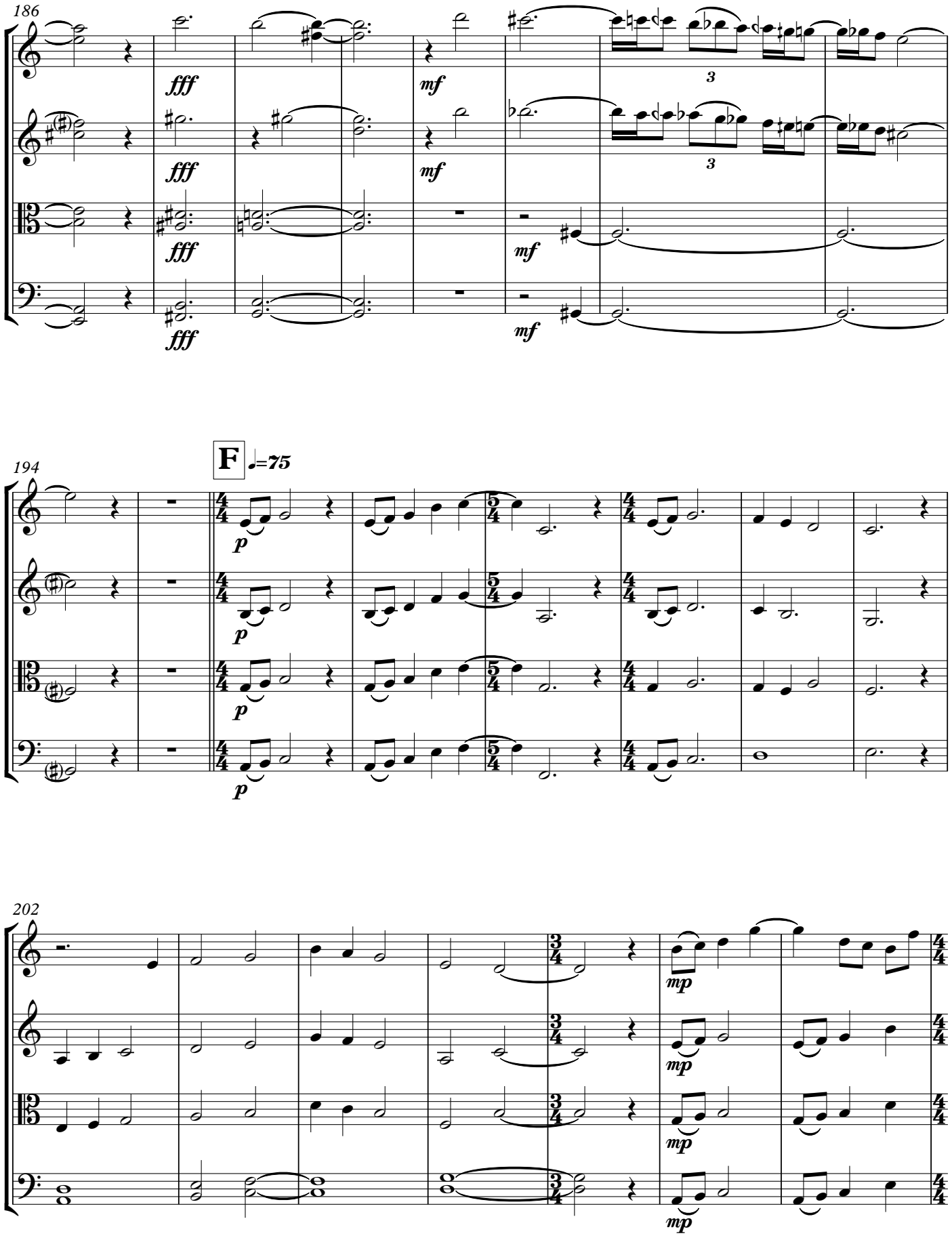
141

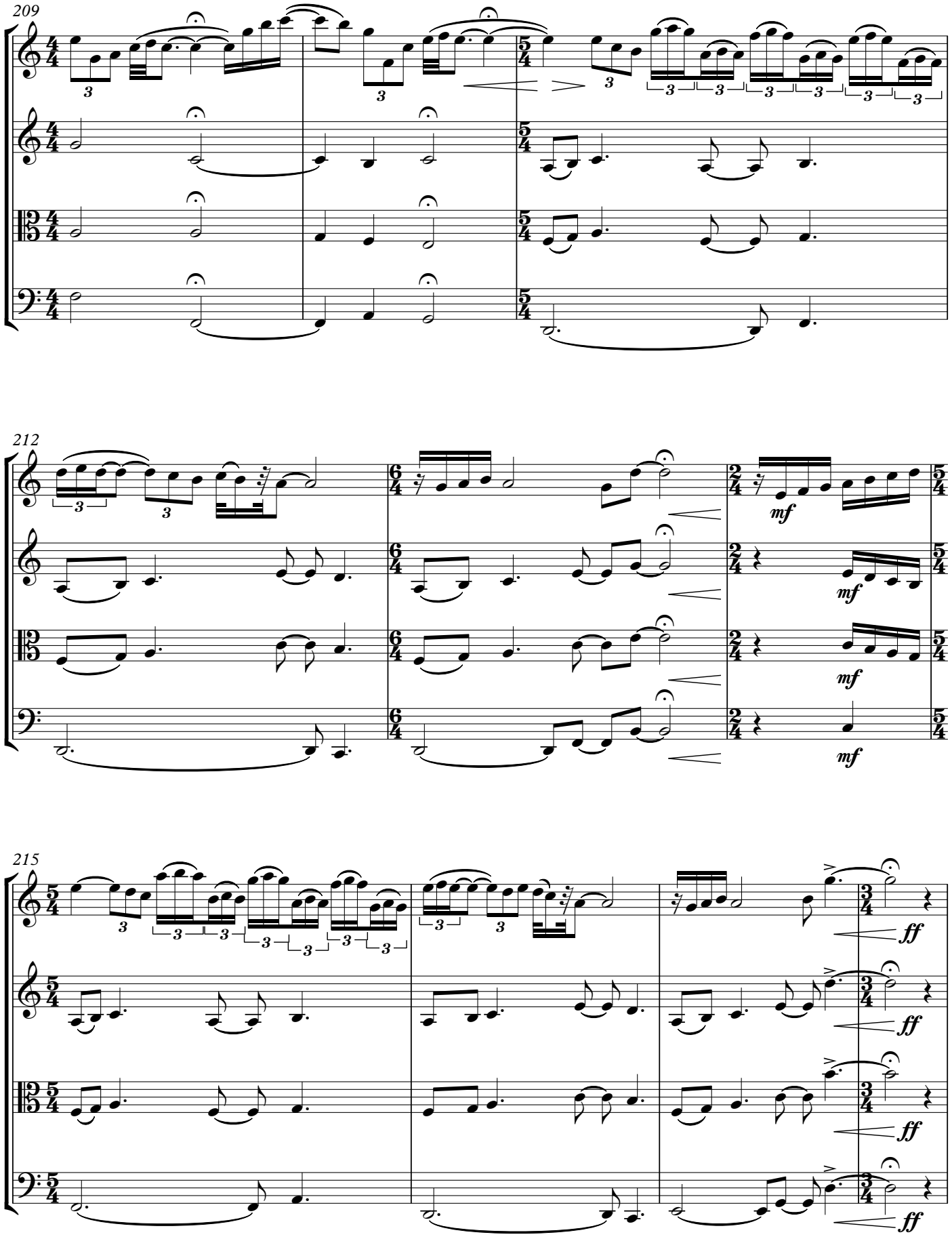


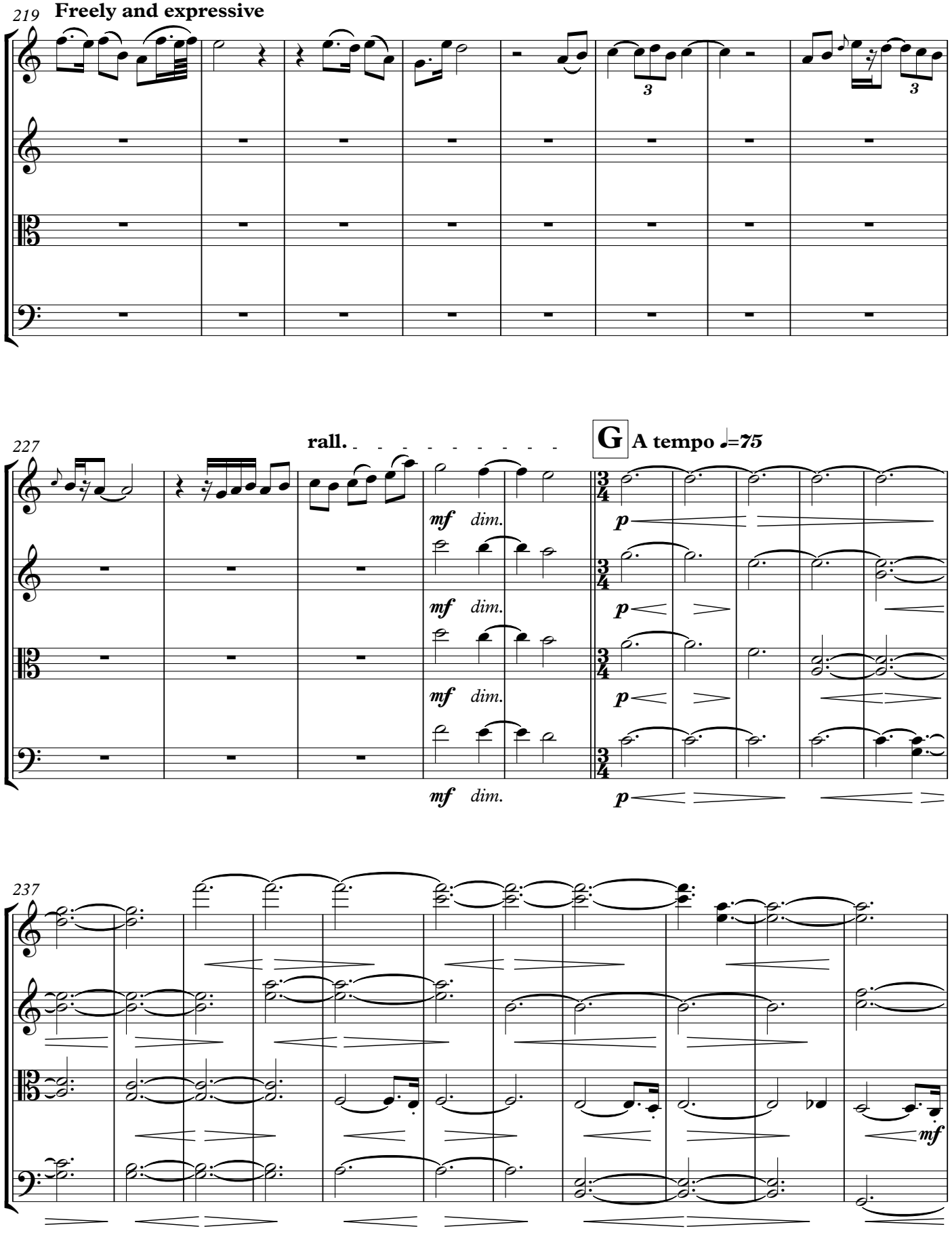

145
mf
mf
mf
148
152
ppp
ff
mf

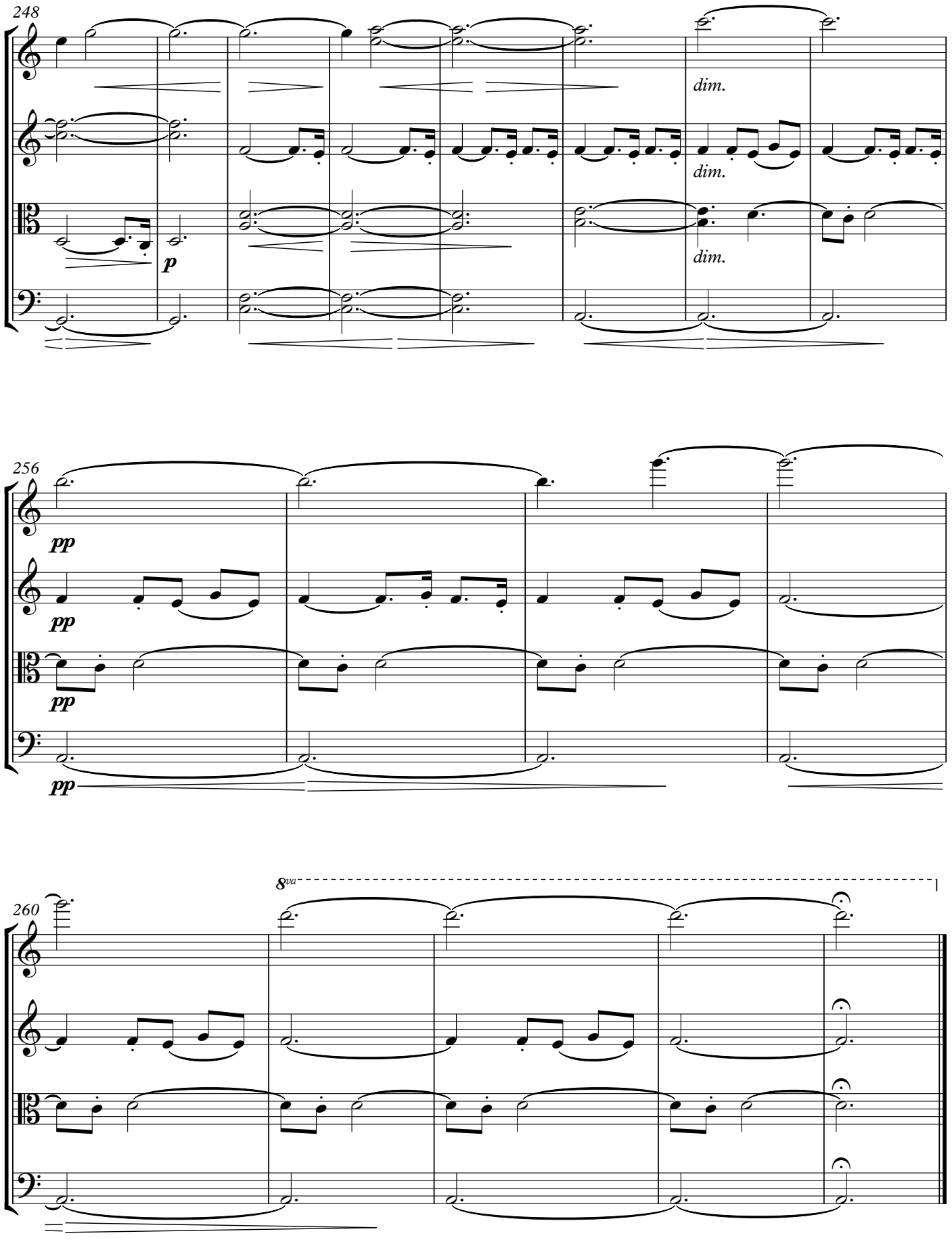

155
p
mf
mf
p
mf
159
f
f
f
ff
f
f
163
ff
ff
ff


167
fff
mp
fff
mp
fff
mp
ff
mp
173
cresc. poco a poco
cresc. poco a poco
cresc. poco a poco
pizz.
cresc. poco a poco
179
ff
ff
ff
arco
ff
3/4
3/4
3/4
3/4


186
fff
mf
194
F
♩=75
202
mp

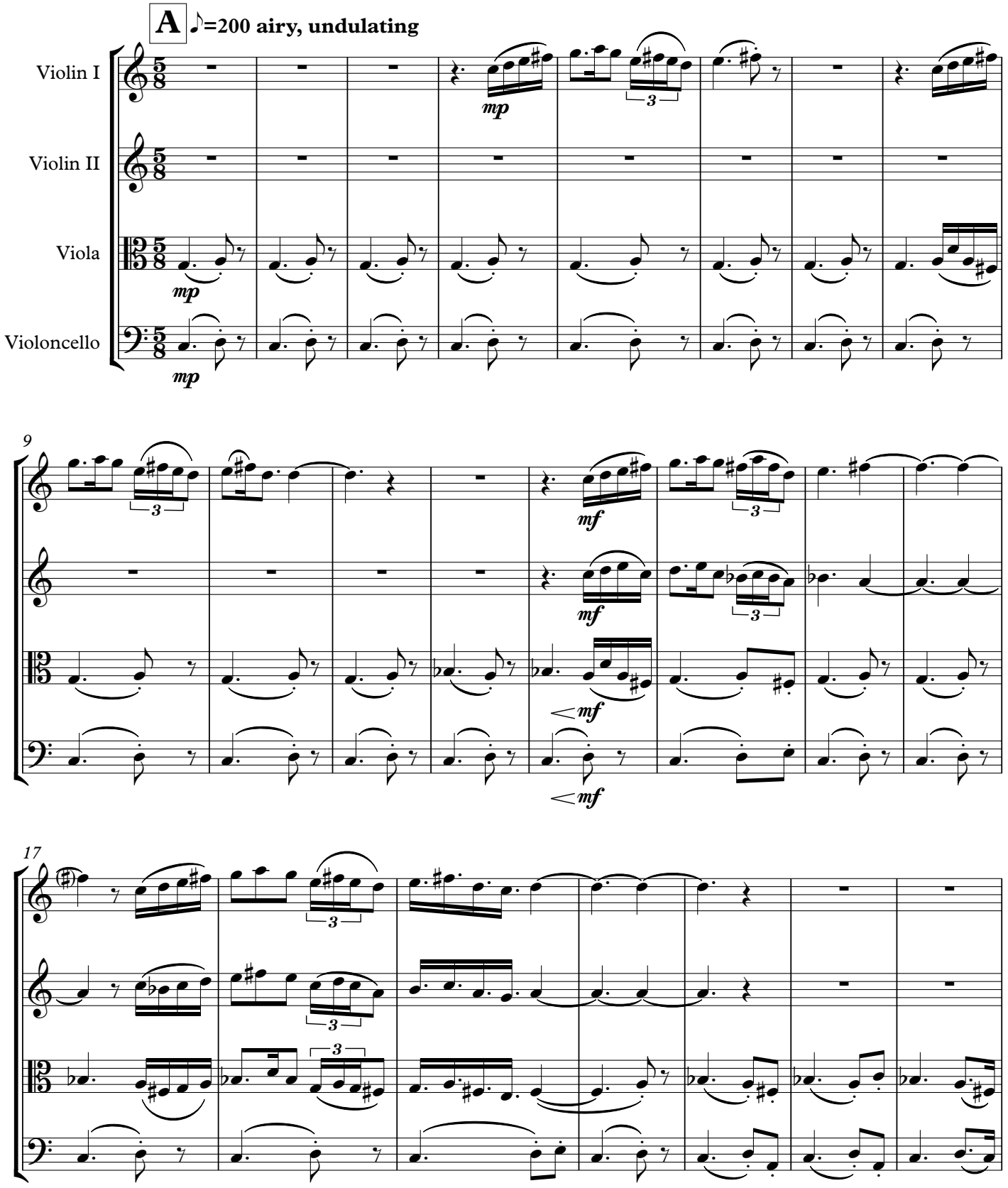

209
212
mf
mf
mf
mf
215
ff
ff
ff
ff

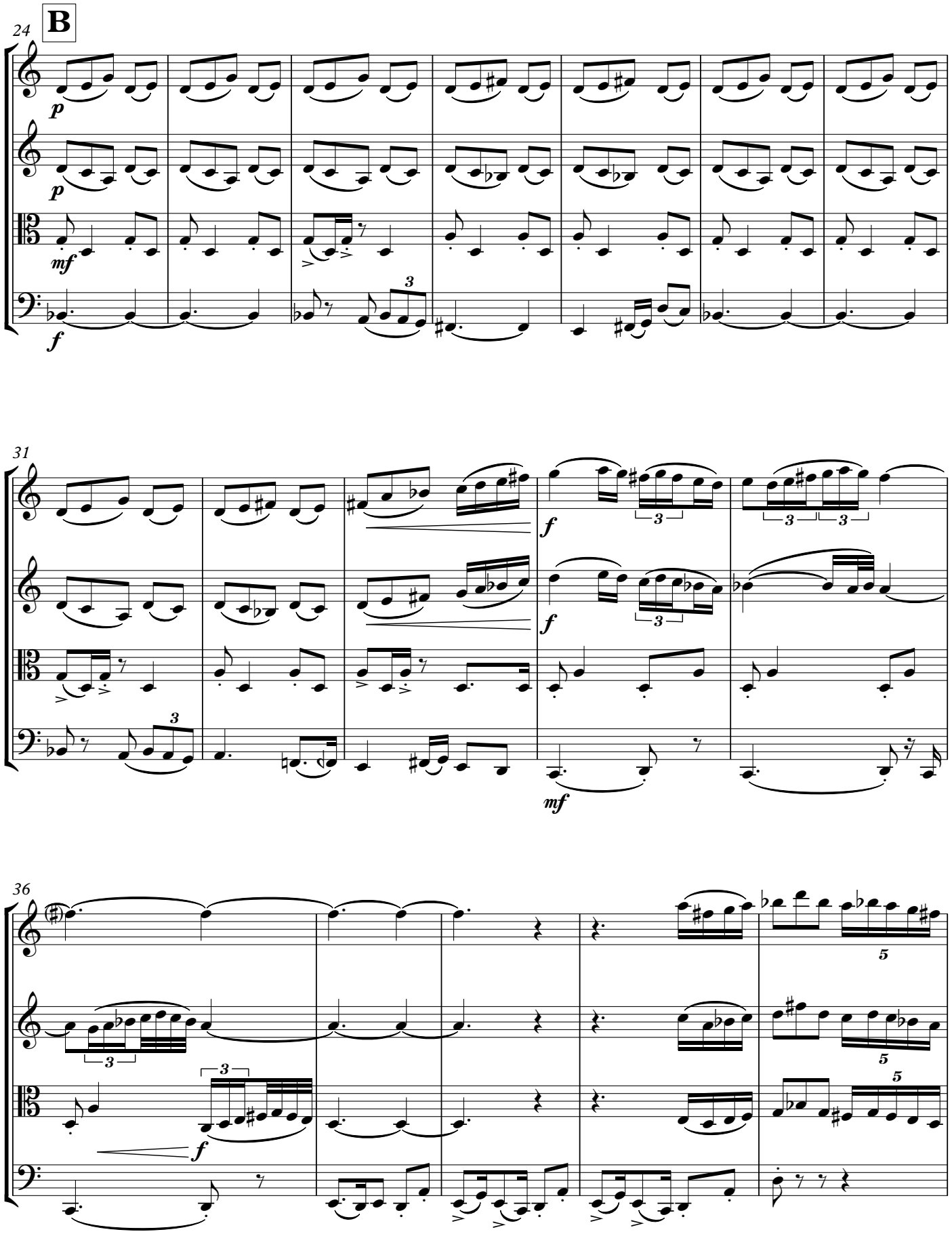

219
Freely and expressive
227
rall.
G
A tempo ♩=75
mf dim.
p
237
mf

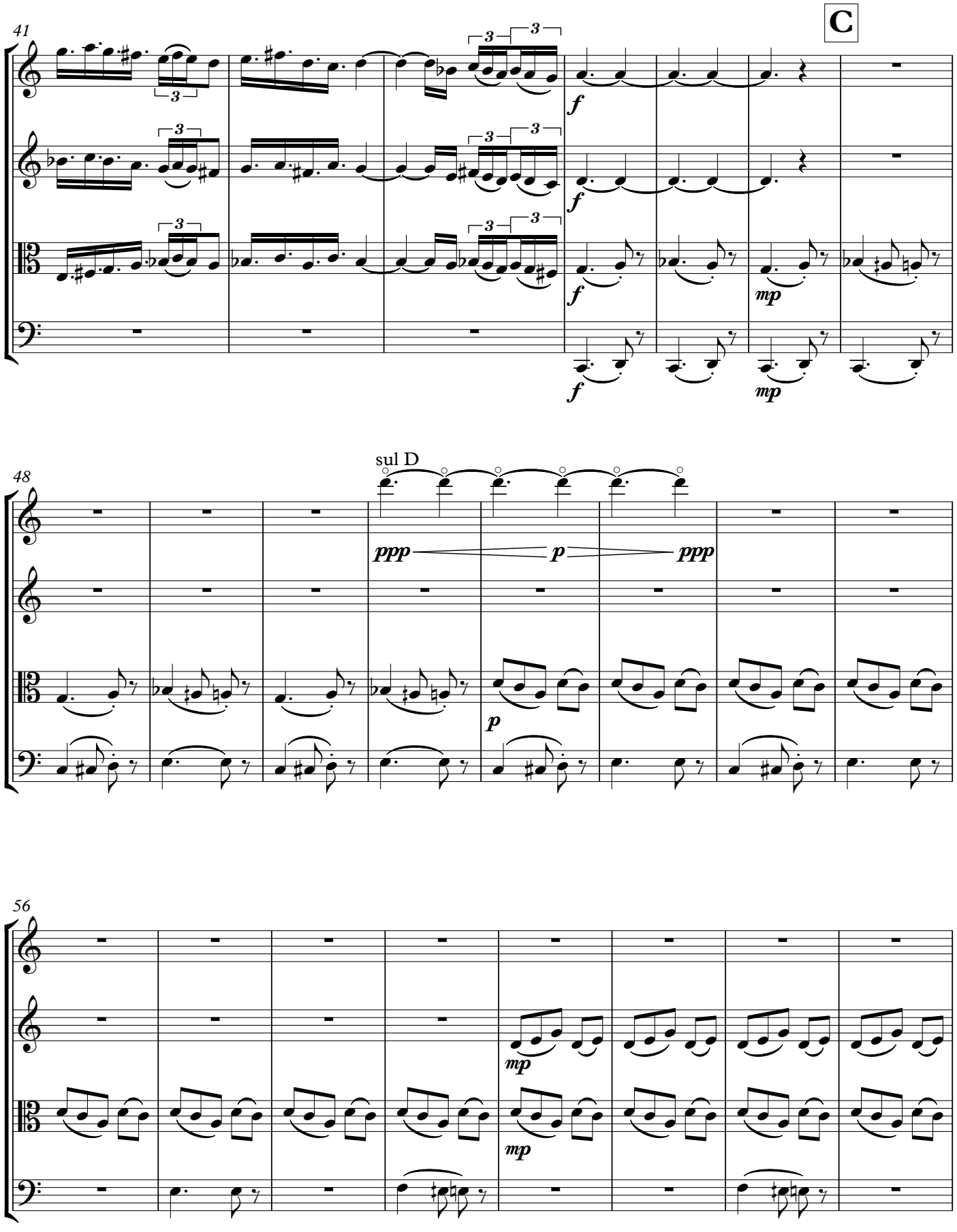

248
dim.
dim.
dim.
p
256
pp
pp
pp
pp
260
8va

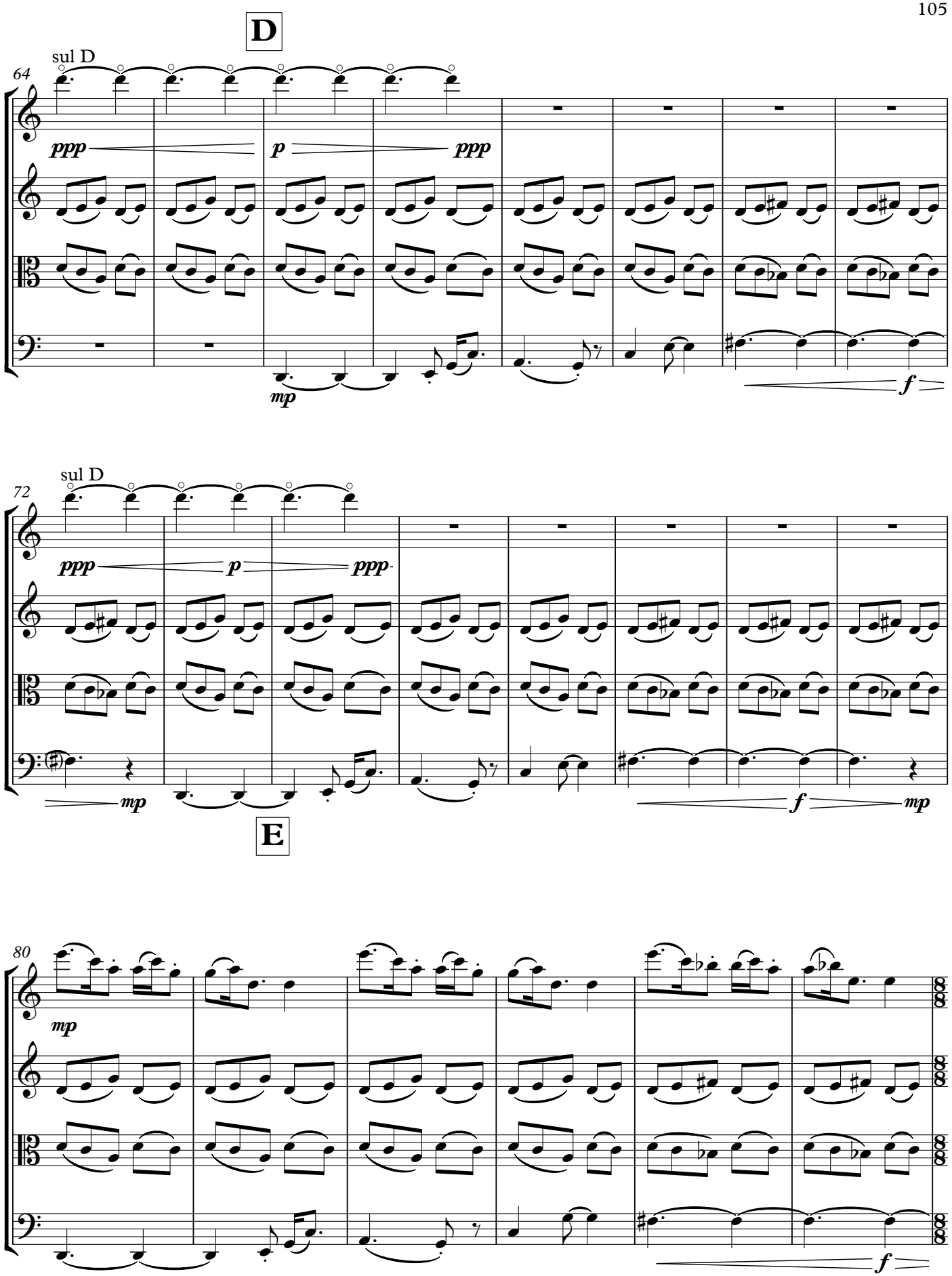
Hexagon IX: Promethean

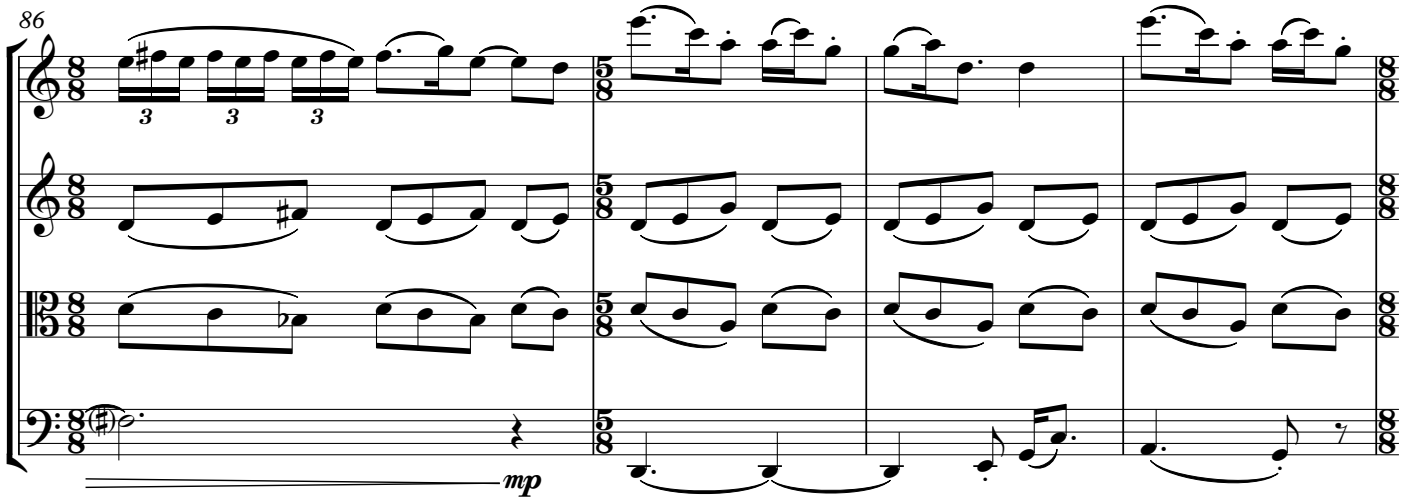
k. Scott Eggert

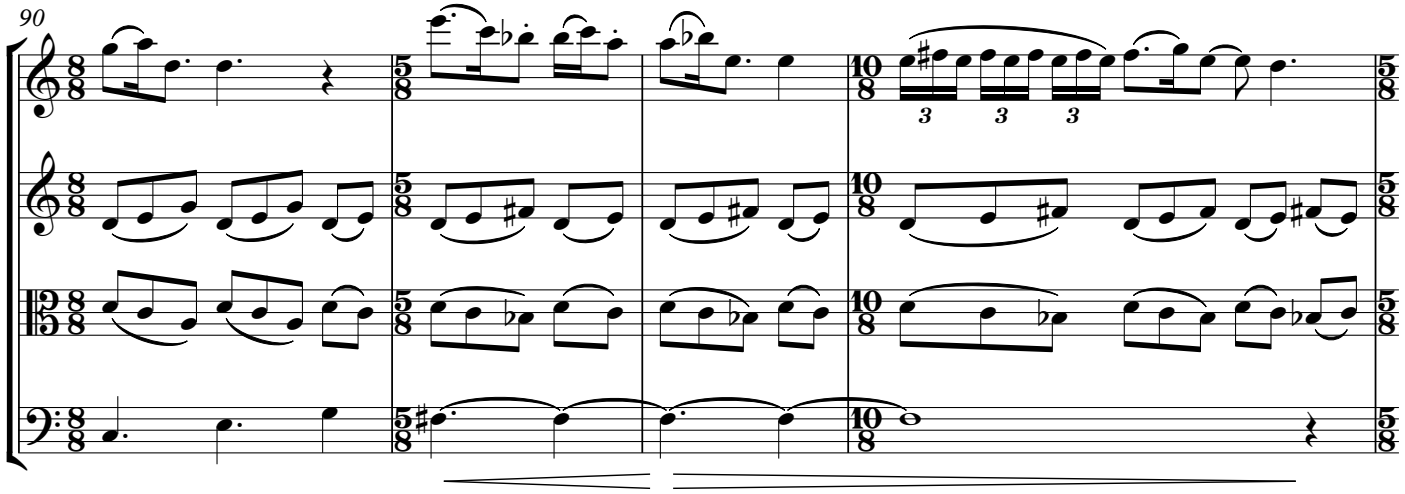



24
B
p
p
mf
f
3
31
f
f
3
3
3
3
mf
36
3
3
f
5
5
5

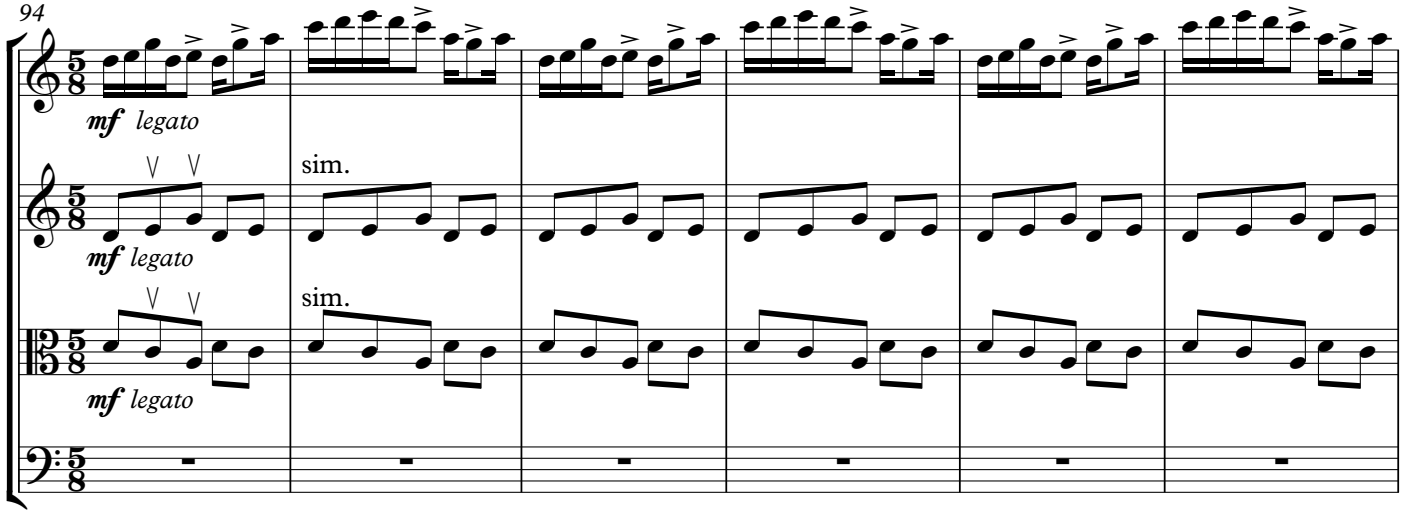

41
C
f
mp
48
sul D
ppp
p
ppp
56
mp

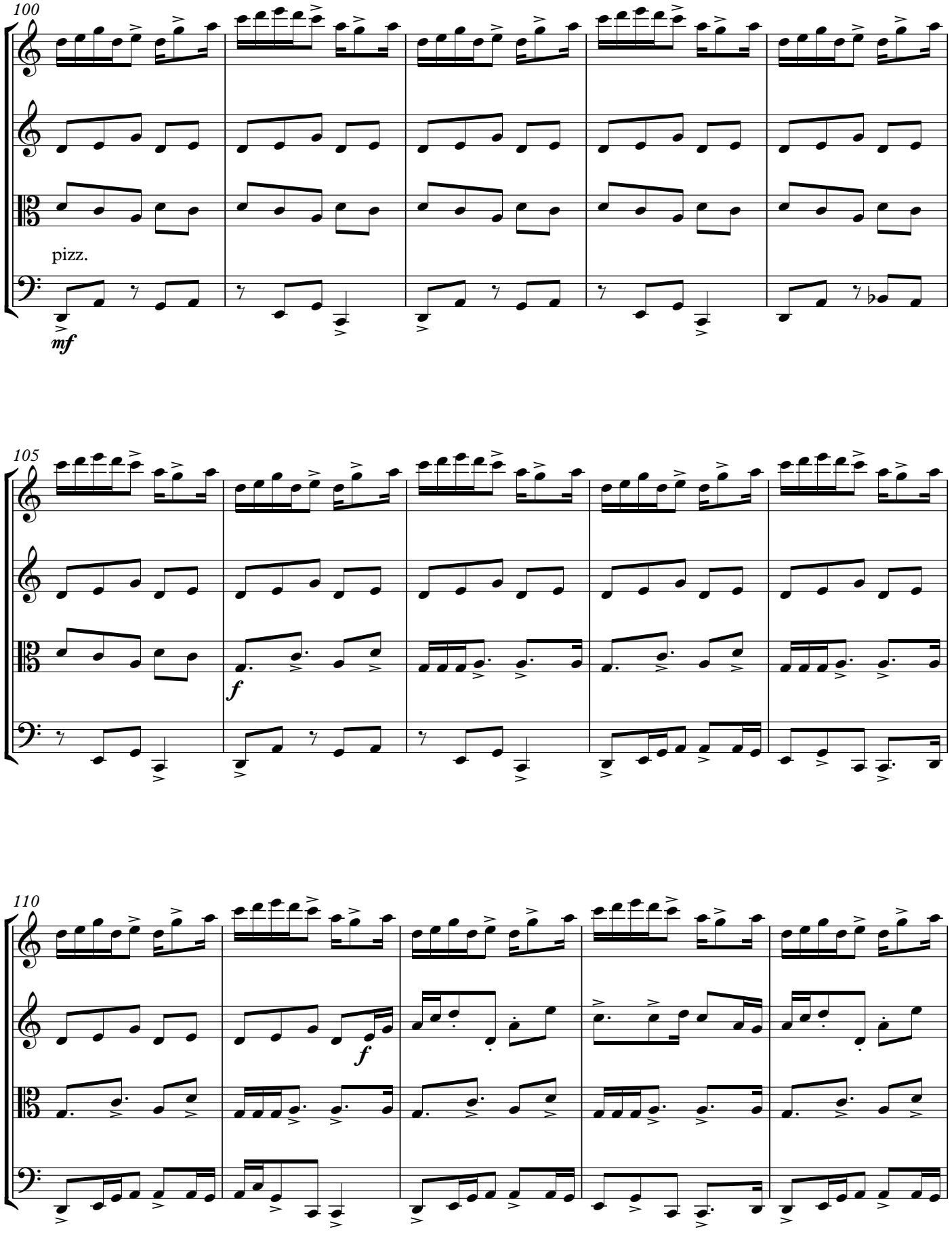

D
sul D
64
ppp
p
ppp
mp
f
sul D
72
ppp
p
ppp
mp
f
mp
E
80
mp
f

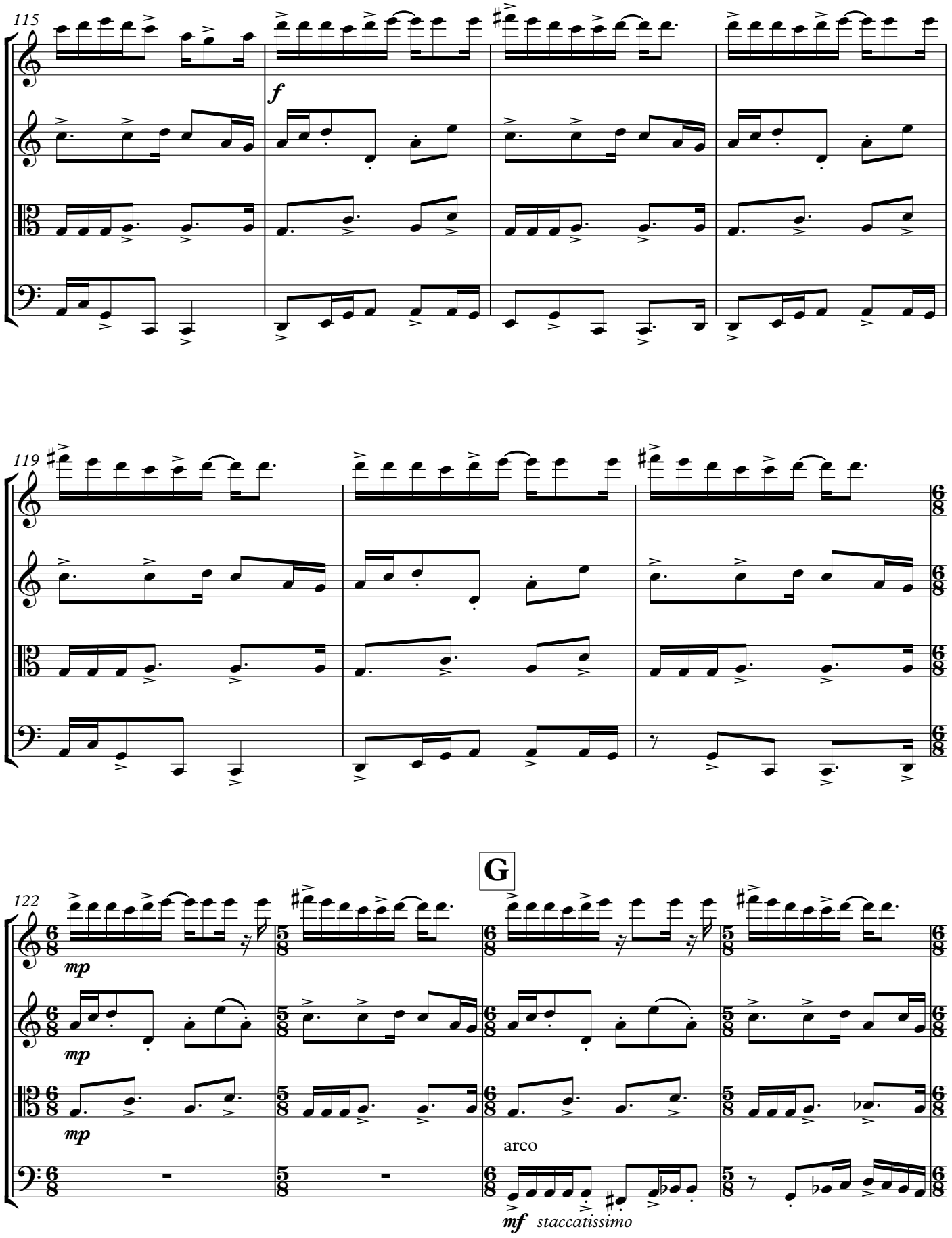


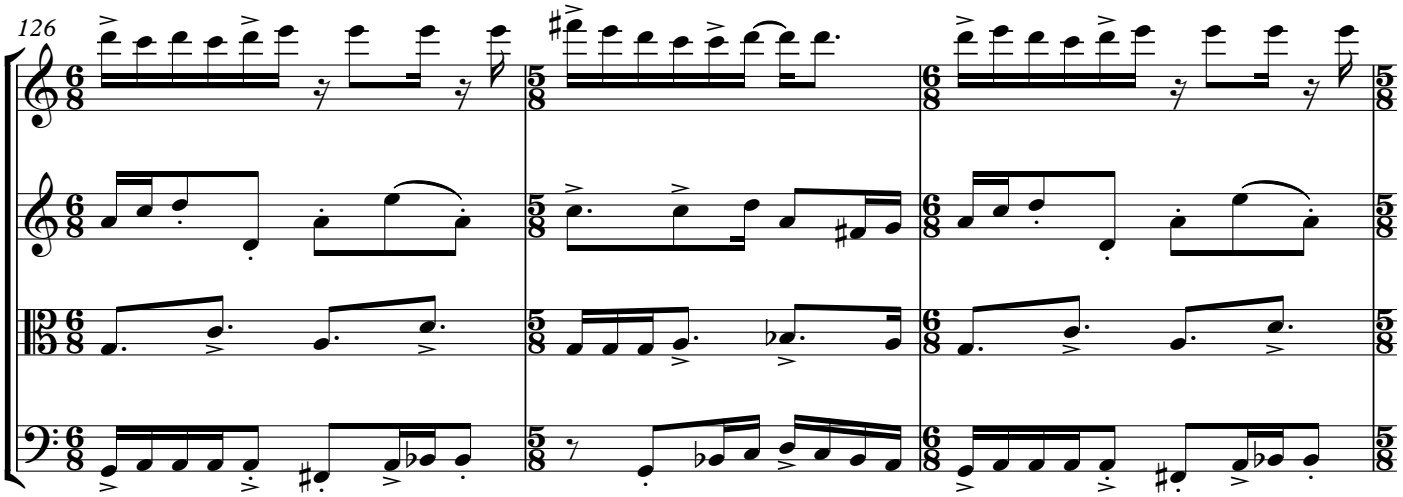


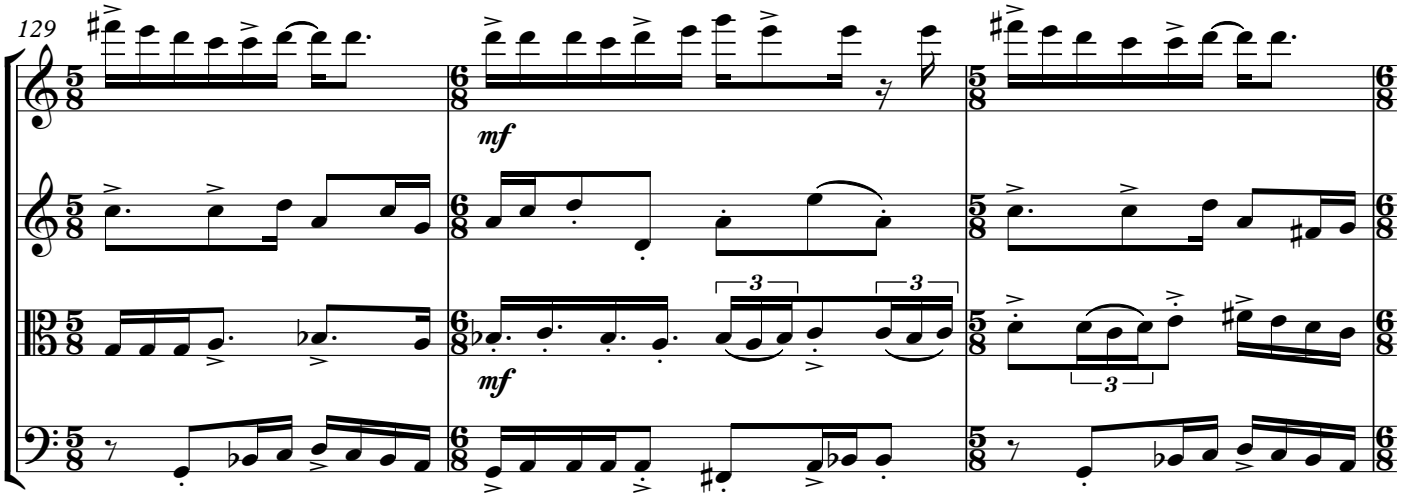
F **more rhythmic intensity,**
but still flowing and connected

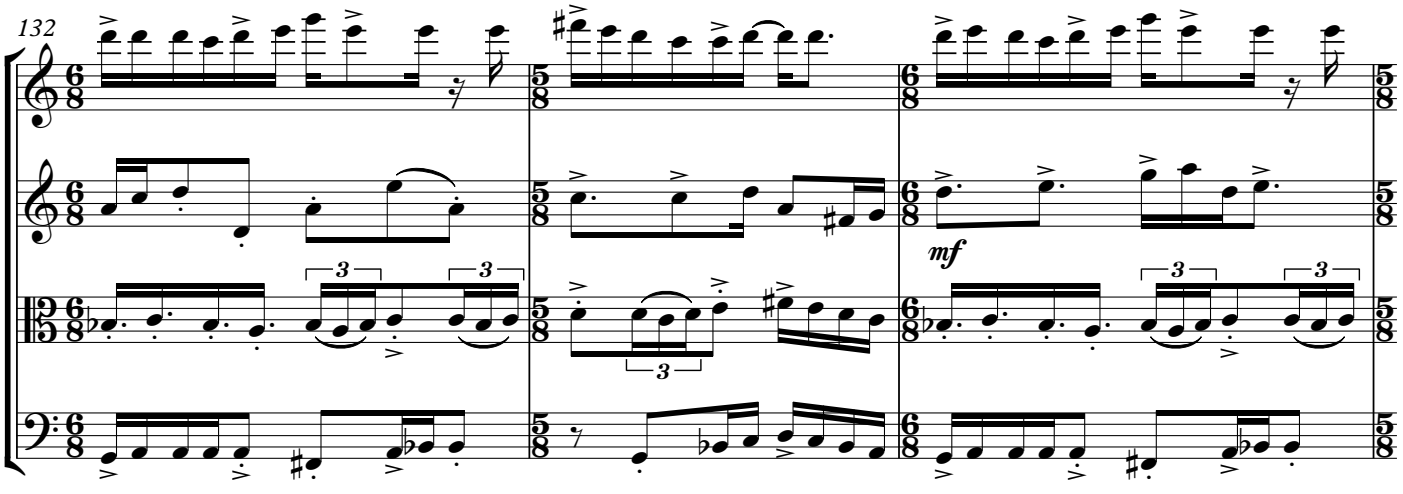


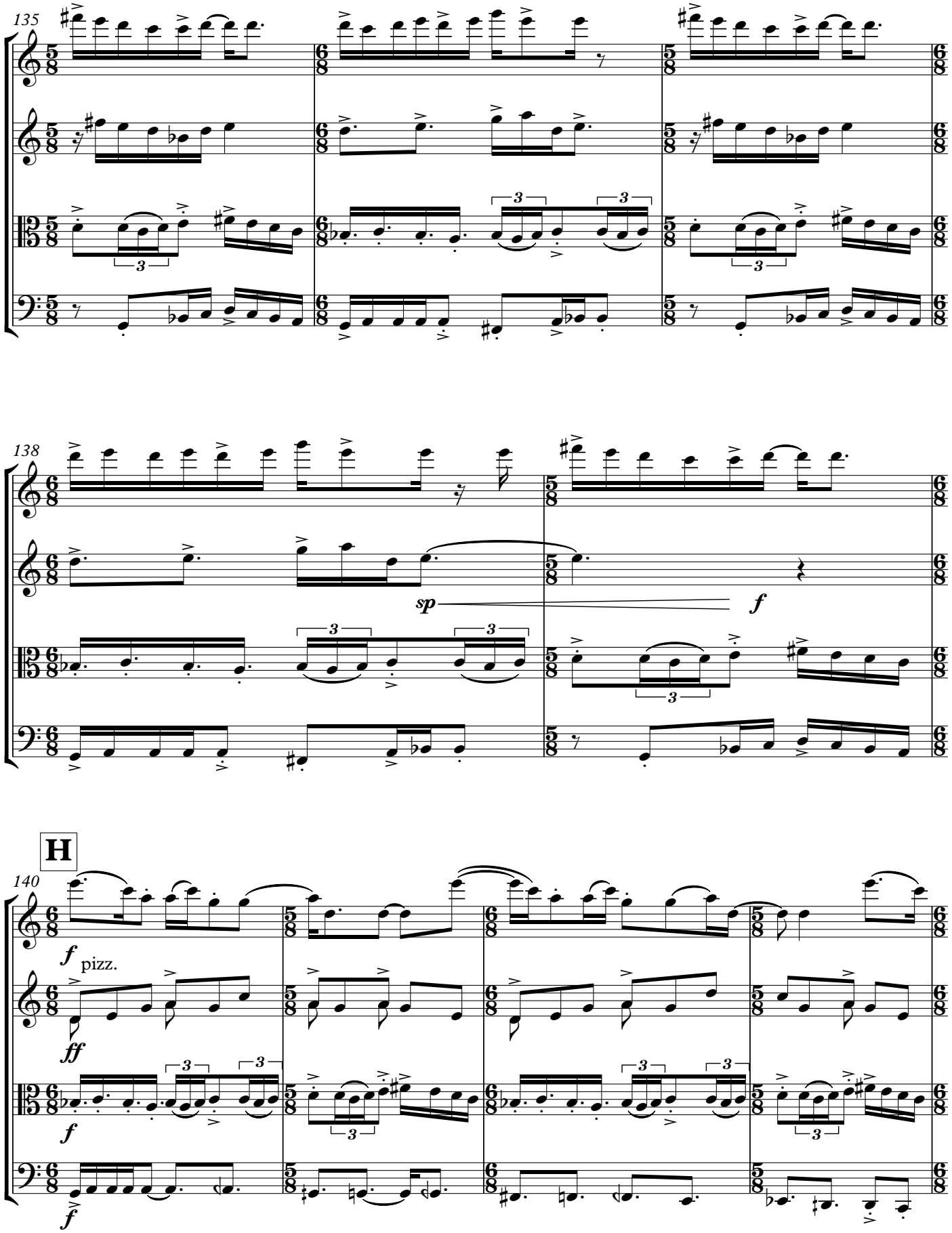

100
pizz.
mf
105
f
110
f

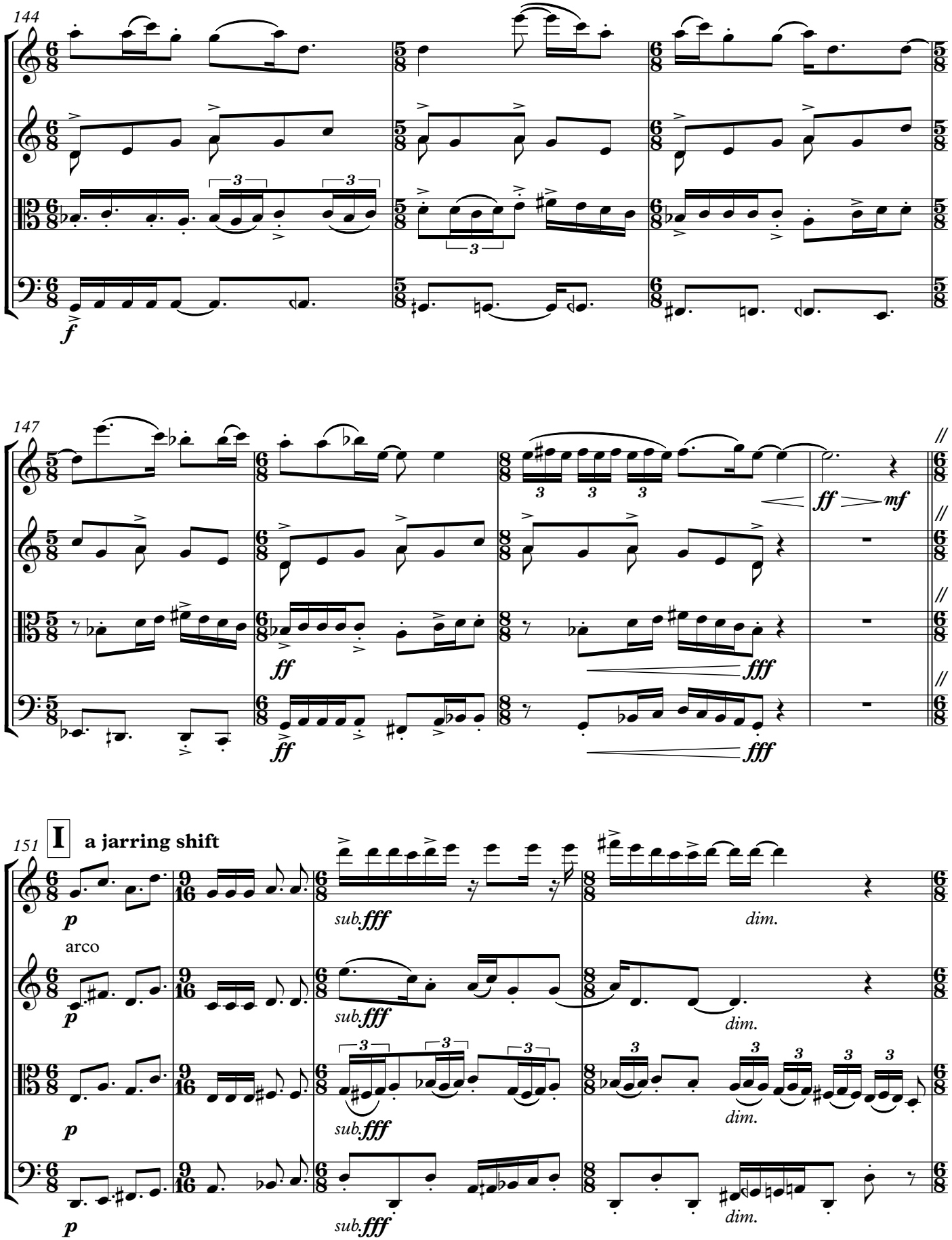

115
f
119
G
122
mp
mp
mp
arco
mf staccatissimo

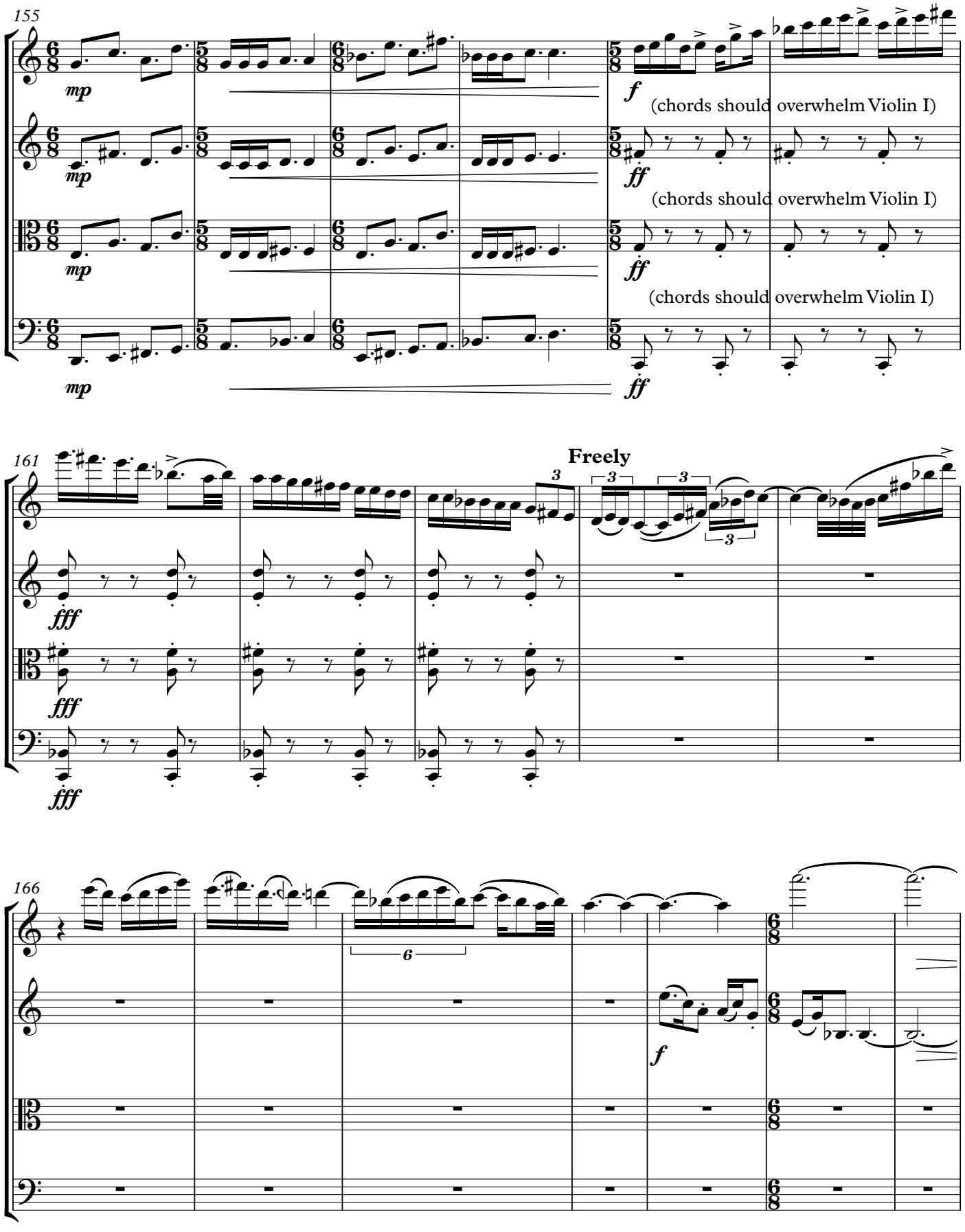

126

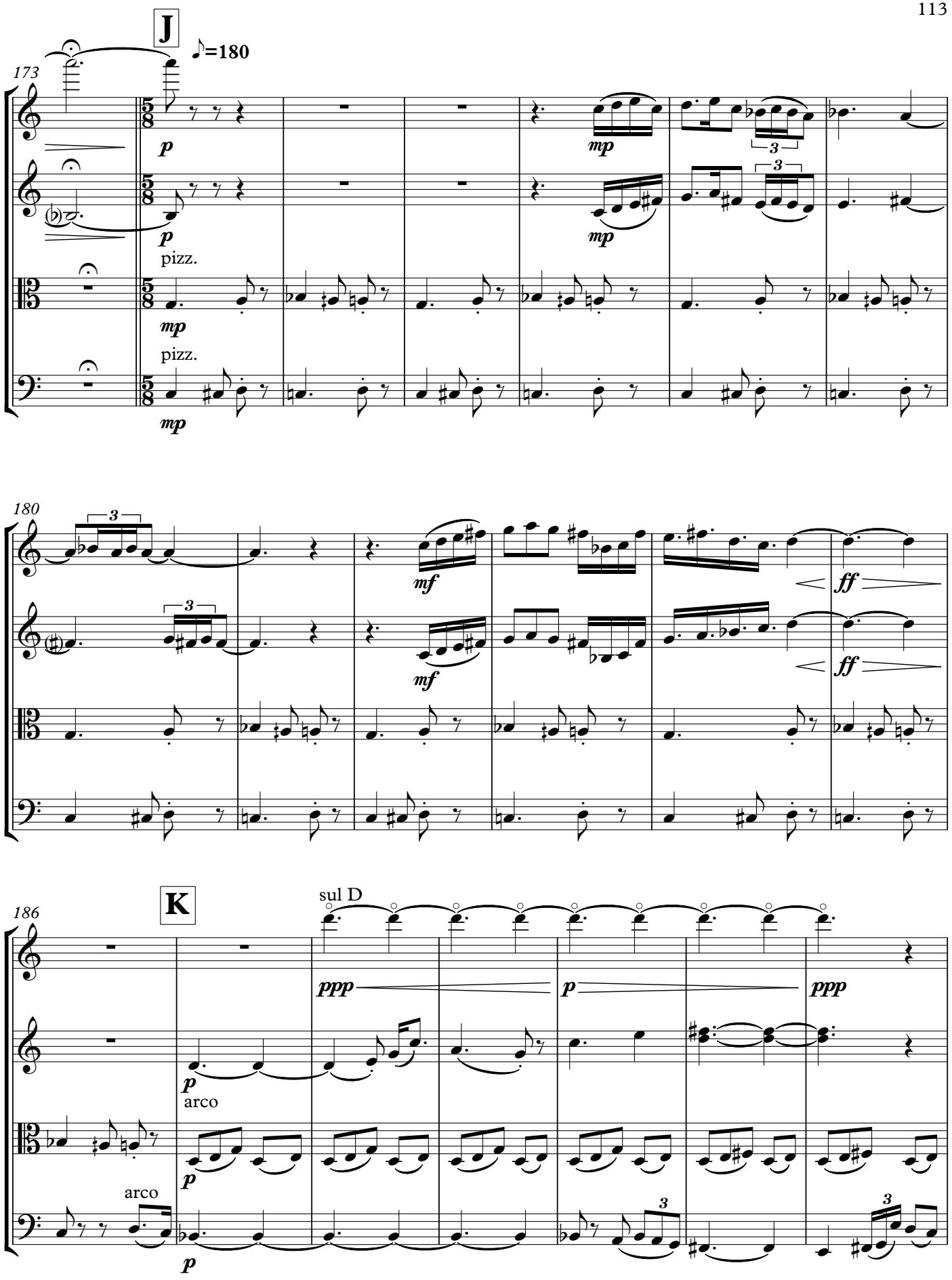

129
mf
mf

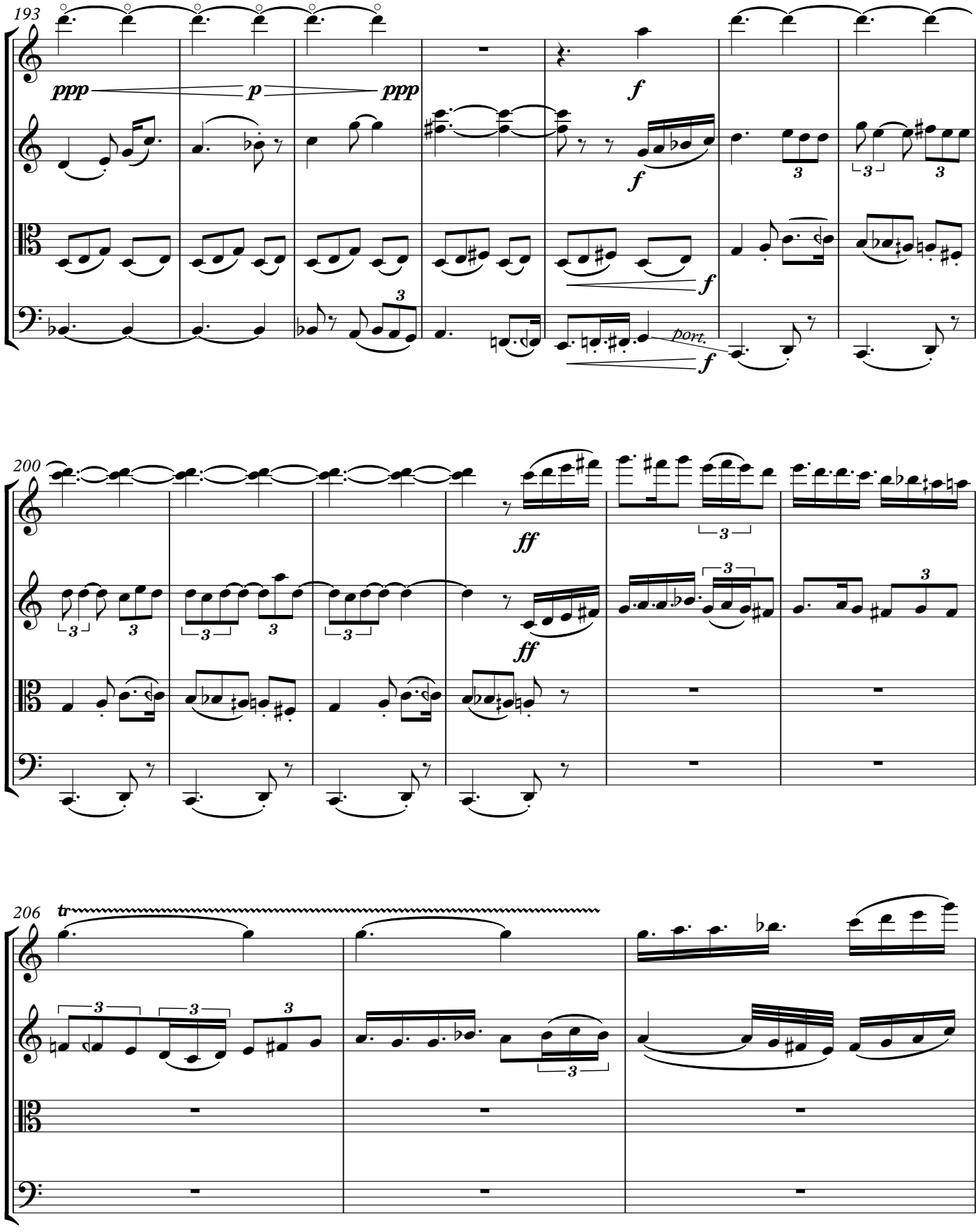

132
mf

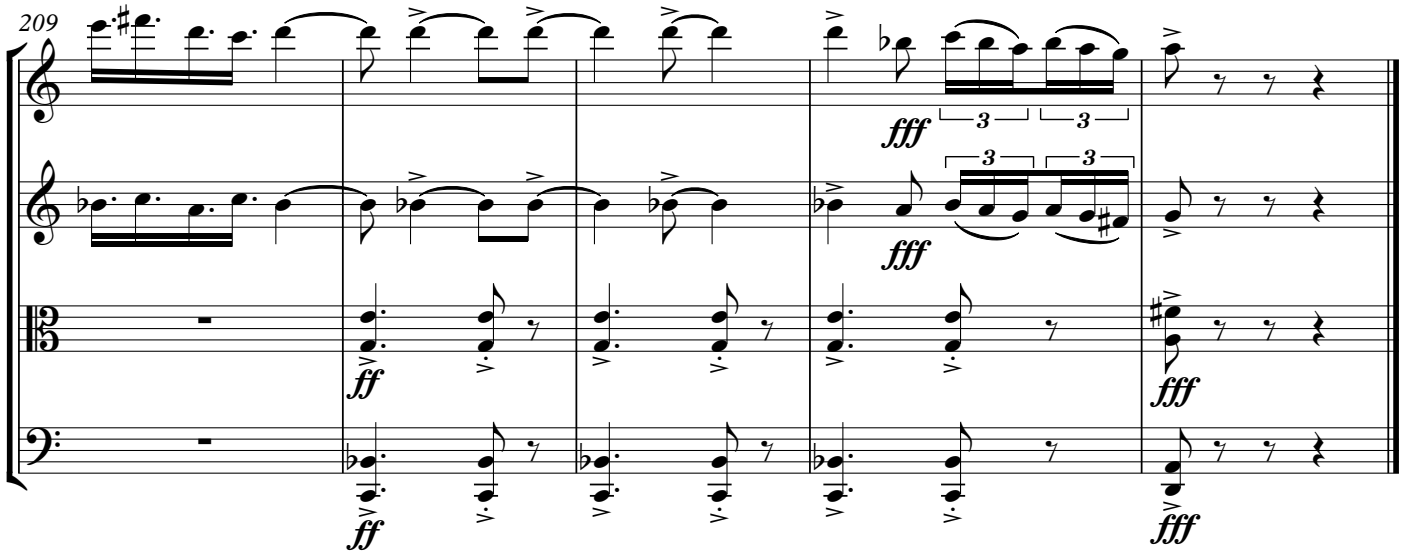

135
138
sp
f
H
140
f
pizz.
ff
f
f


144
147
151
I
a jarring shift
arco
sub.fff
dim.


155
mp
mp
mp
mp
f
(chords should overwhelm Violin I)
ff
(chords should overwhelm Violin I)
ff
(chords should overwhelm Violin I)
ff
161
Freely
fff
fff
fff
166
6
f

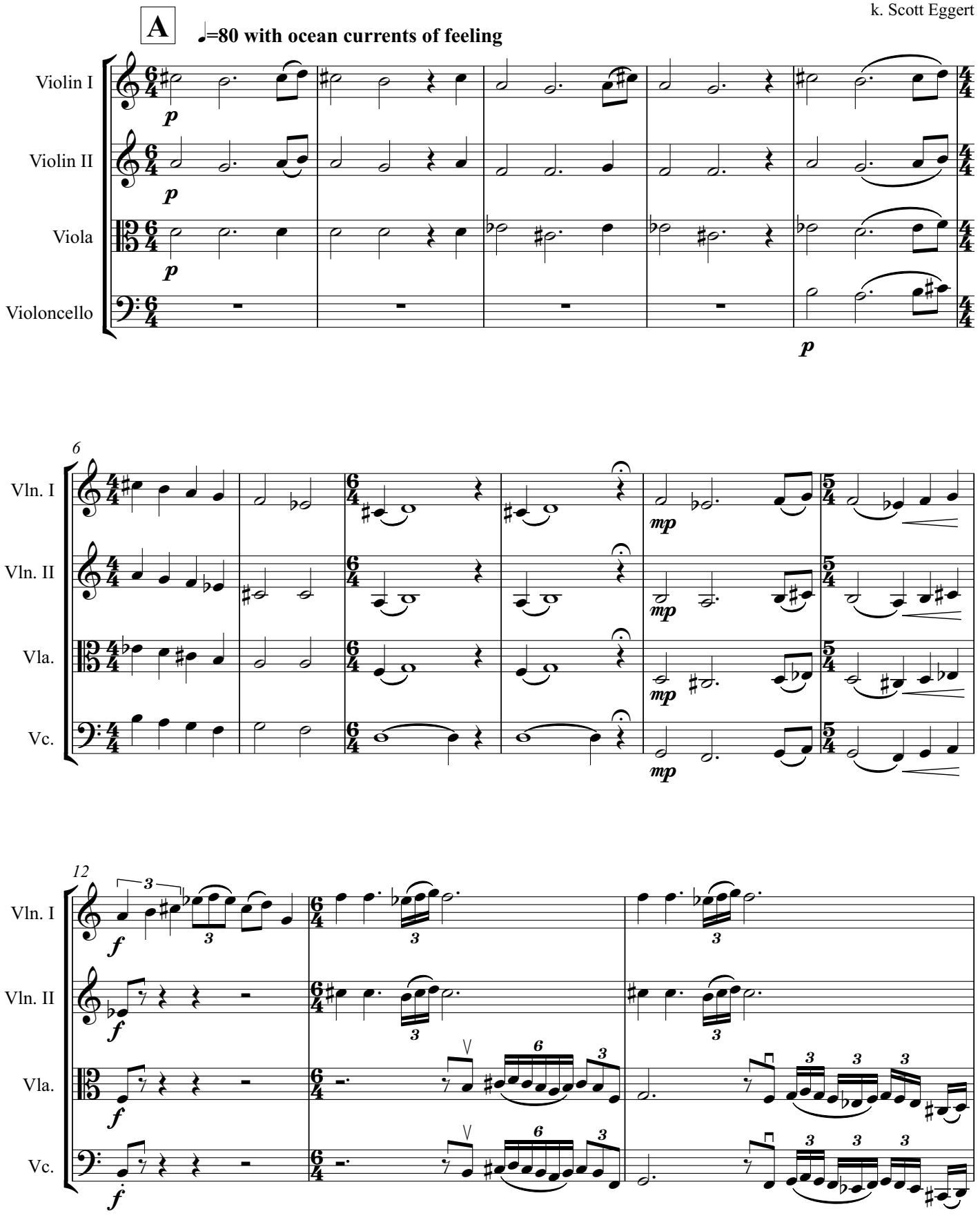

J
♪=180
173
p
mp
pizz.
mp
pizz.
mp
180
mf
ff
186
K
sul D
ppp
p
ppp
arco
arco

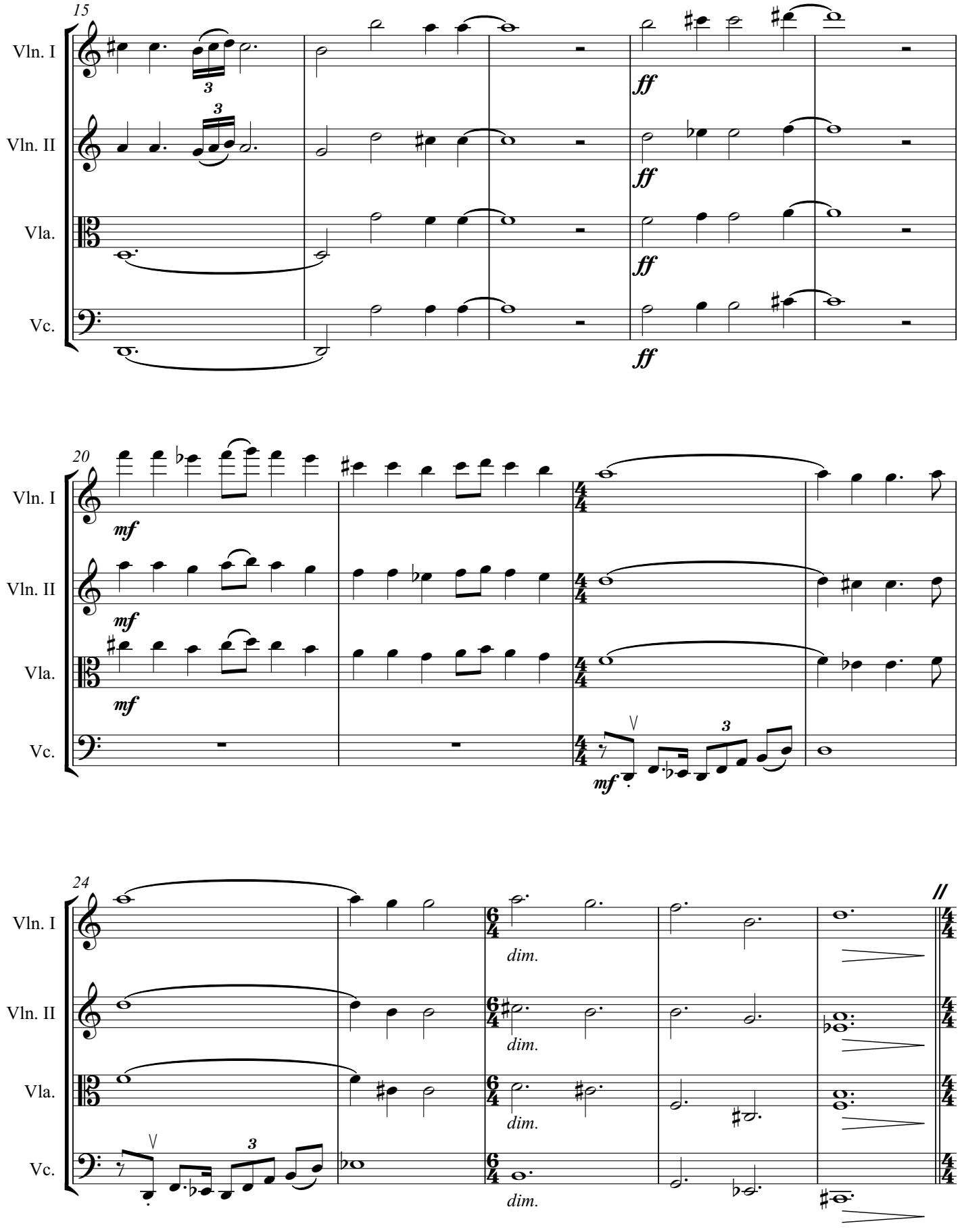

193
ppp
p
ppp
f
f
f
port.
f
200
ff
ff
206
tr

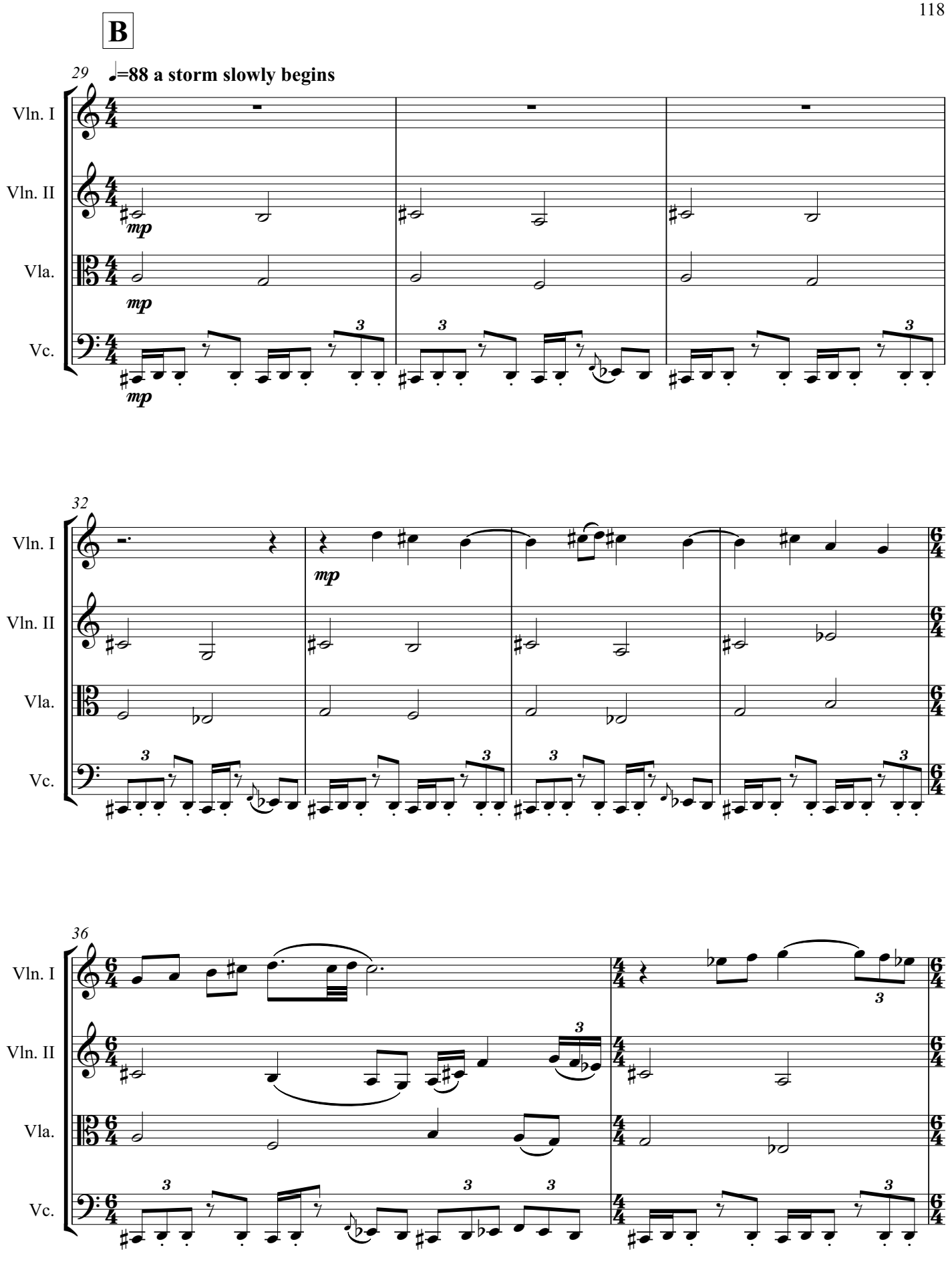

209
fff
fff
ff
fff
ff
fff

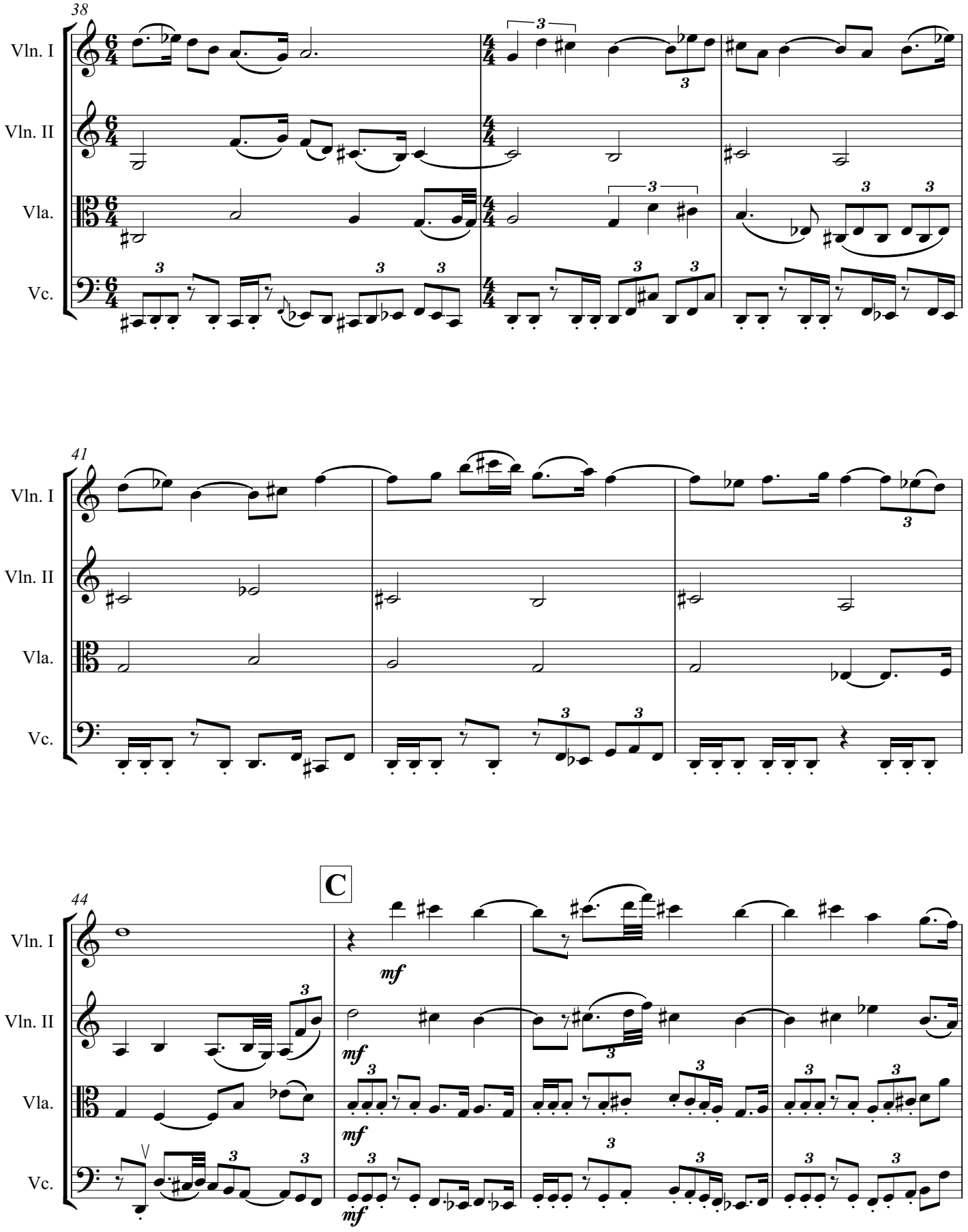
Hexagon VIII: Phrygionian

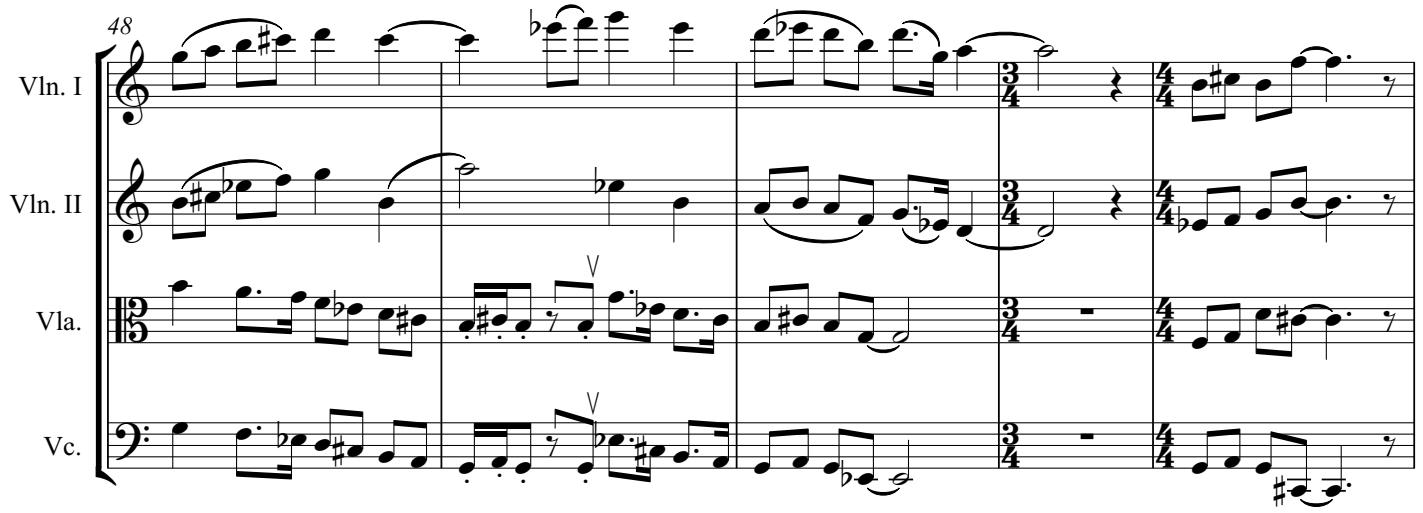
k. Scott Eggert

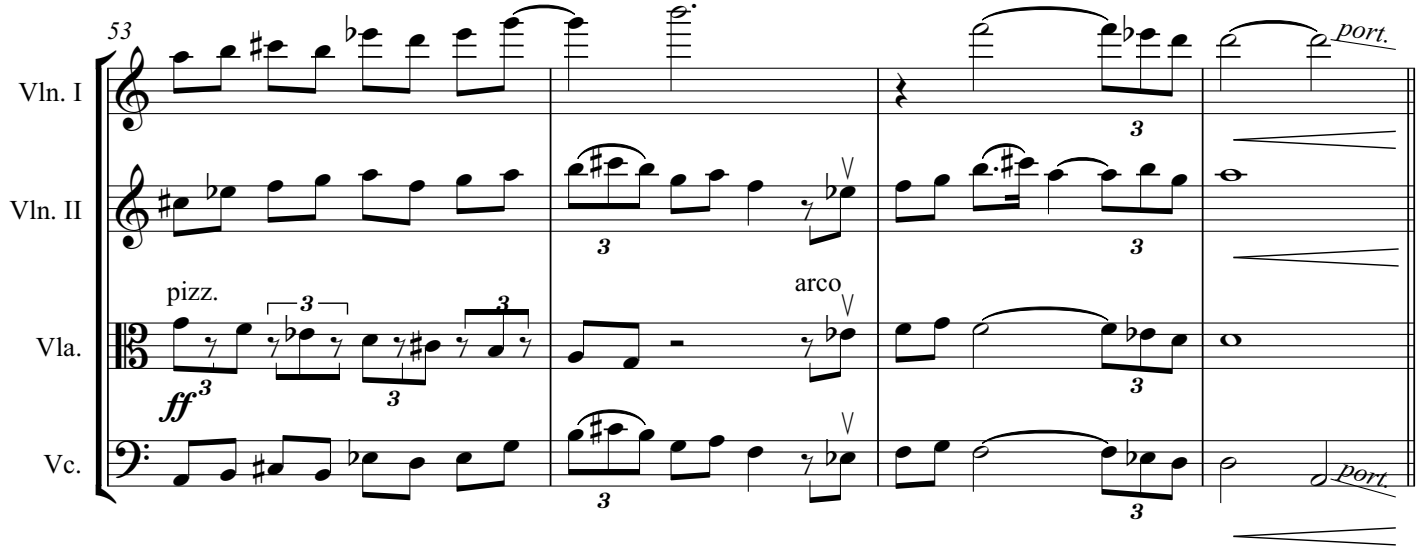



15
Vln. I
Vln. II
Vla.
Vc.
3
ff
20
mf
24
dim.
//

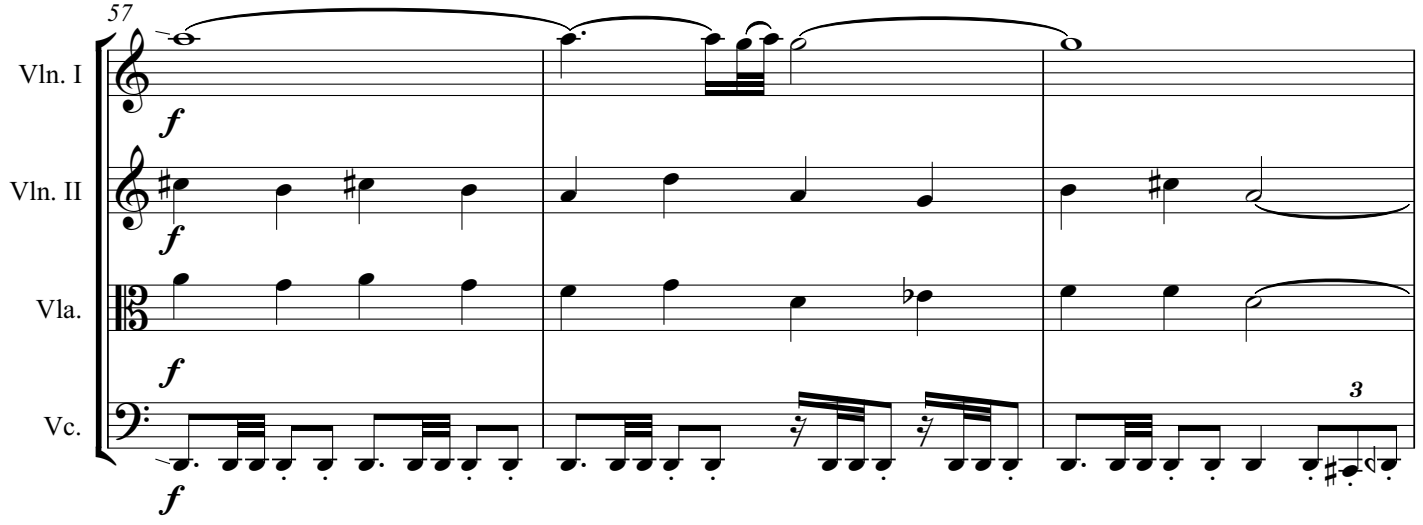

B
29
♩=88 a storm slowly begins
Vln. I
Vln. II
Vla.
Vc.
mp
32
36

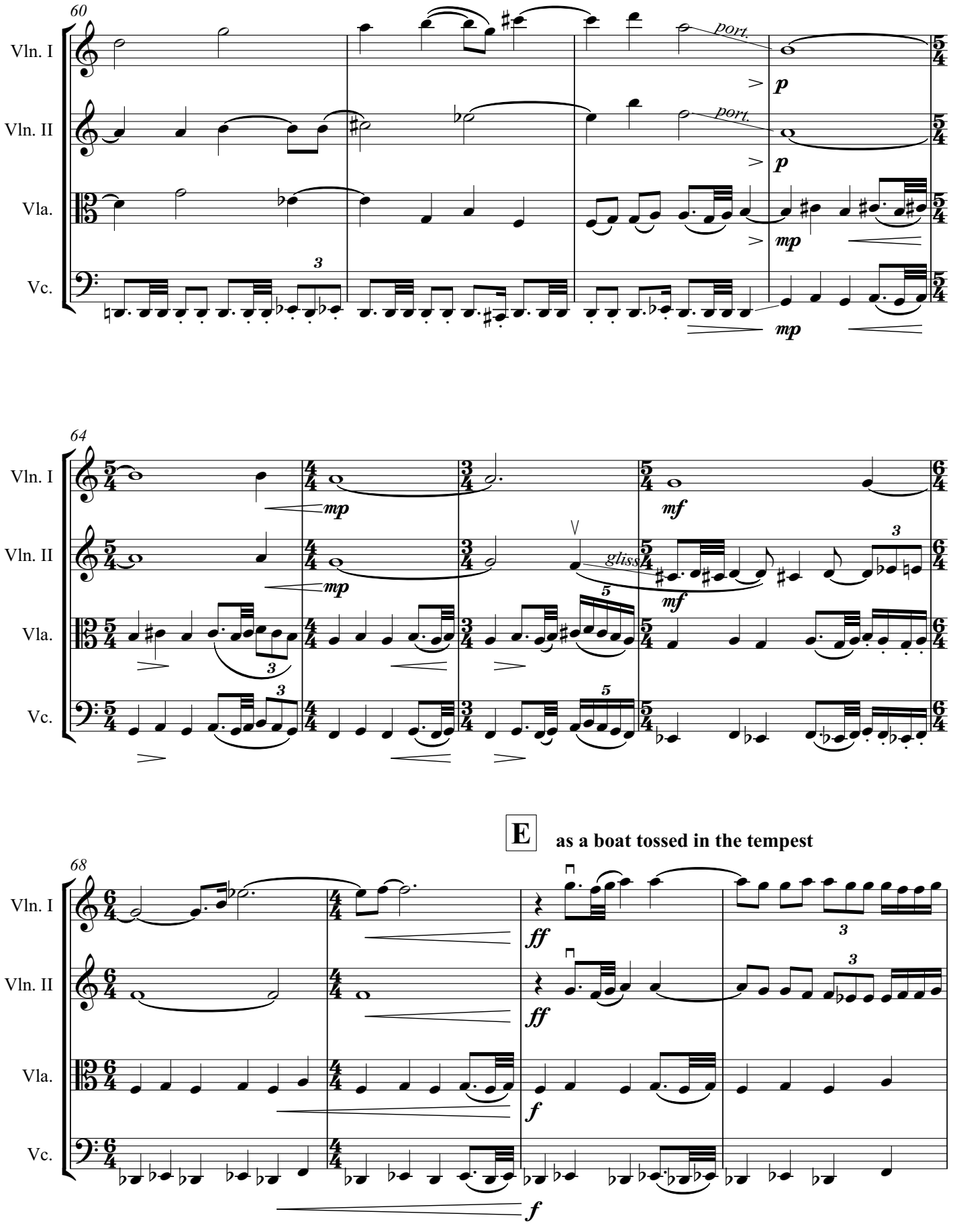

38
Vln. I
Vln. II
Vla.
Vc.
41
Vln. I
Vln. II
Vla.
Vc.
C
44
Vln. I
Vln. II
Vla.
Vc.
mf
mf
mf
mf

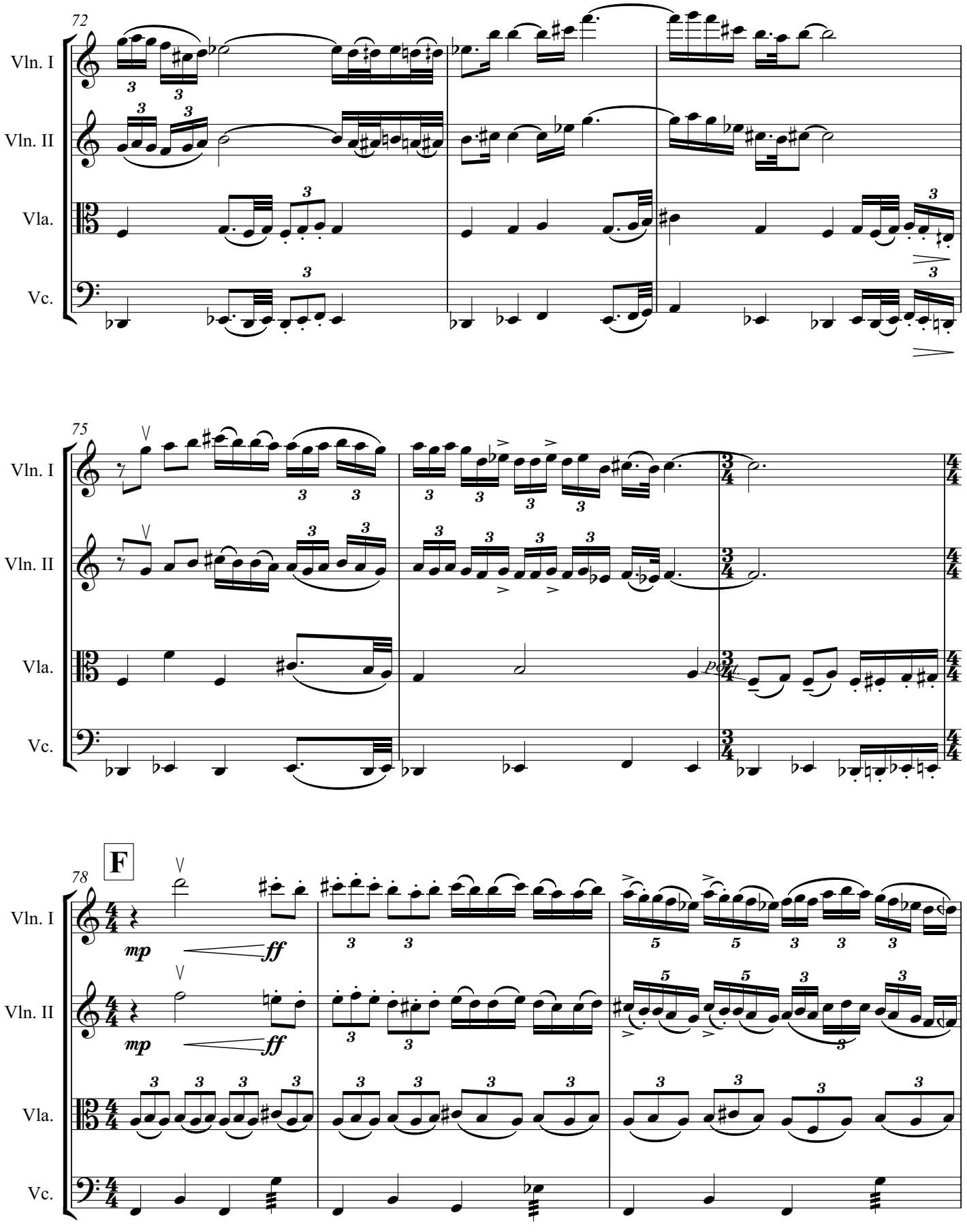


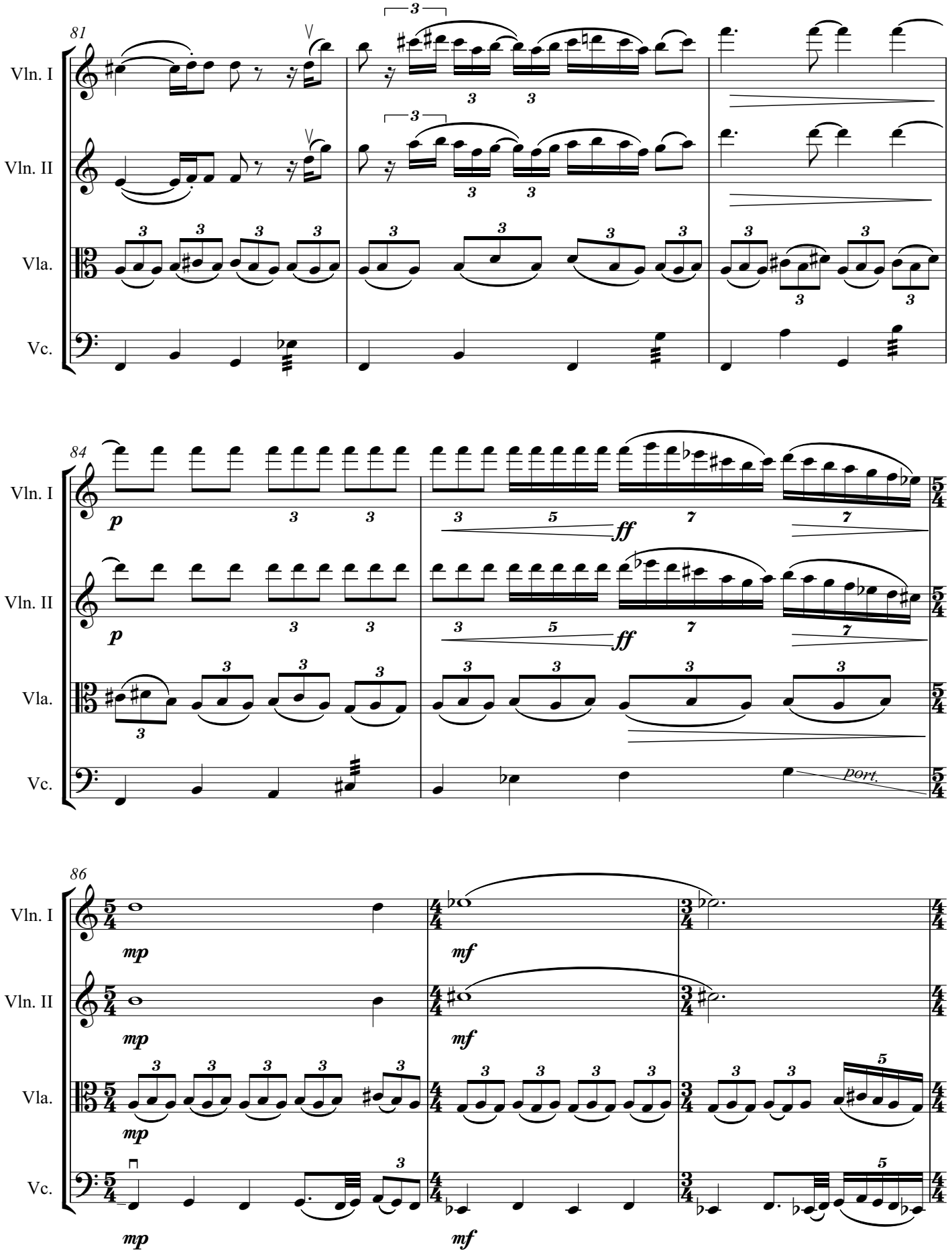


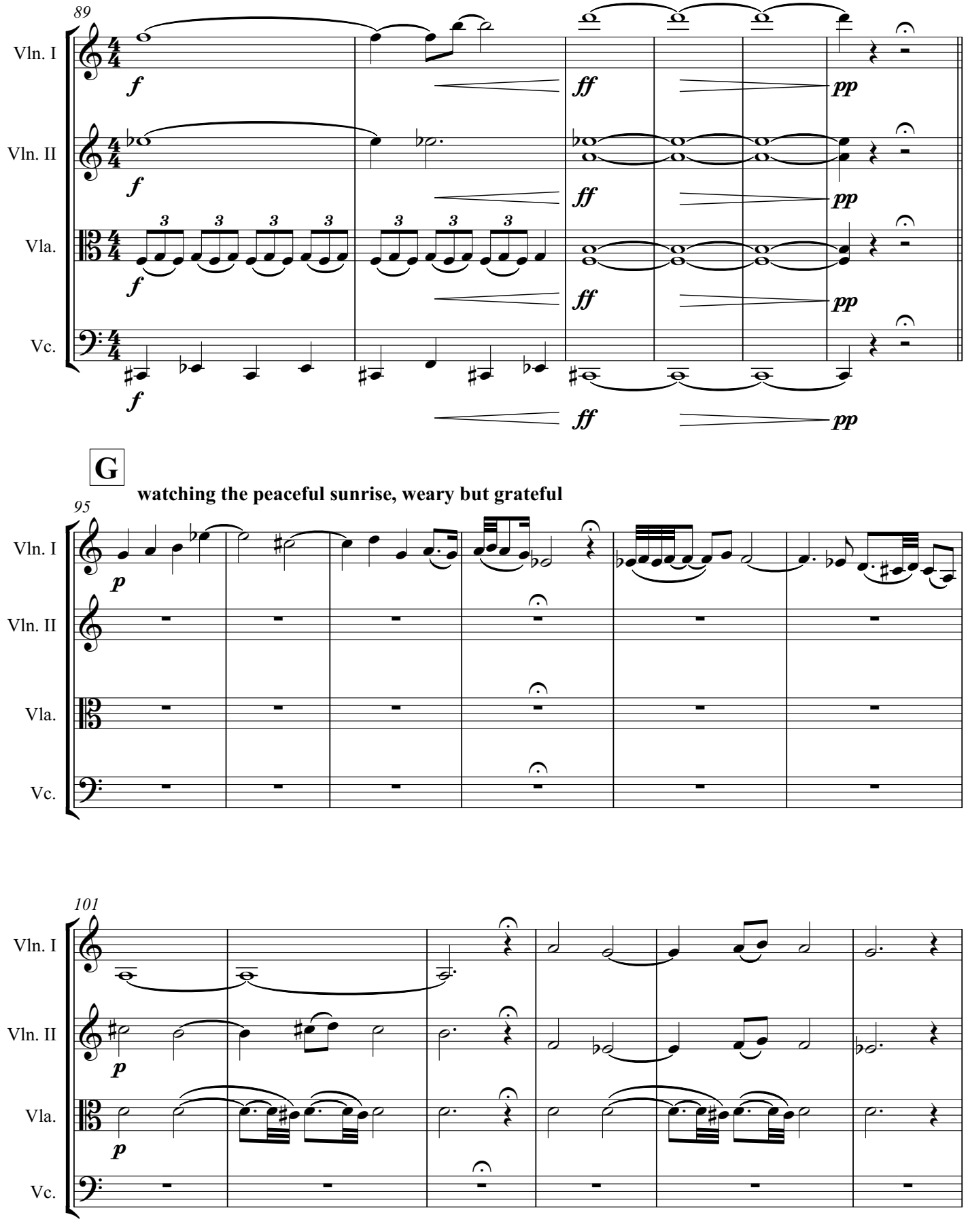
D **with firm resolve**

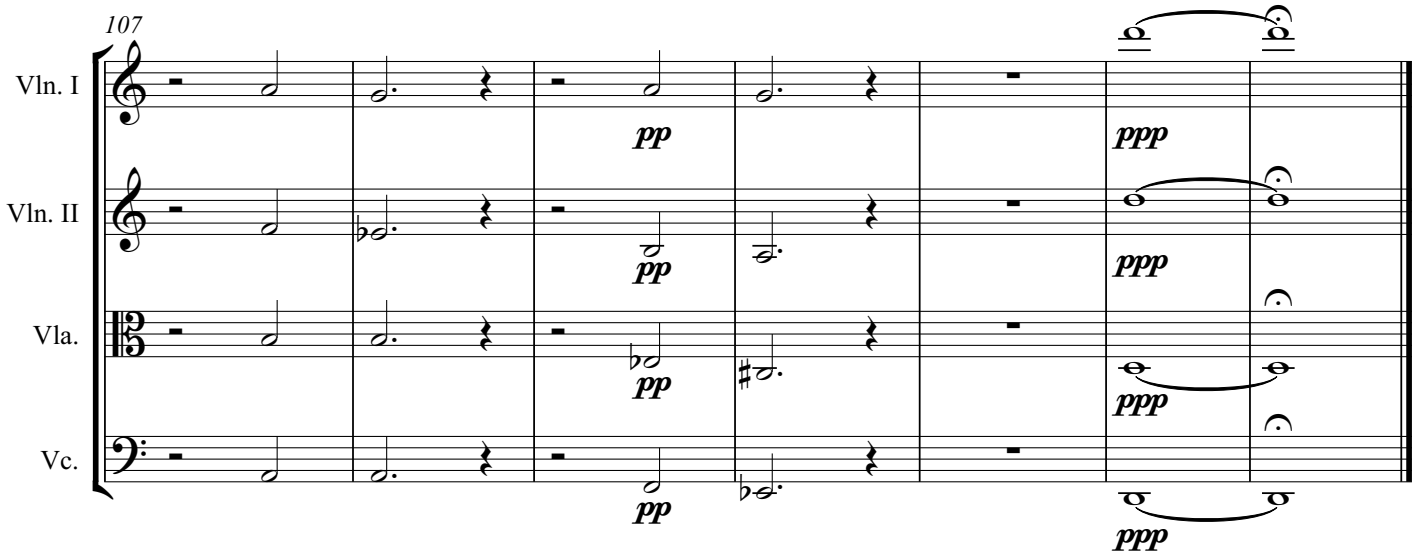



60
Vln. I
Vln. II
Vla.
Vc.
port.
port.
p
p
mp
mp
64
mp
mp
mf
mf
gliss.
68
E
as a boat tossed in the tempest
ff
ff
f
f


72
Vln. I
Vln. II
Vla.
Vc.
75
Vln. I
Vln. II
Vla.
Vc.
F
78
Vln. I
Vln. II
Vla.
Vc.
mp
ff


81
Vln. I
Vln. II
Vla.
Vc.
84
p
ff
port.
86
mp
mf


89
Vln. I
Vln. II
Vla.
Vc.
f
ff
pp
G
watching the peaceful sunrise, weary but grateful
95
p
101

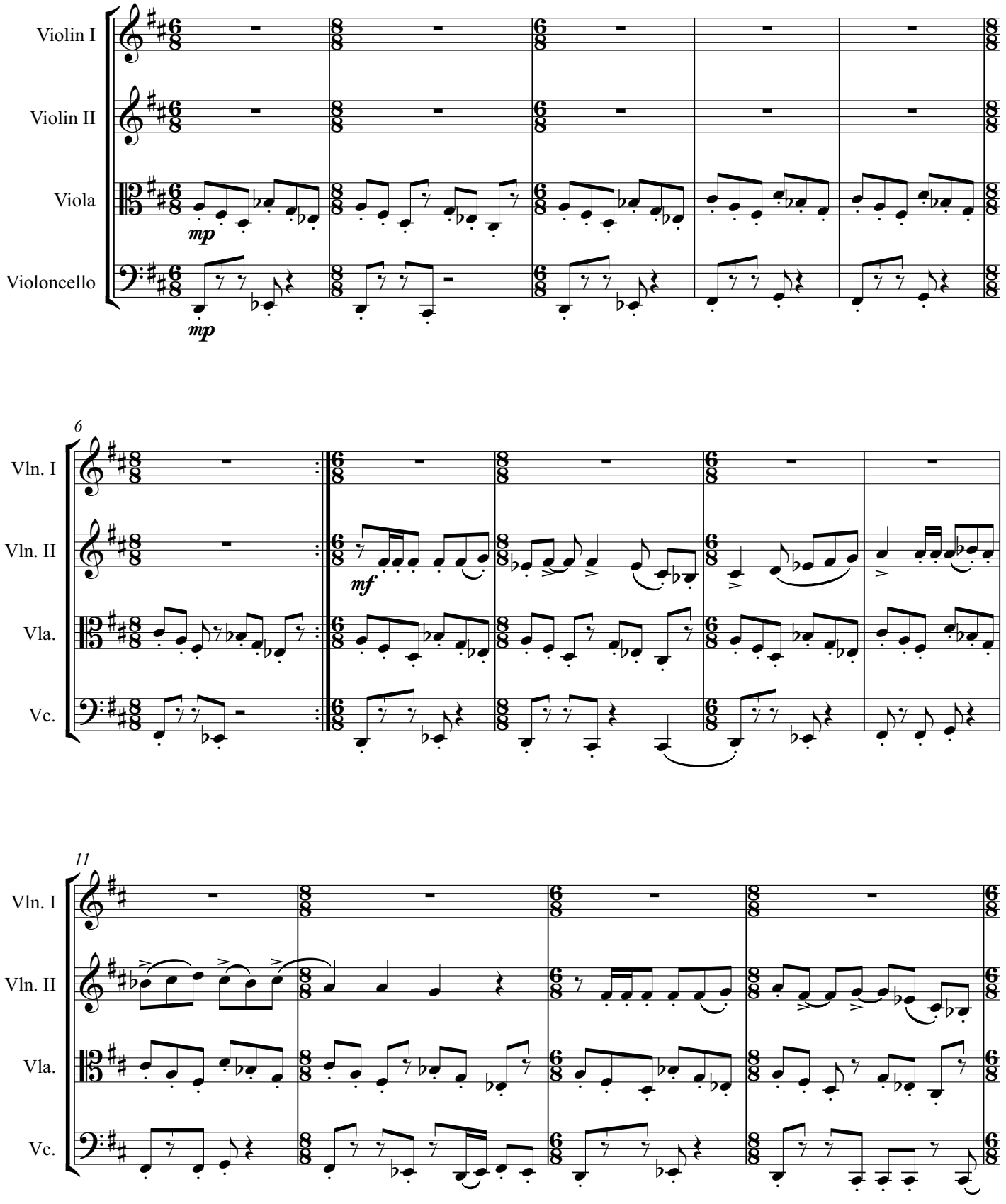

107
Vln. I
Vln. II
Vla.
Vc.
pp
pp
pp
pp
ppp
ppp
ppp
ppp

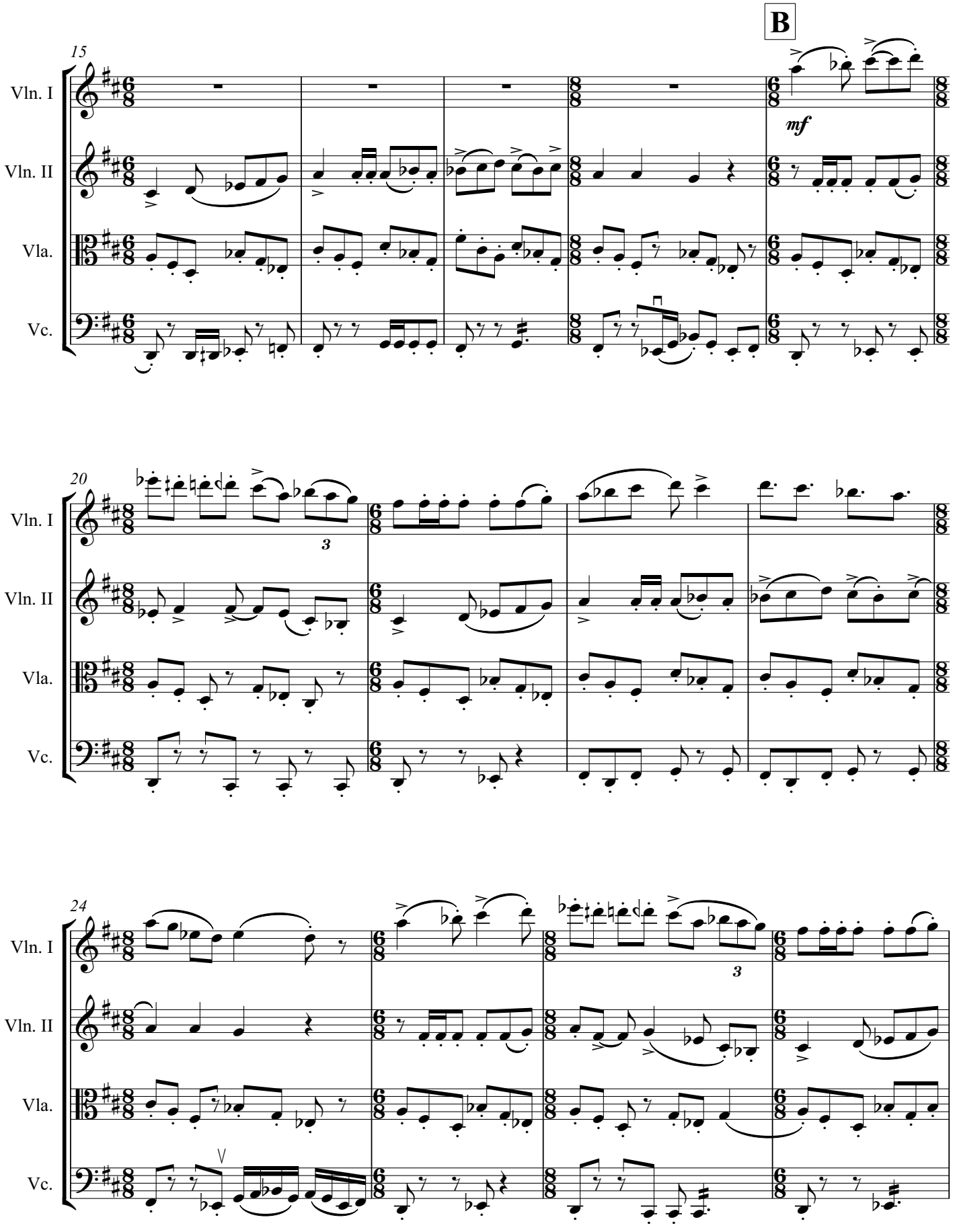
Hexagon VII: Hijaz Kar

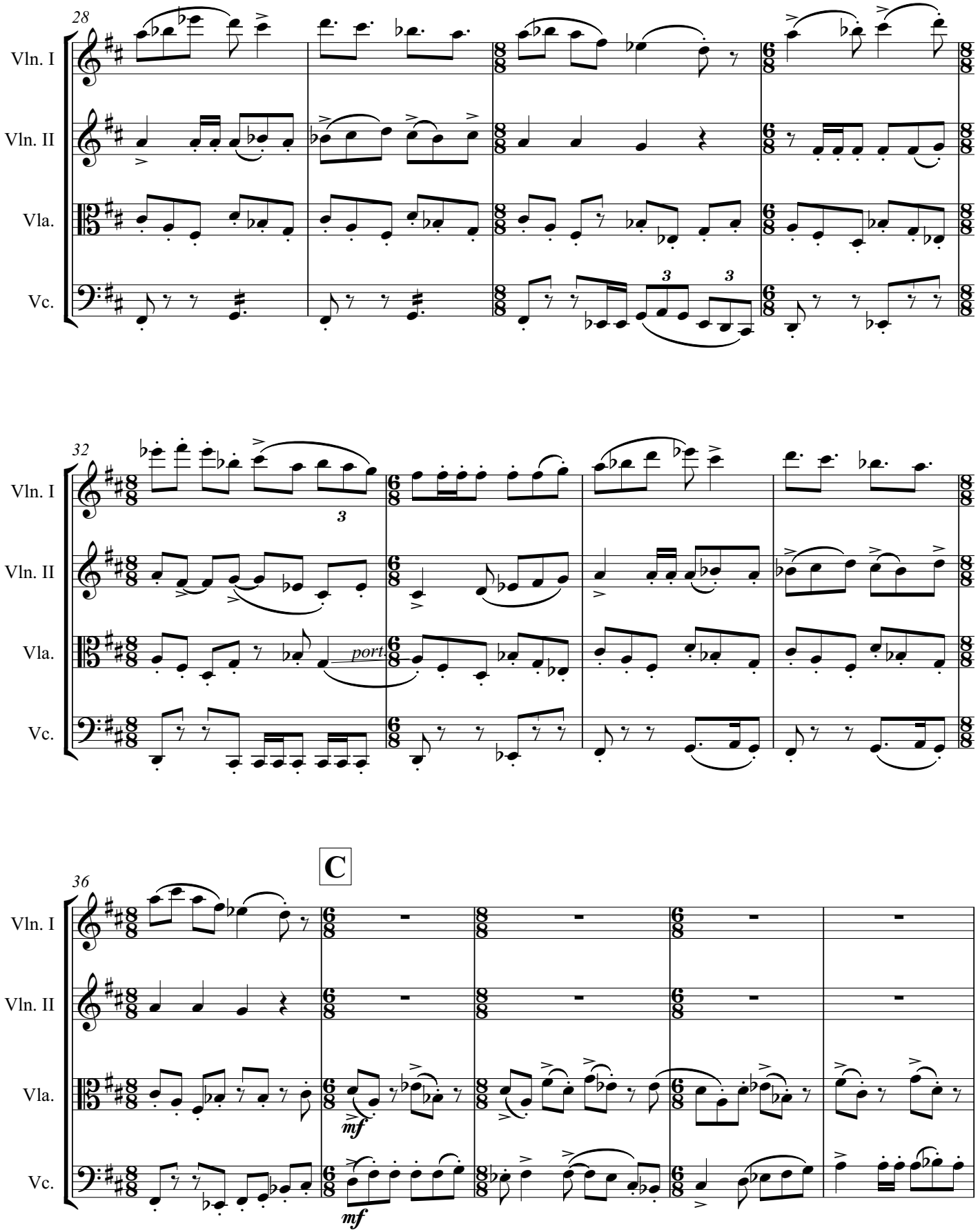
k. Scott Eggert

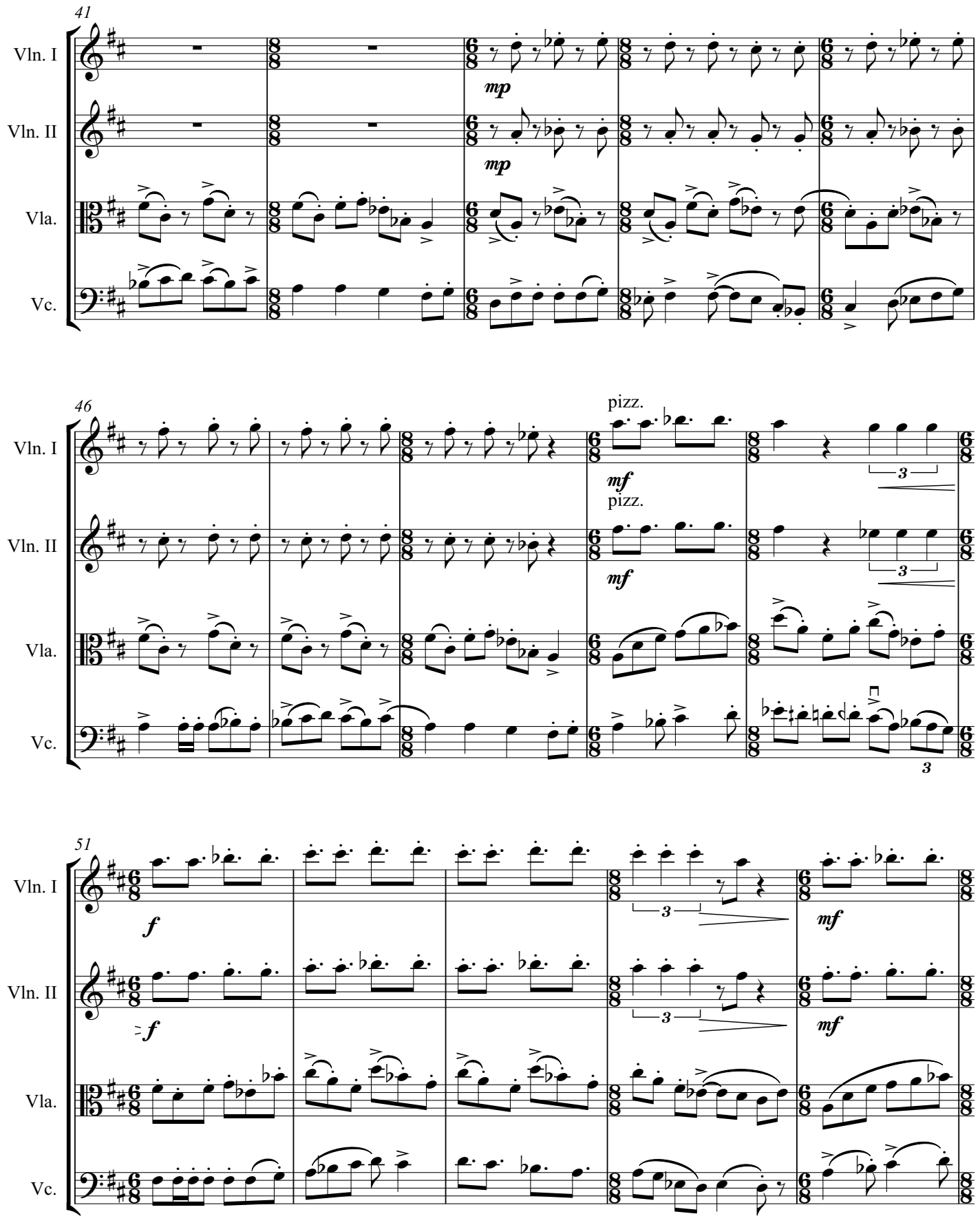
A

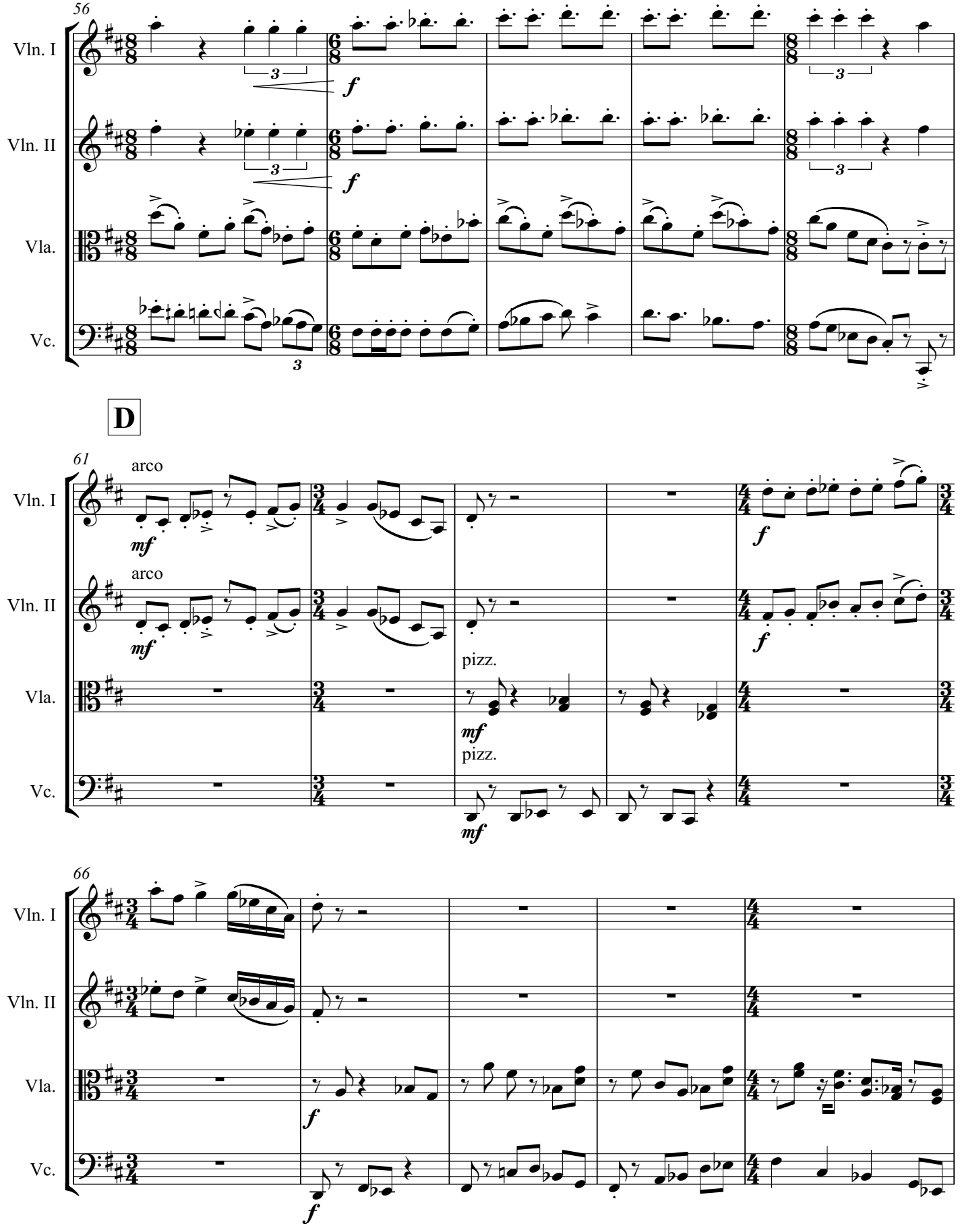
Presto (♩=140)

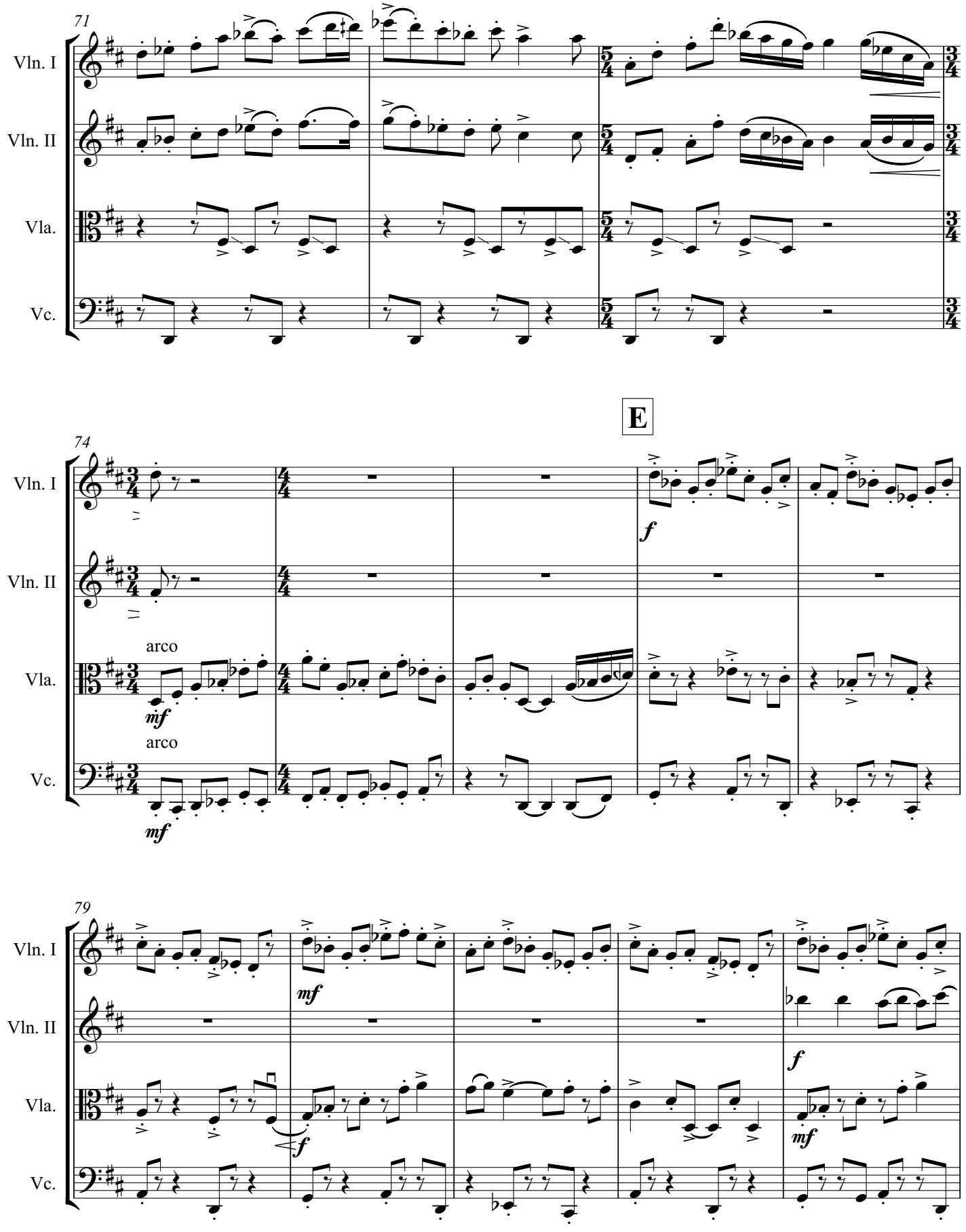


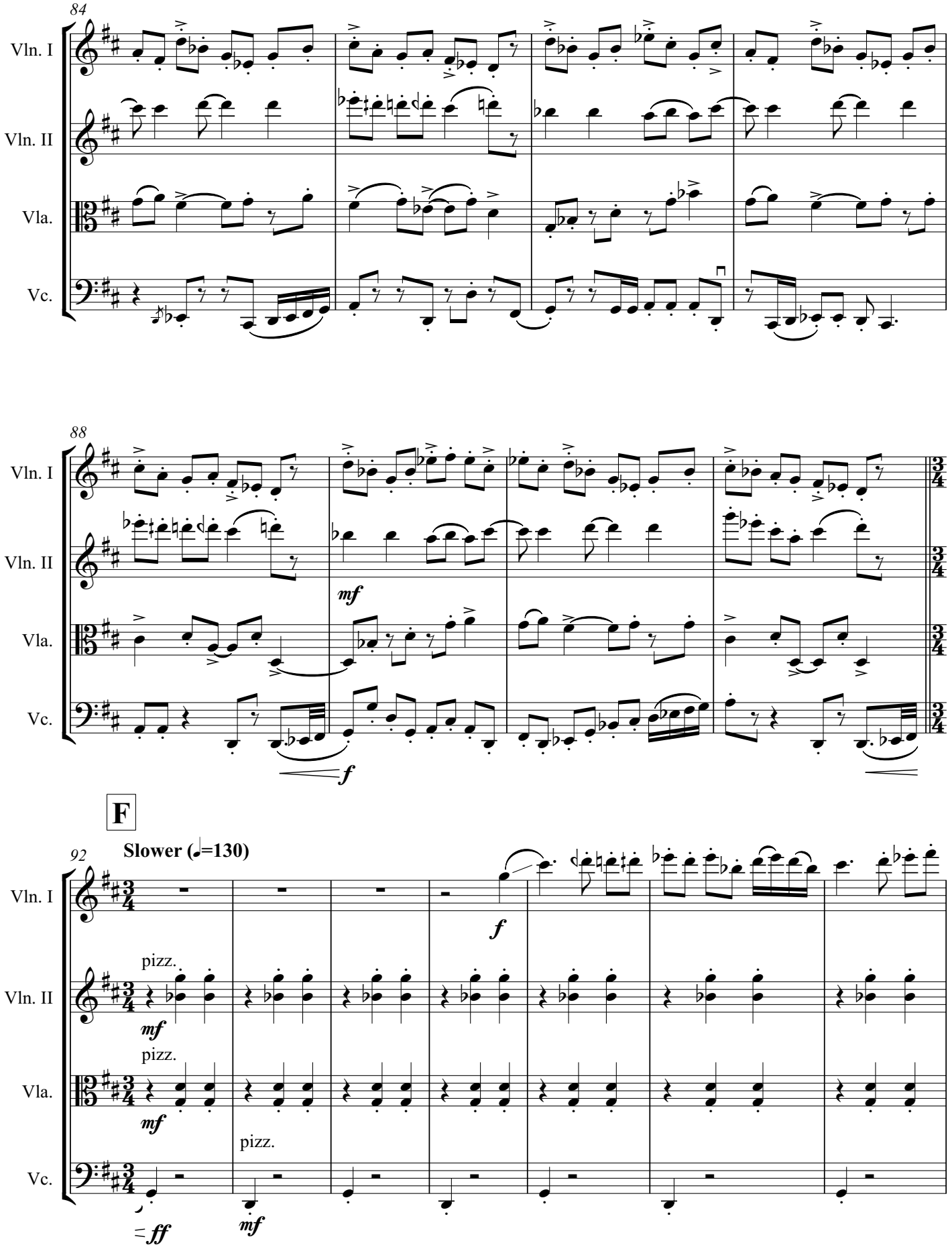

B
15
Vln. I
Vln. II
Vla.
Vc.
mf
20
3
24
3

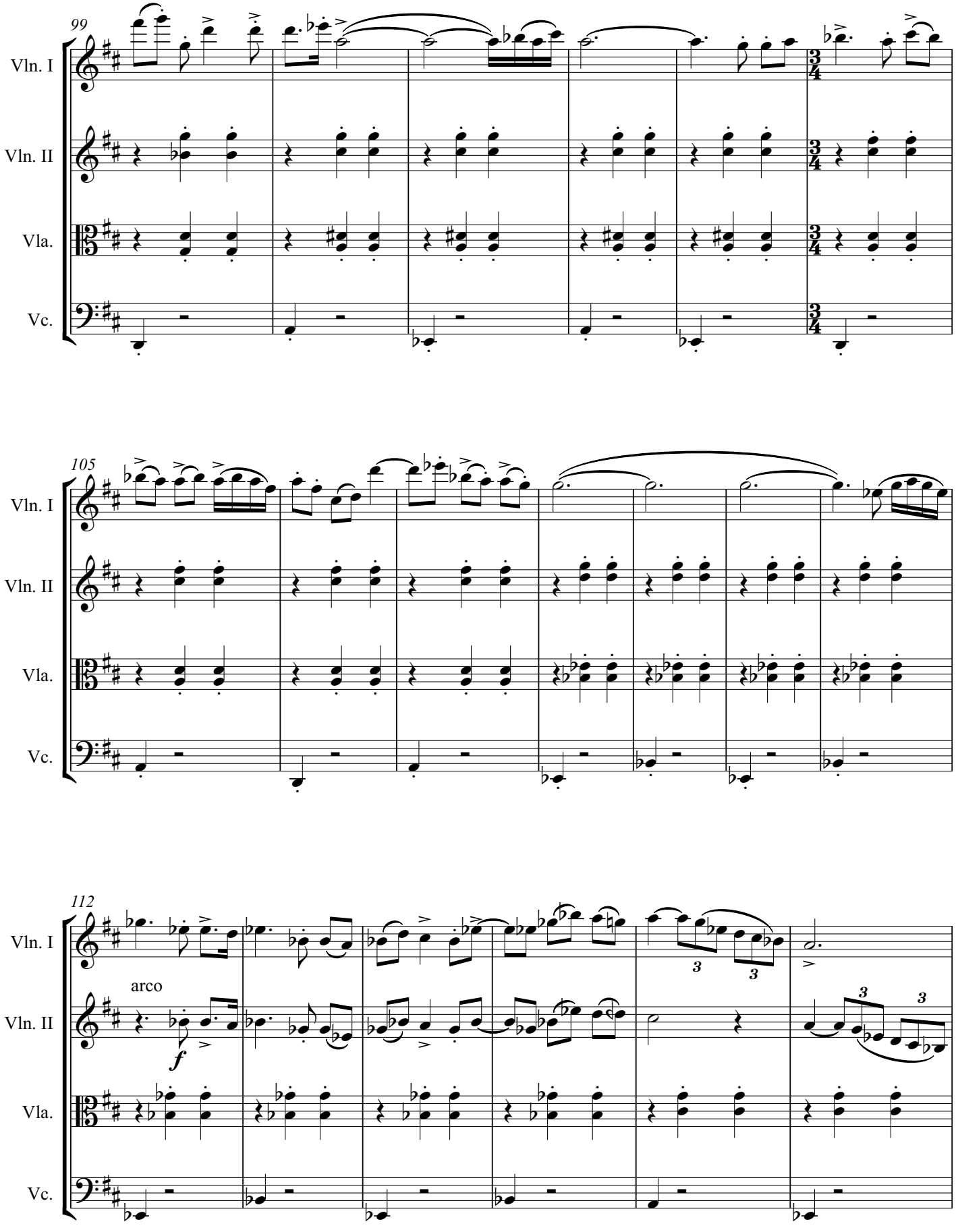

28
Vln. I
Vln. II
Vla.
Vc.
3
3
32
Vln. I
Vln. II
Vla.
Vc.
3
port.
C
36
Vln. I
Vln. II
Vla.
Vc.
mf
mf

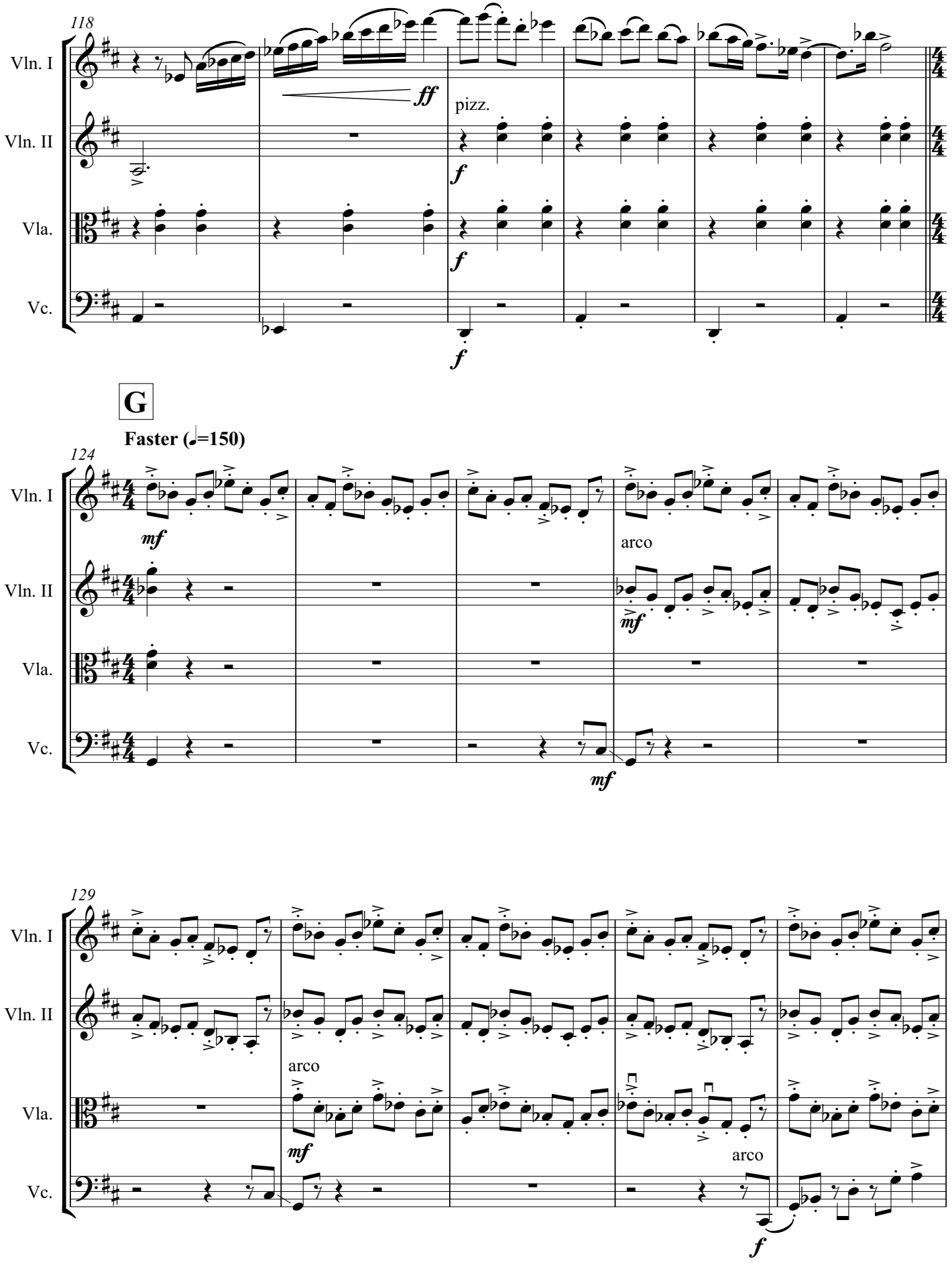

41
Vln. I
Vln. II
Vla.
Vc.
mp
mp
46
pizz.
mf
pizz.
mf
3
3
51
f
f
3
3
mf
mf

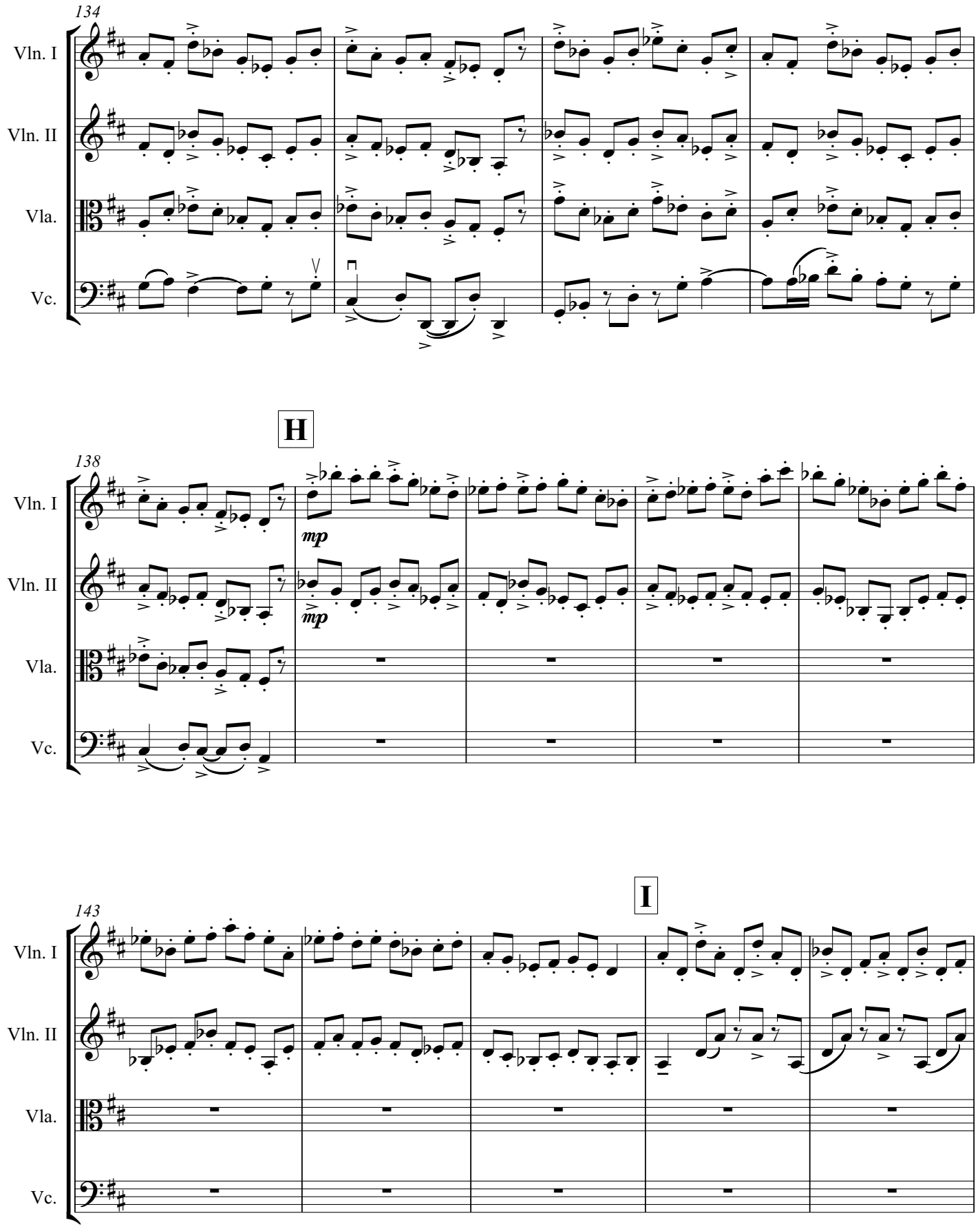

56
Vln. I
Vln. II
Vla.
Vc.
f
3
D
61
arco
mf
pizz.
66

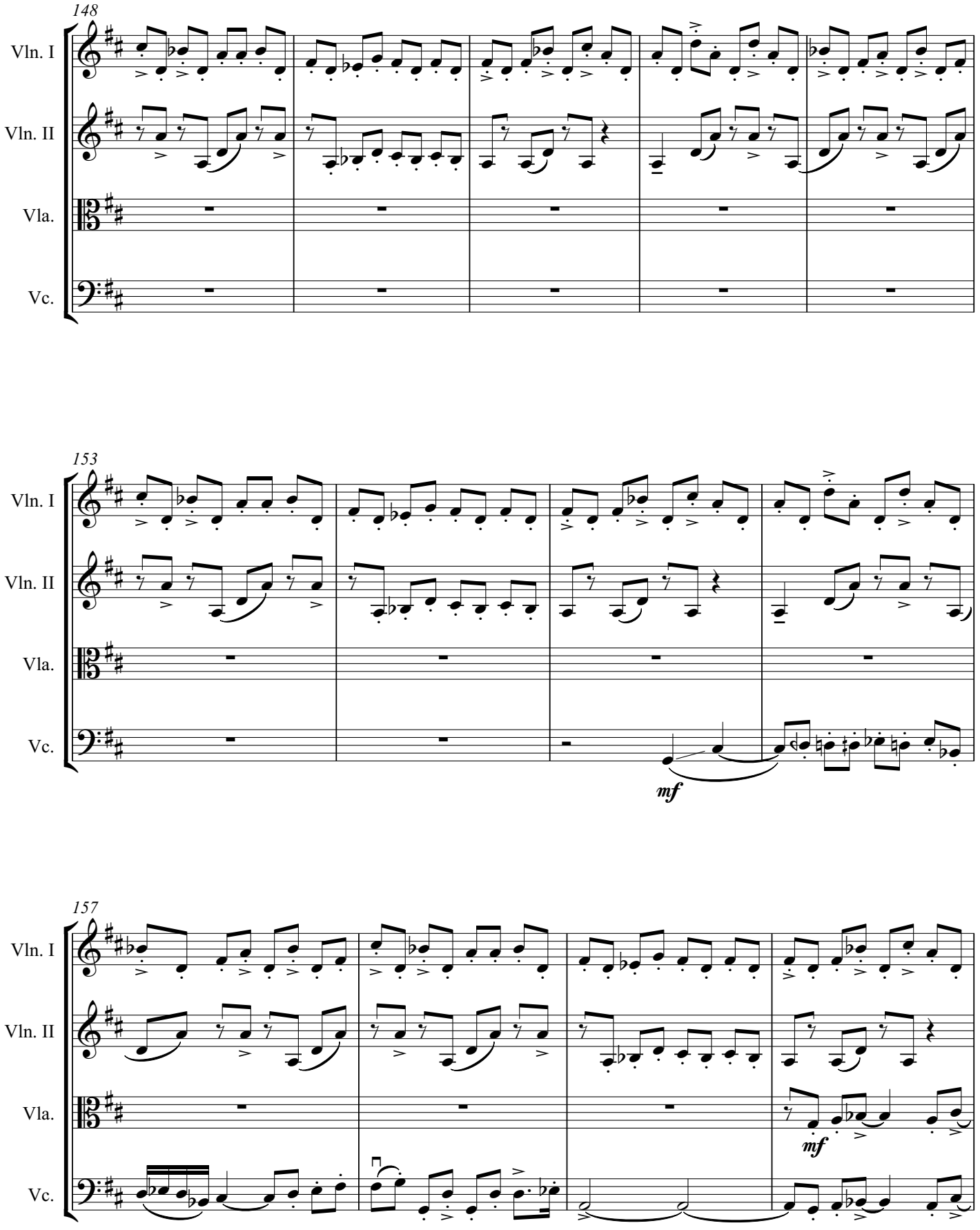

71
Vln. I
Vln. II
Vla.
Vc.
E
74
arco
mf
arco
mf
f
79
mf
f
f
mf

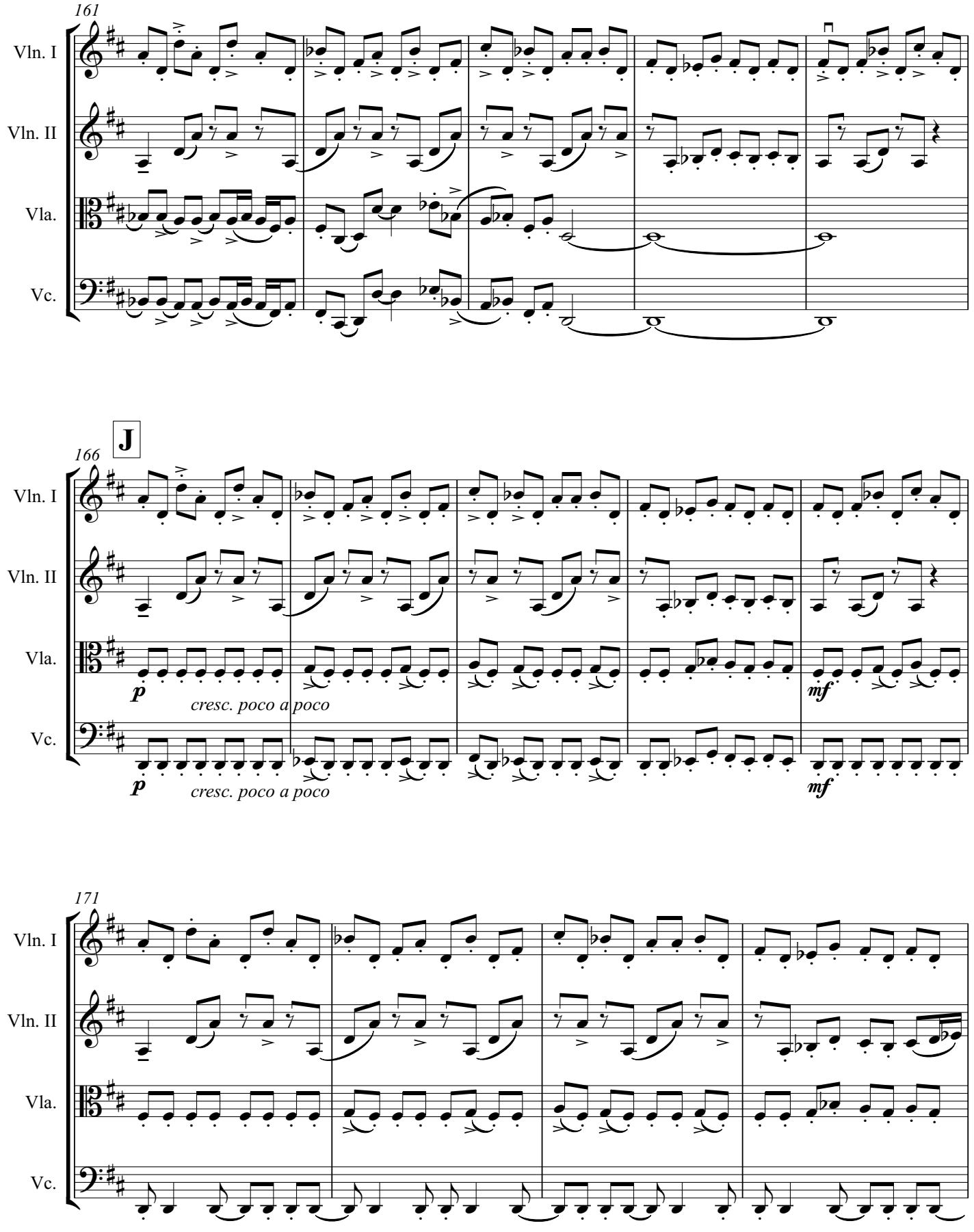

84
Vln. I
Vln. II
Vla.
Vc.
88
mf
f
F
Slower (♩=130)
92
pizz.
mf
ff

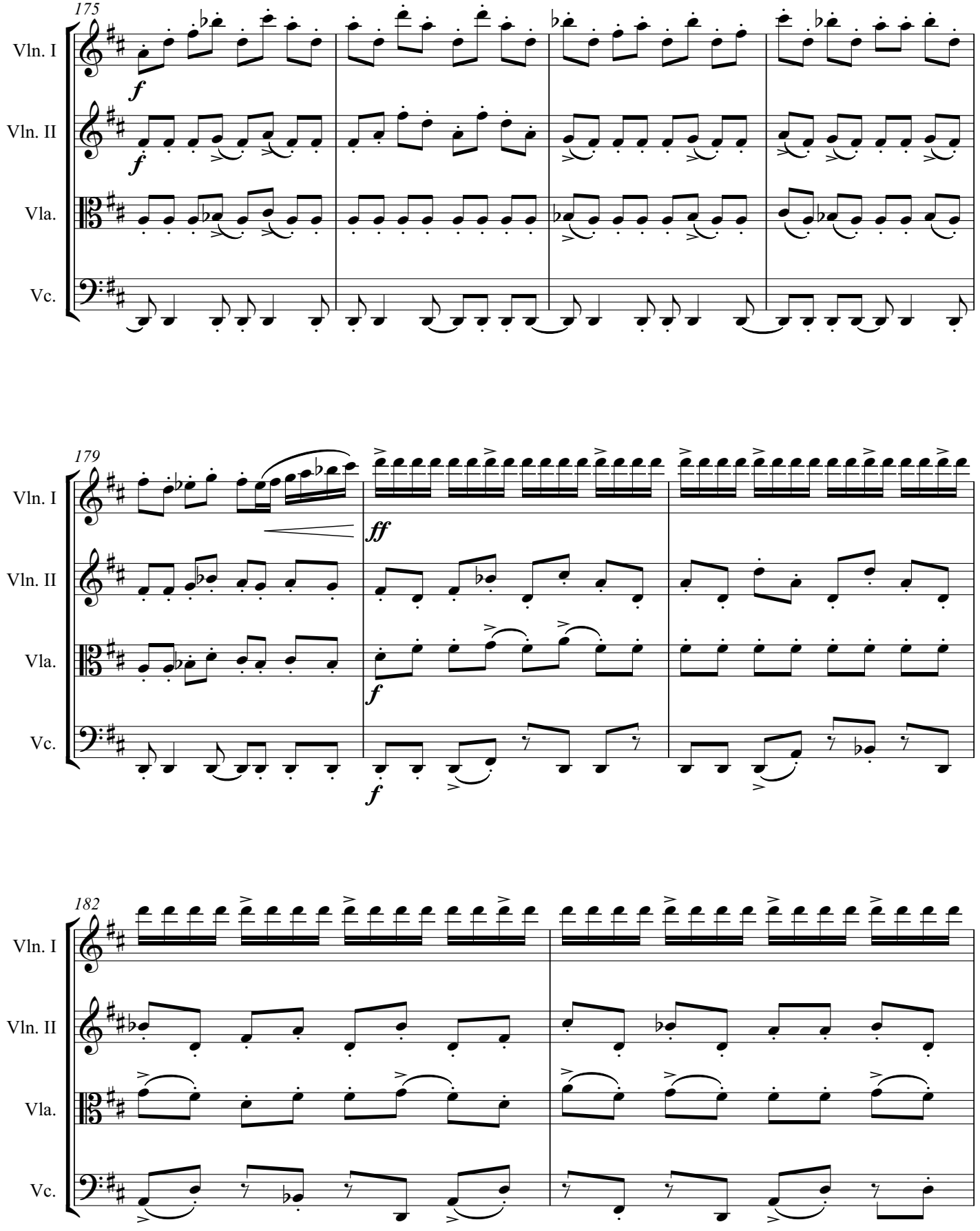

99
Vln. I
Vln. II
Vla.
Vc.
105
Vln. I
Vln. II
Vla.
Vc.
112
Vln. I
arco
f
Vln. II
Vla.
Vc.


118
Vln. I
Vln. II
Vla.
Vc.
ff
pizz.
f
f
f
G
Faster (♩=150)
124
mf
arco
mf
mf
129
arco
mf
arco
f


134
Vln. I
Vln. II
Vla.
Vc.
H
138
mp
mp
I
143


148
Vln. I
Vln. II
Vla.
Vc.
153
Vln. I
Vln. II
Vla.
Vc.
mf
157
Vln. I
Vln. II
Vla.
Vc.
mf


161
Vln. I
Vln. II
Vla.
Vc.
J
166
Vln. I
Vln. II
Vla.
Vc.
p
cresc. poco a poco
p
cresc. poco a poco
mf
mf
171
Vln. I
Vln. II
Vla.
Vc.


175
Vln. I
Vln. II
Vla.
Vc.
f
f
179
Vln. I
Vln. II
Vla.
Vc.
ff
f
f
182
Vln. I
Vln. II
Vla.
Vc.

K

184

Vln. I

Vln. II

Vla.

Vc.

ff

pizz.

f

188

mf

191

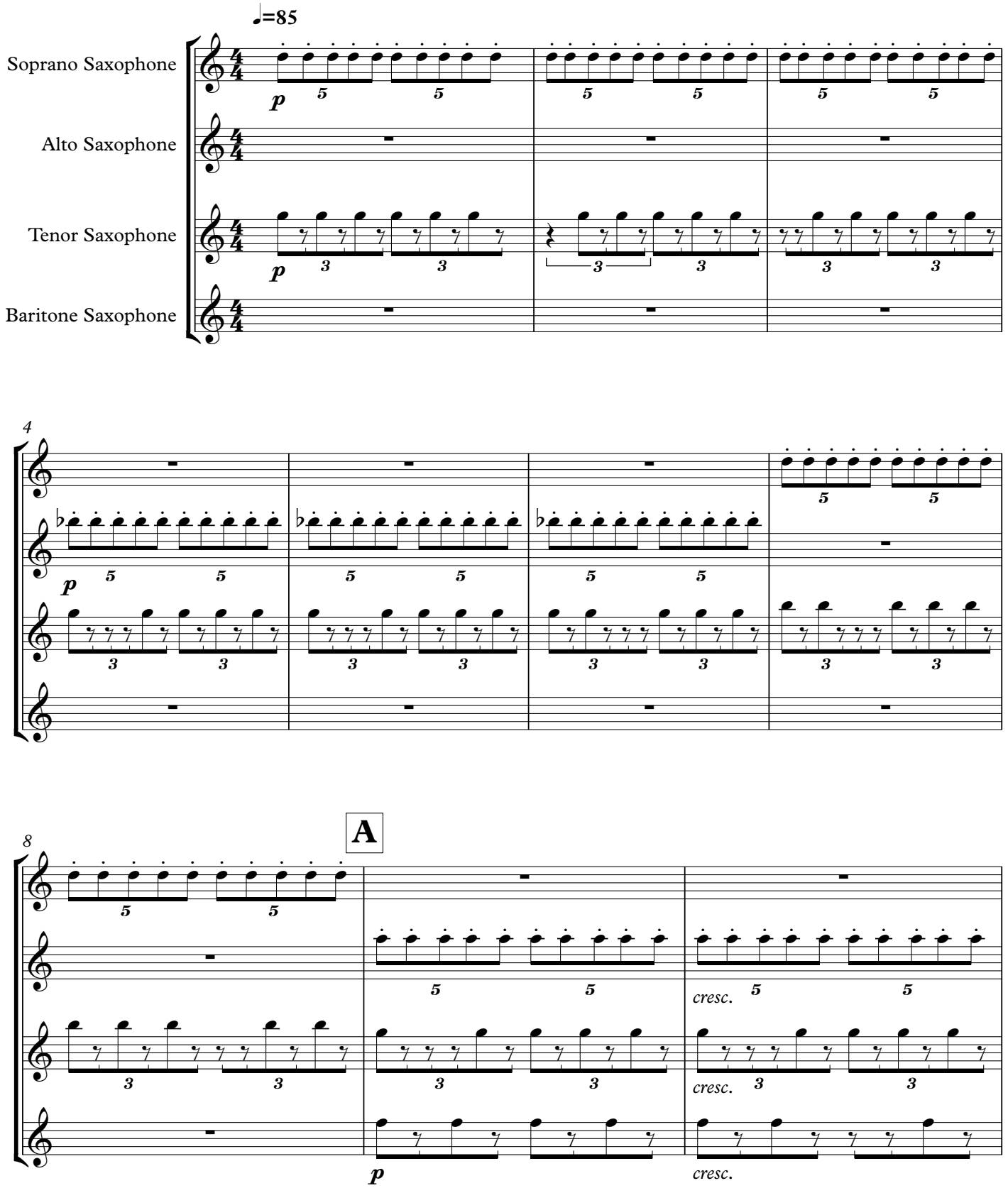
arco

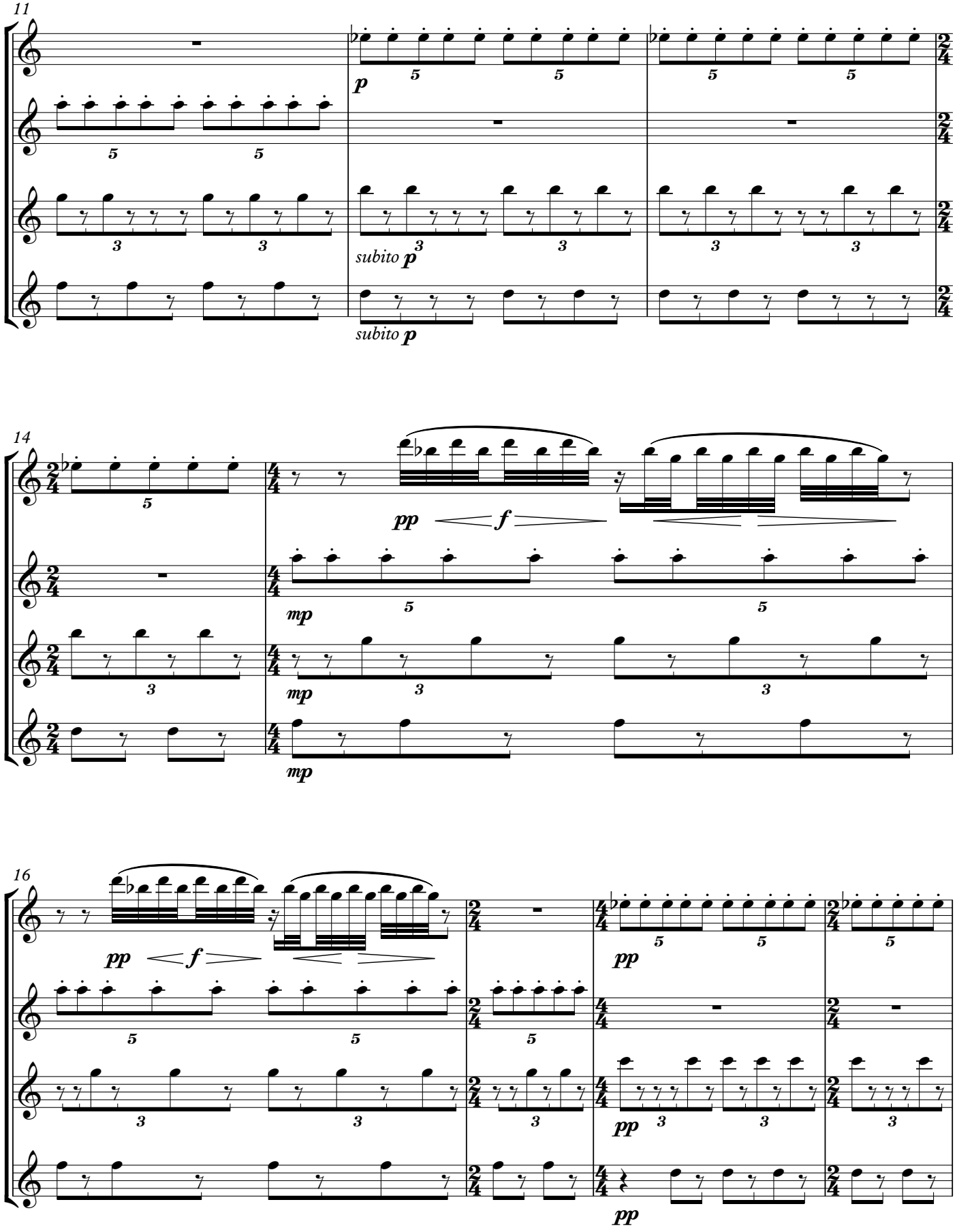
mp

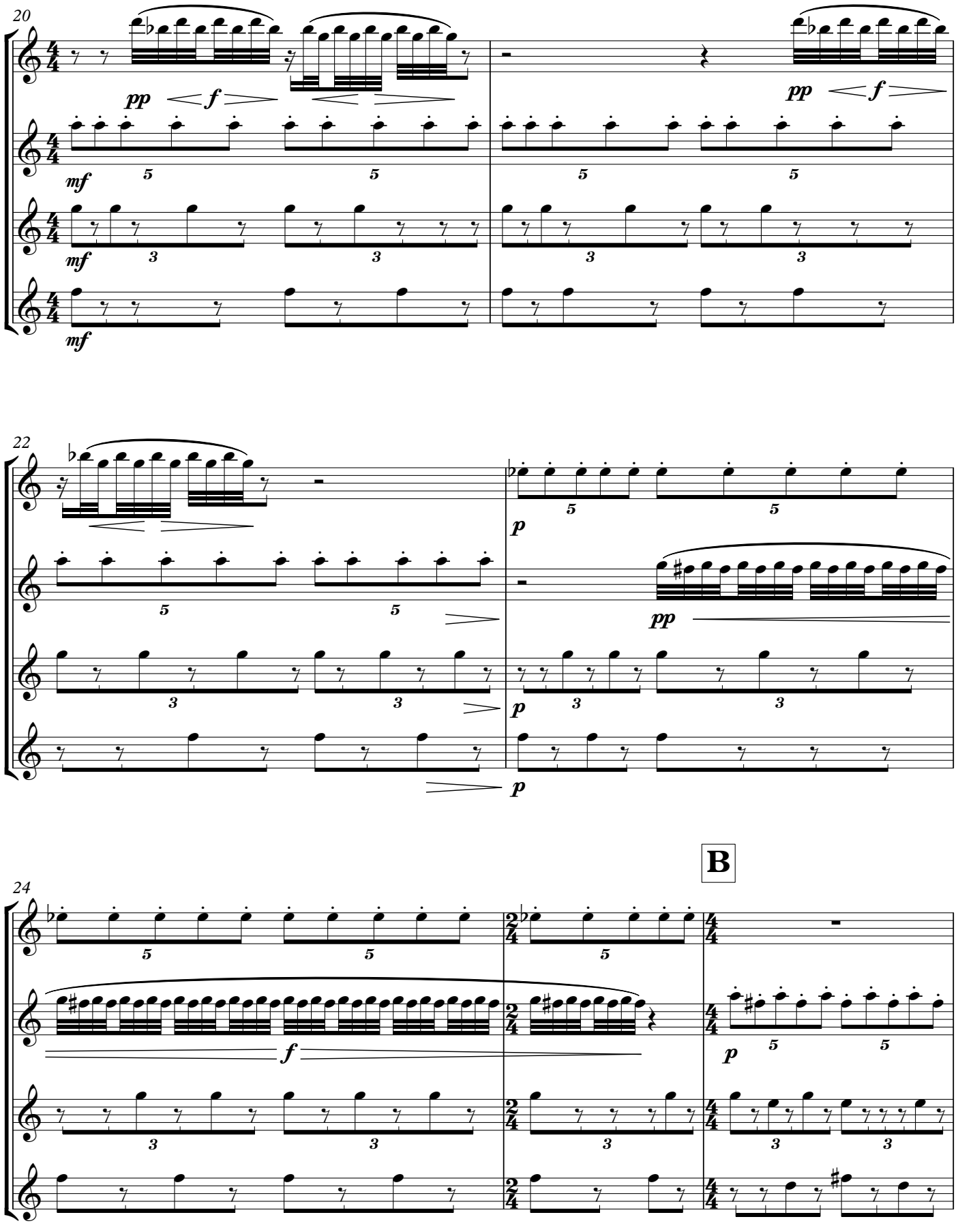
fff

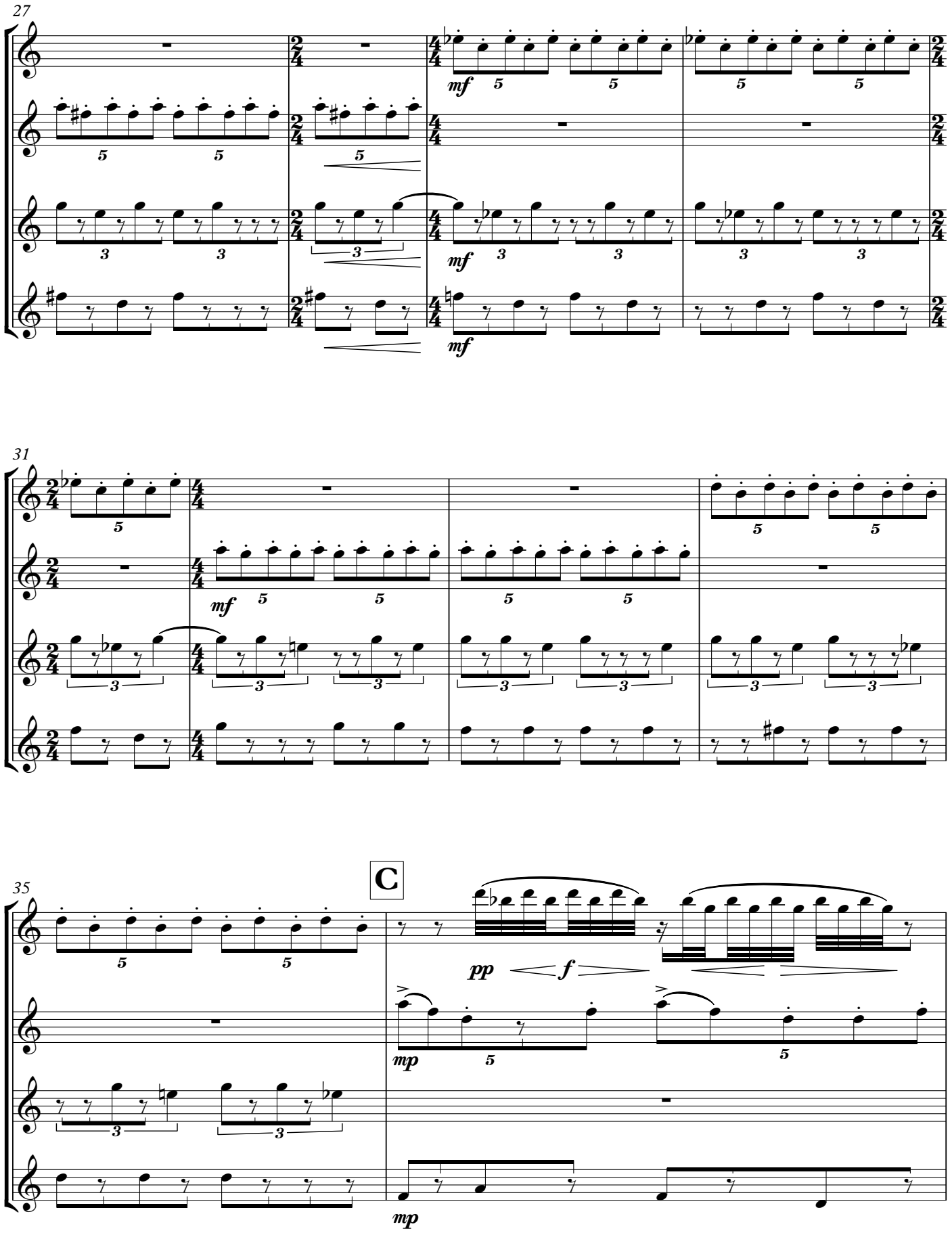
Hexagon VI: Lattice Mode

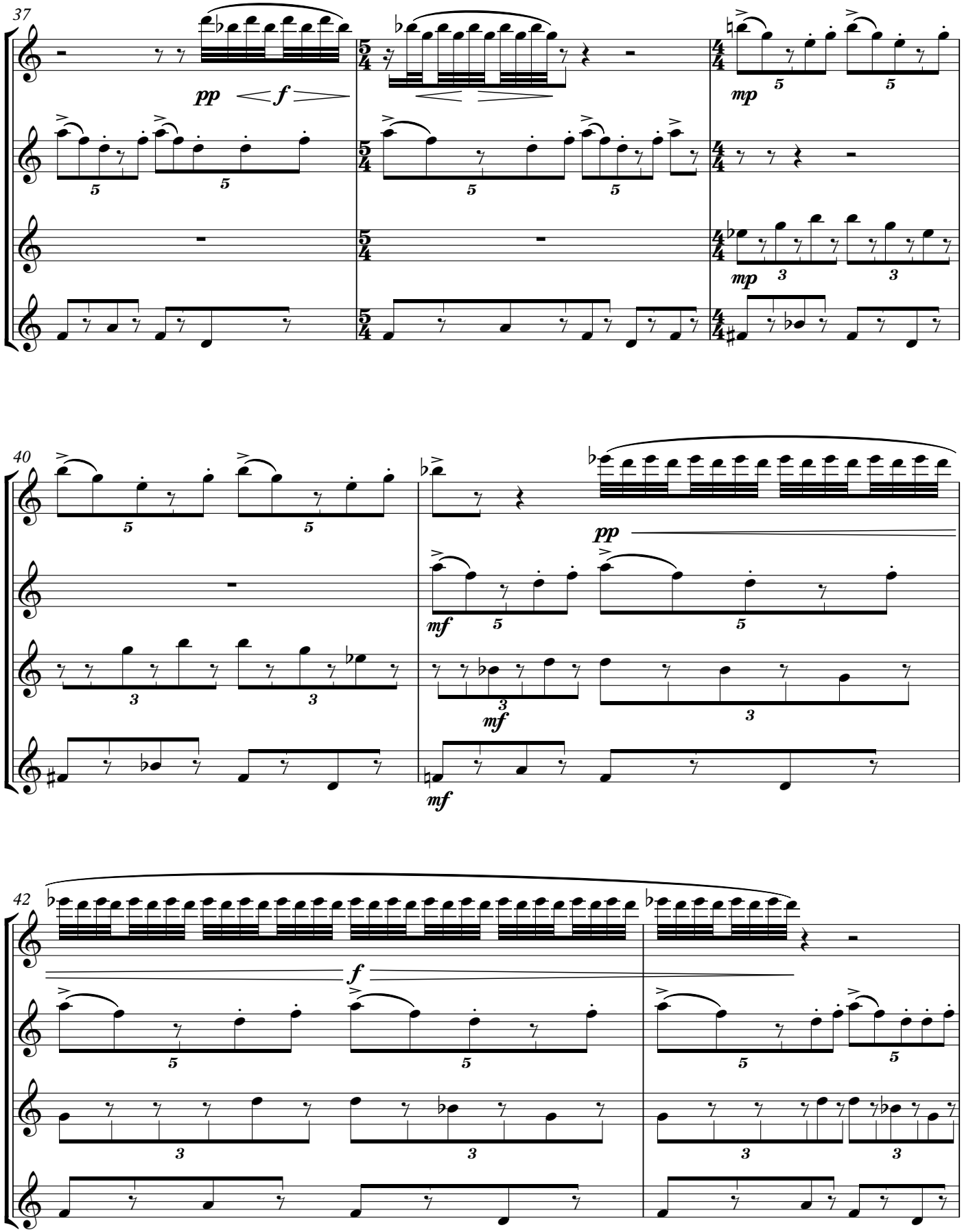
k. Scott Eggert

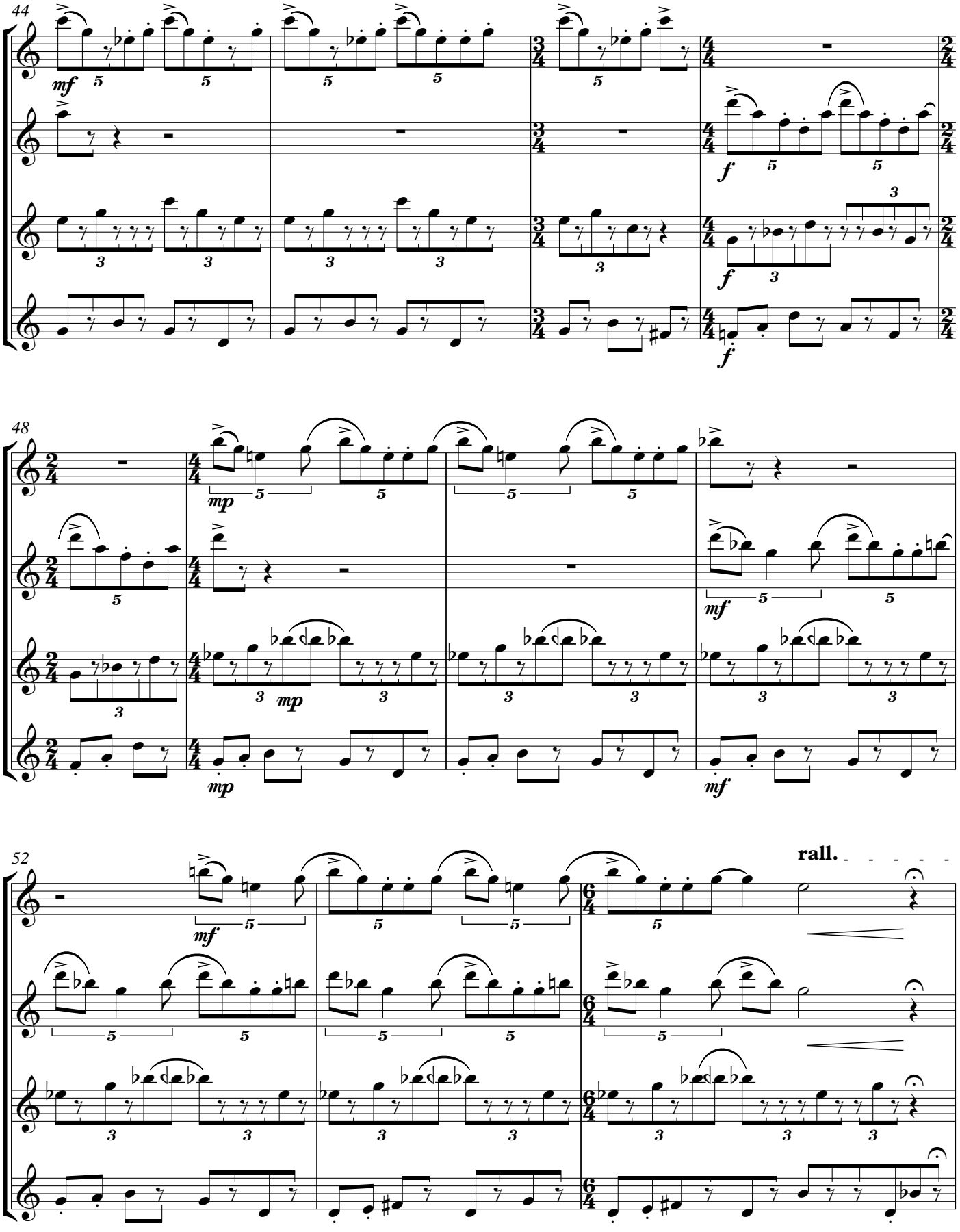


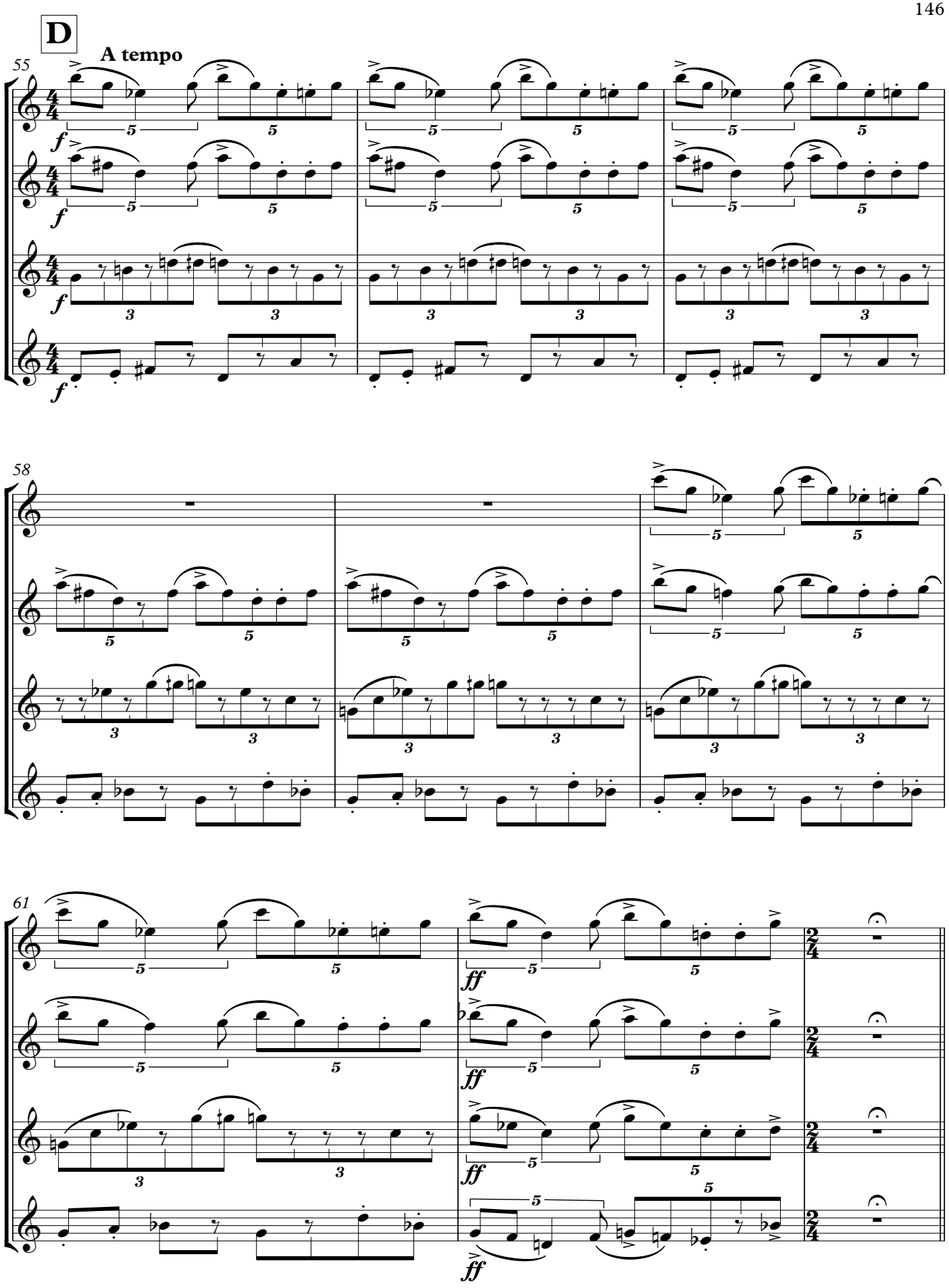

11
p
subito p
subito p
14
pp
f
mp
mp
mp
16
pp
f
pp
pp
pp

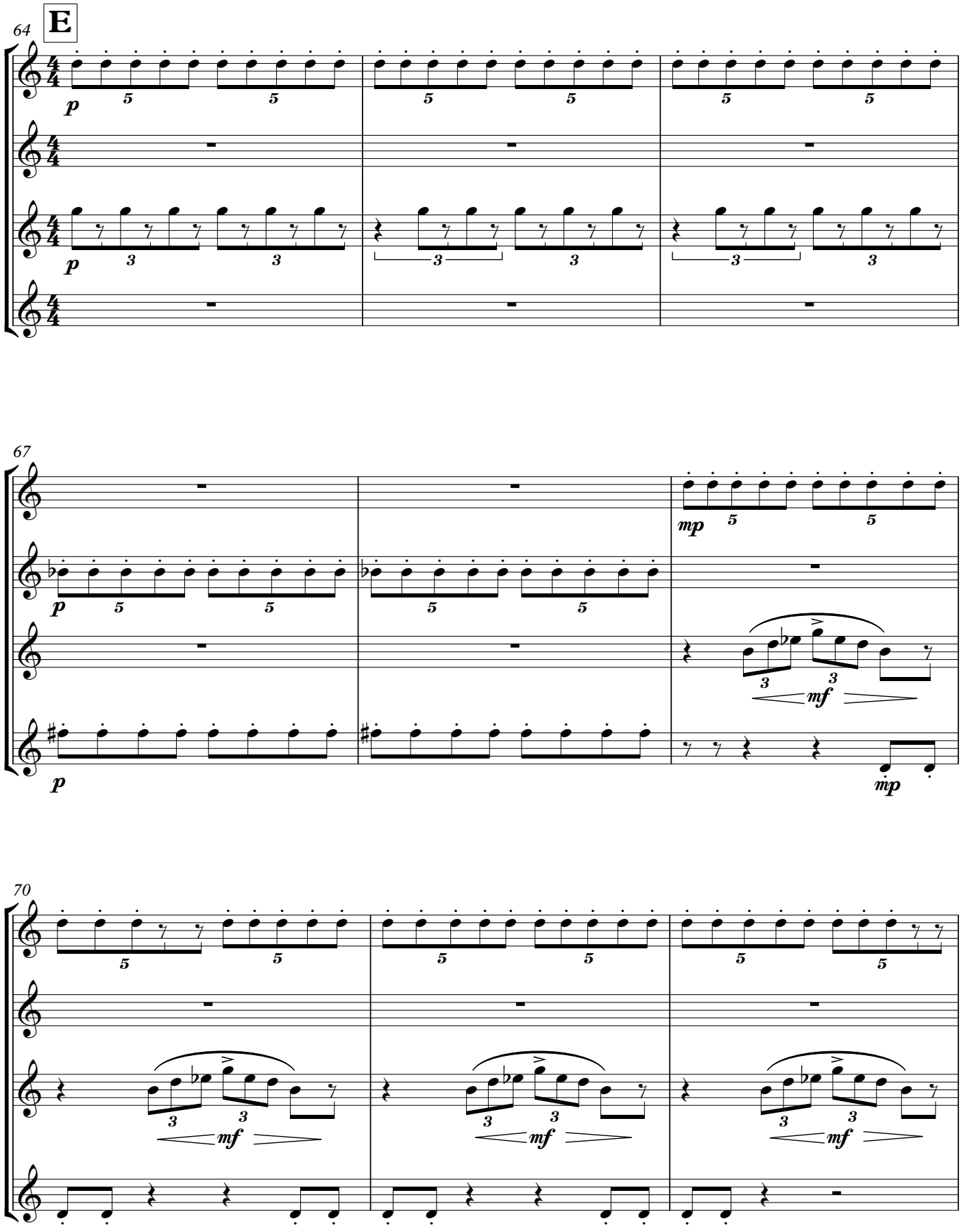

20
pp
f
mf
22
p
pp
24
B

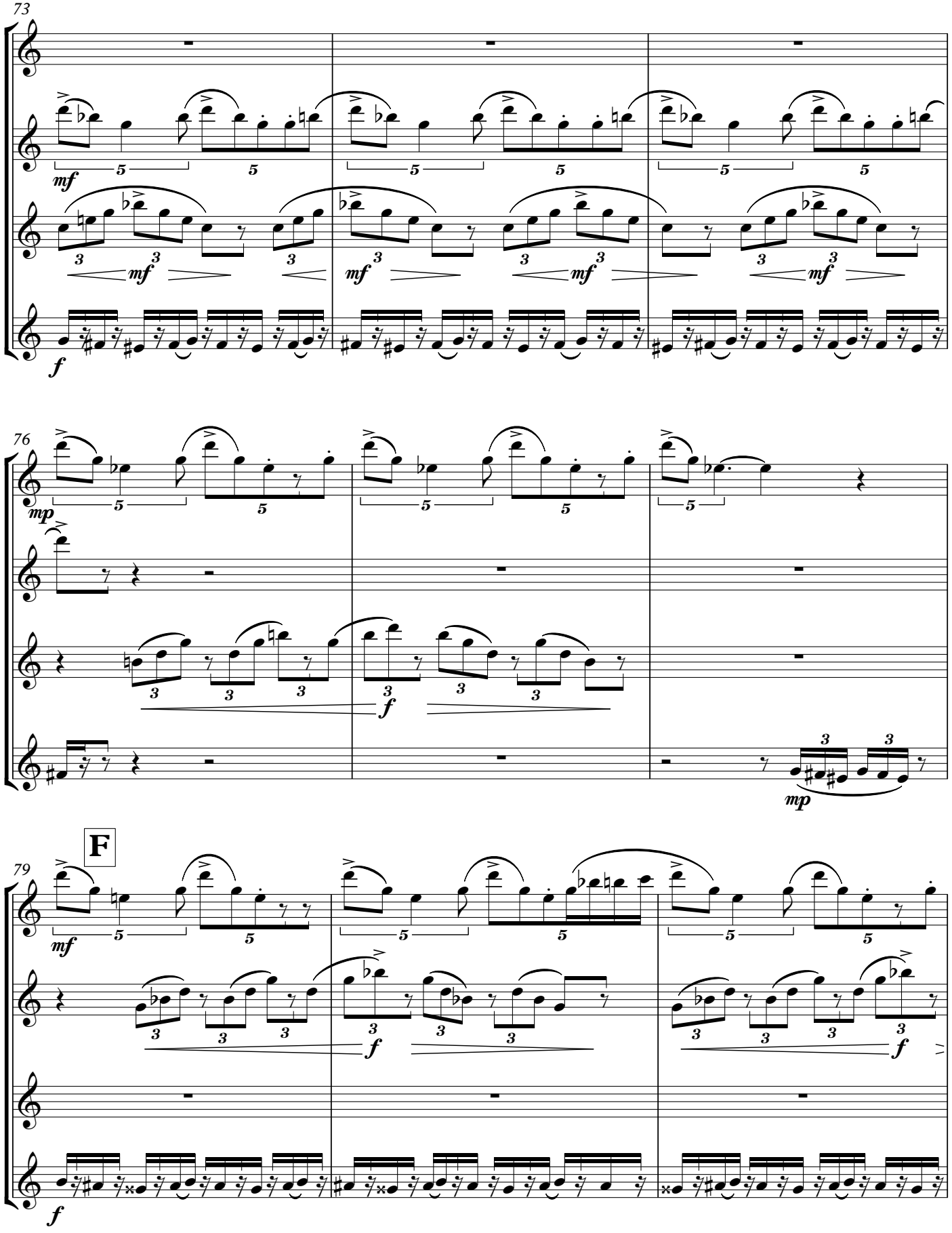

27
mf
31
mf
35
C
pp
f
mp
mp

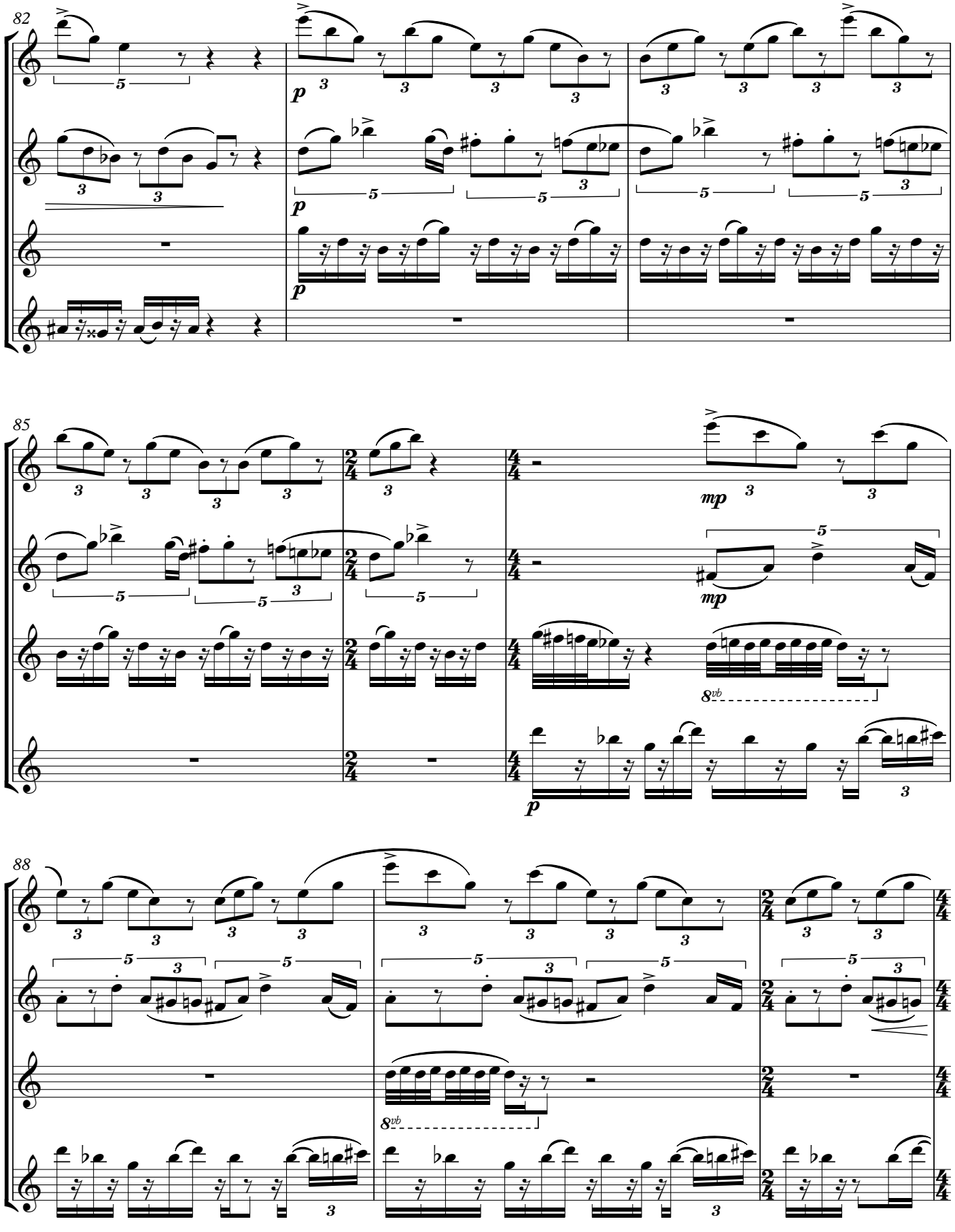

37
pp
f
mp
mp
40
pp
mf
mf
mf
42
f

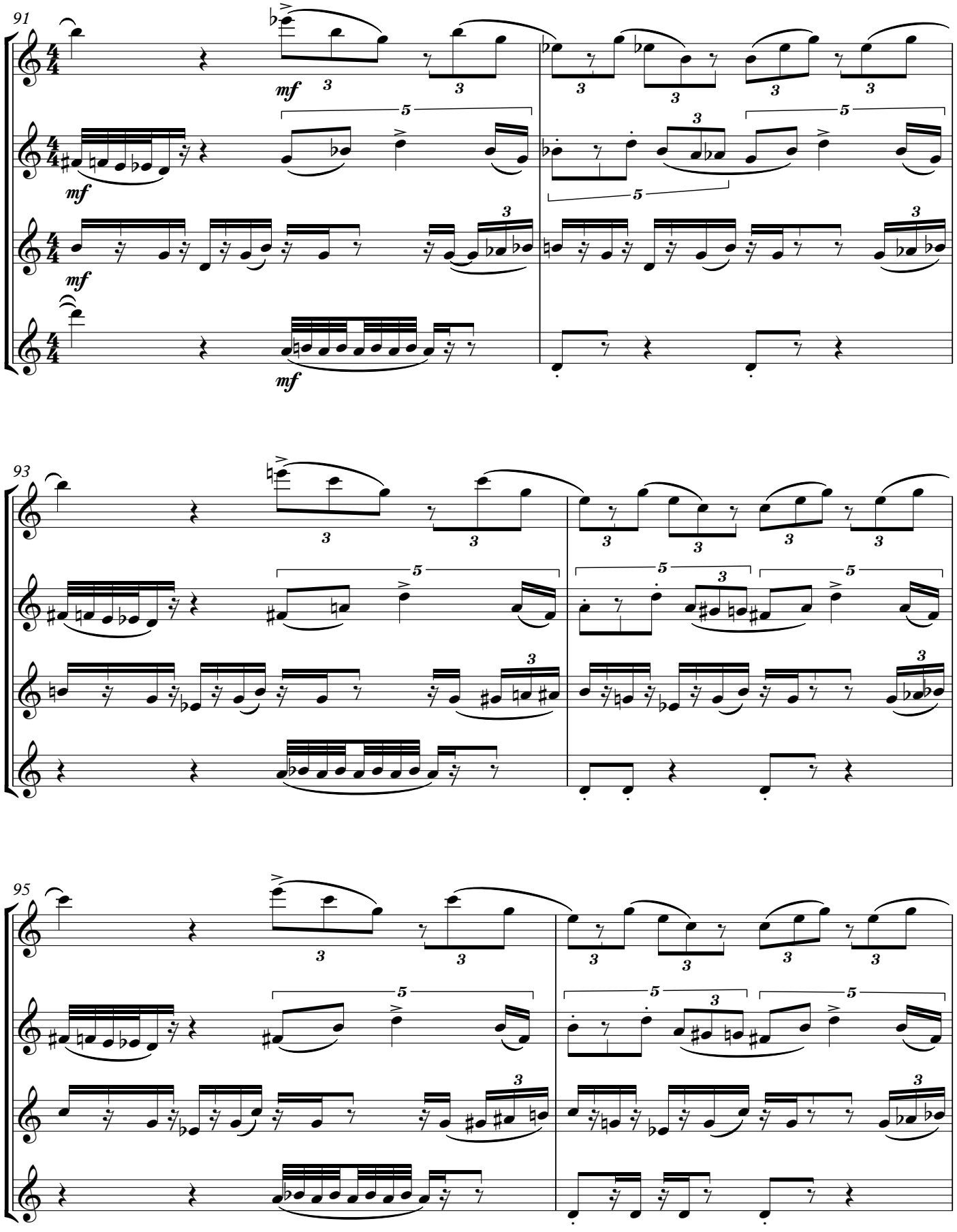

44
mf
f
f
48
mp
mp
mf
mf
52
rall.

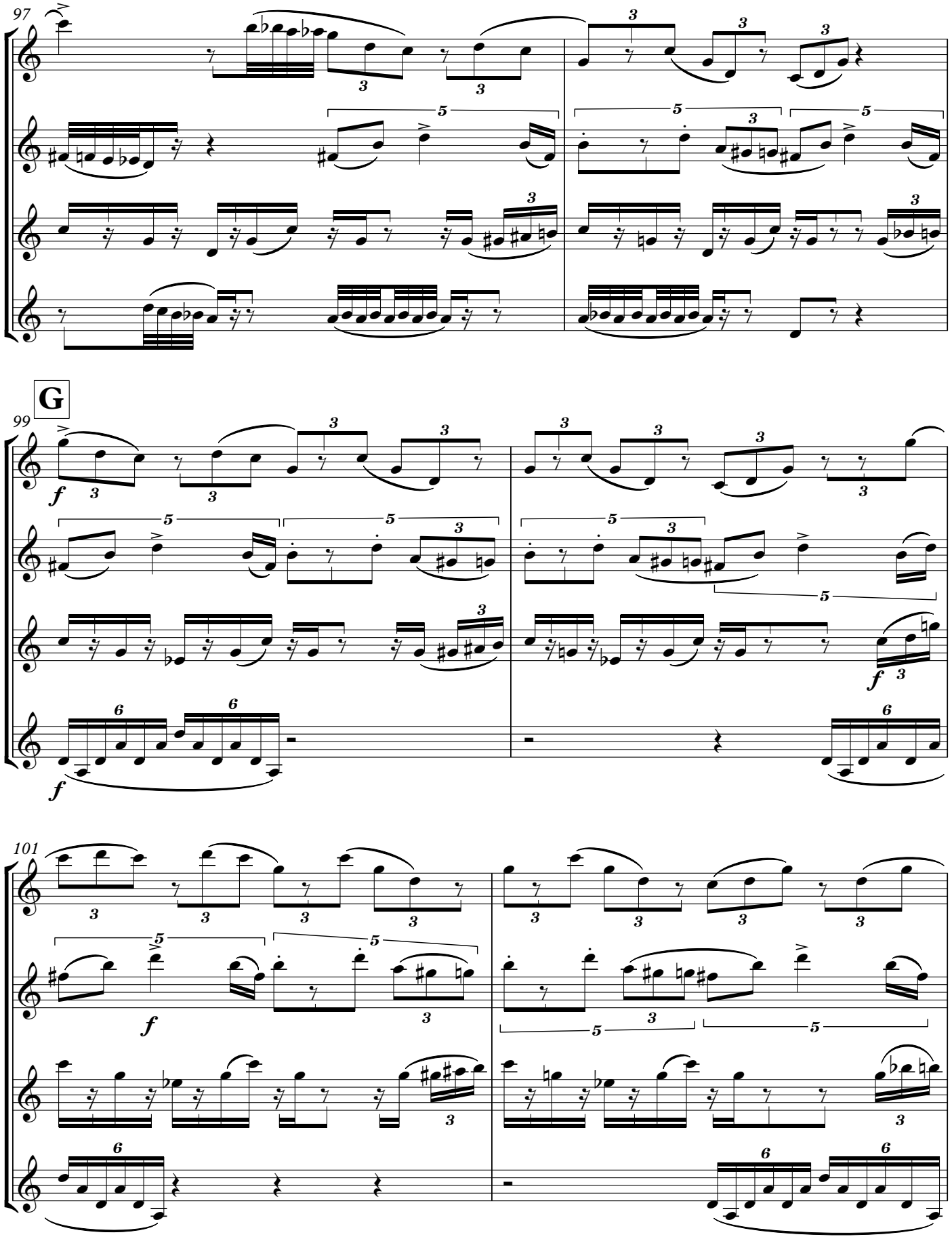

D
A tempo
55
58
61

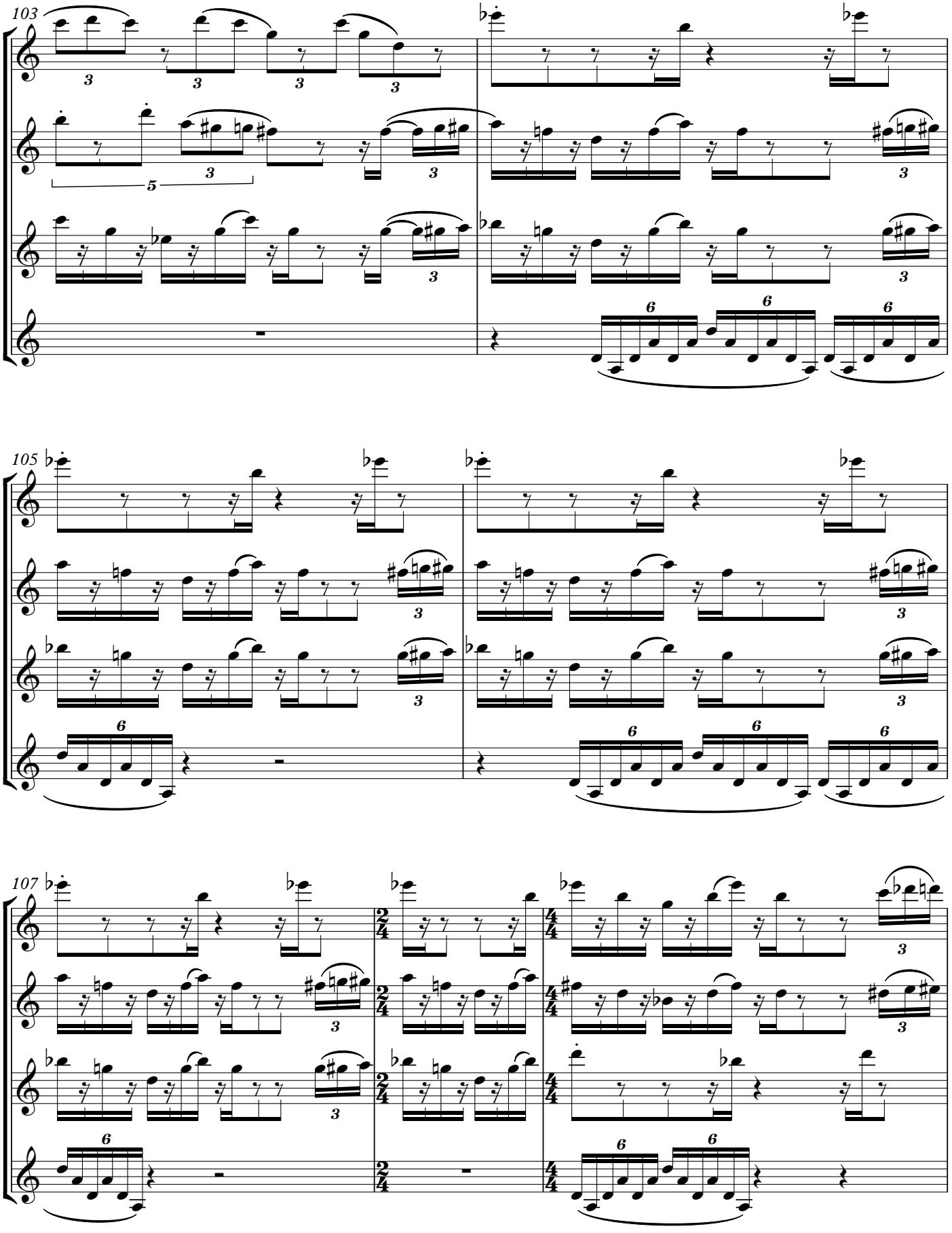

64
E
p
67
mp
mf
70

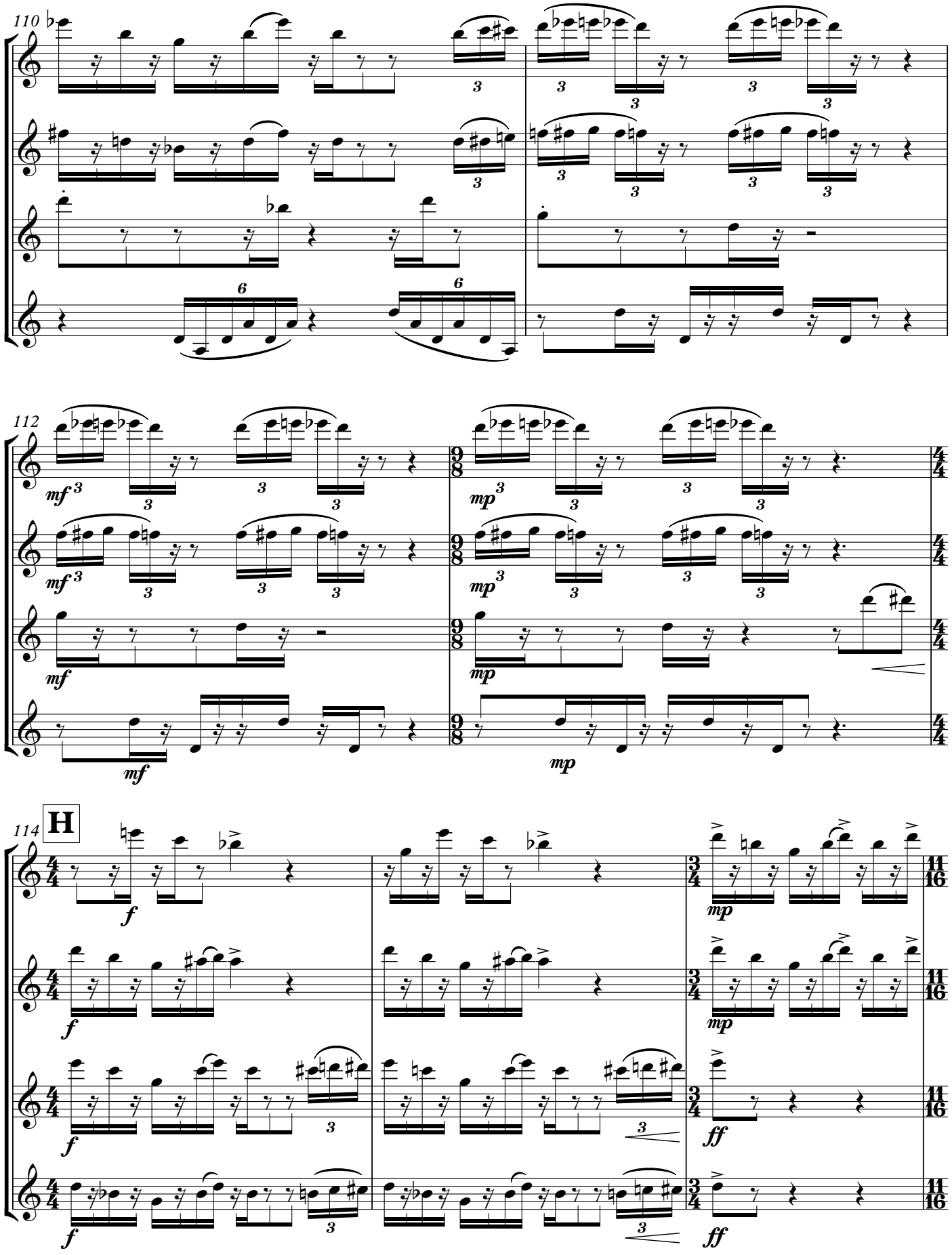

73
mf
f
76
mp
f
mp
79
F
mf
f

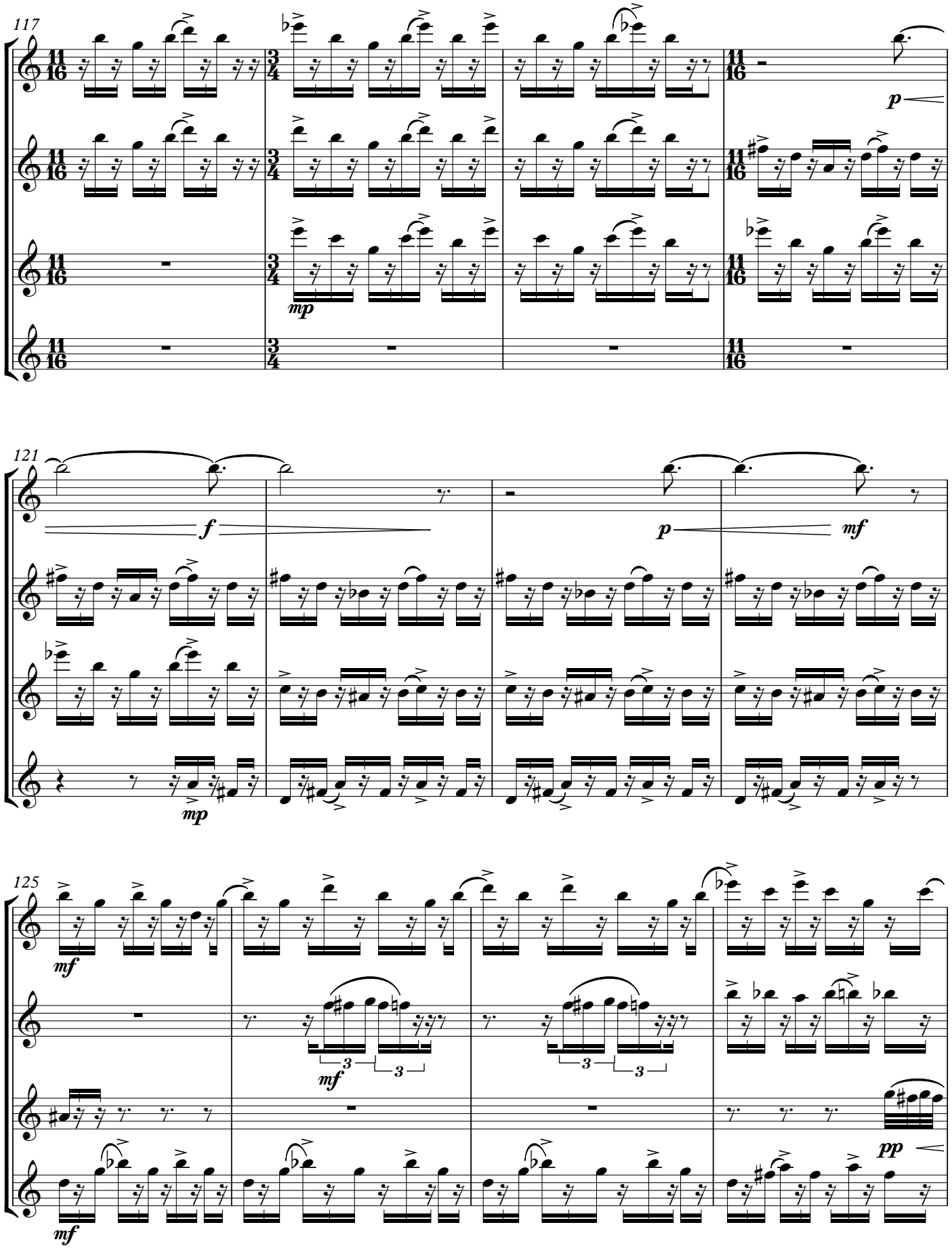

82
p
85
mp
8vb
88
8vb

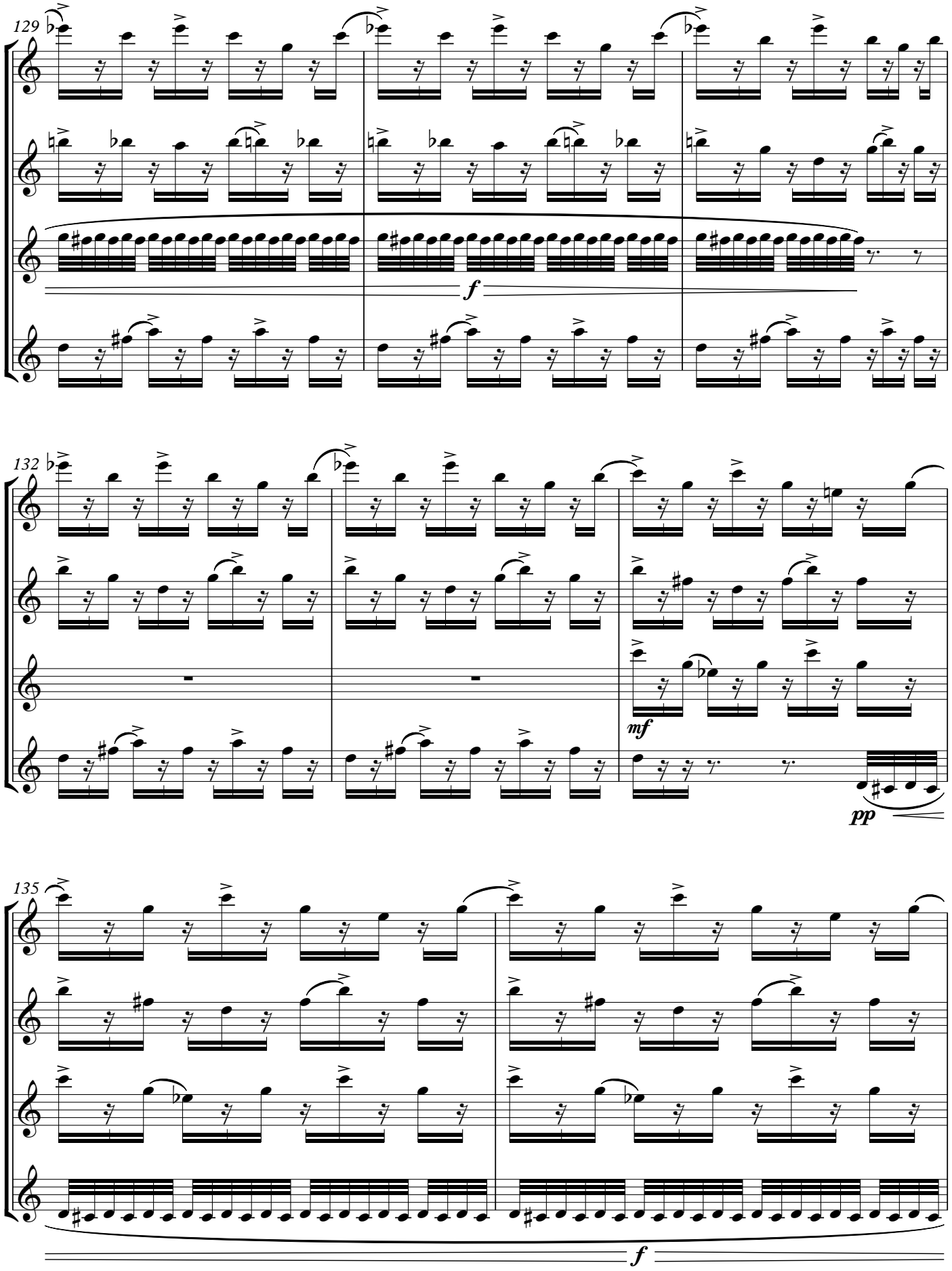

91
mf
93
95

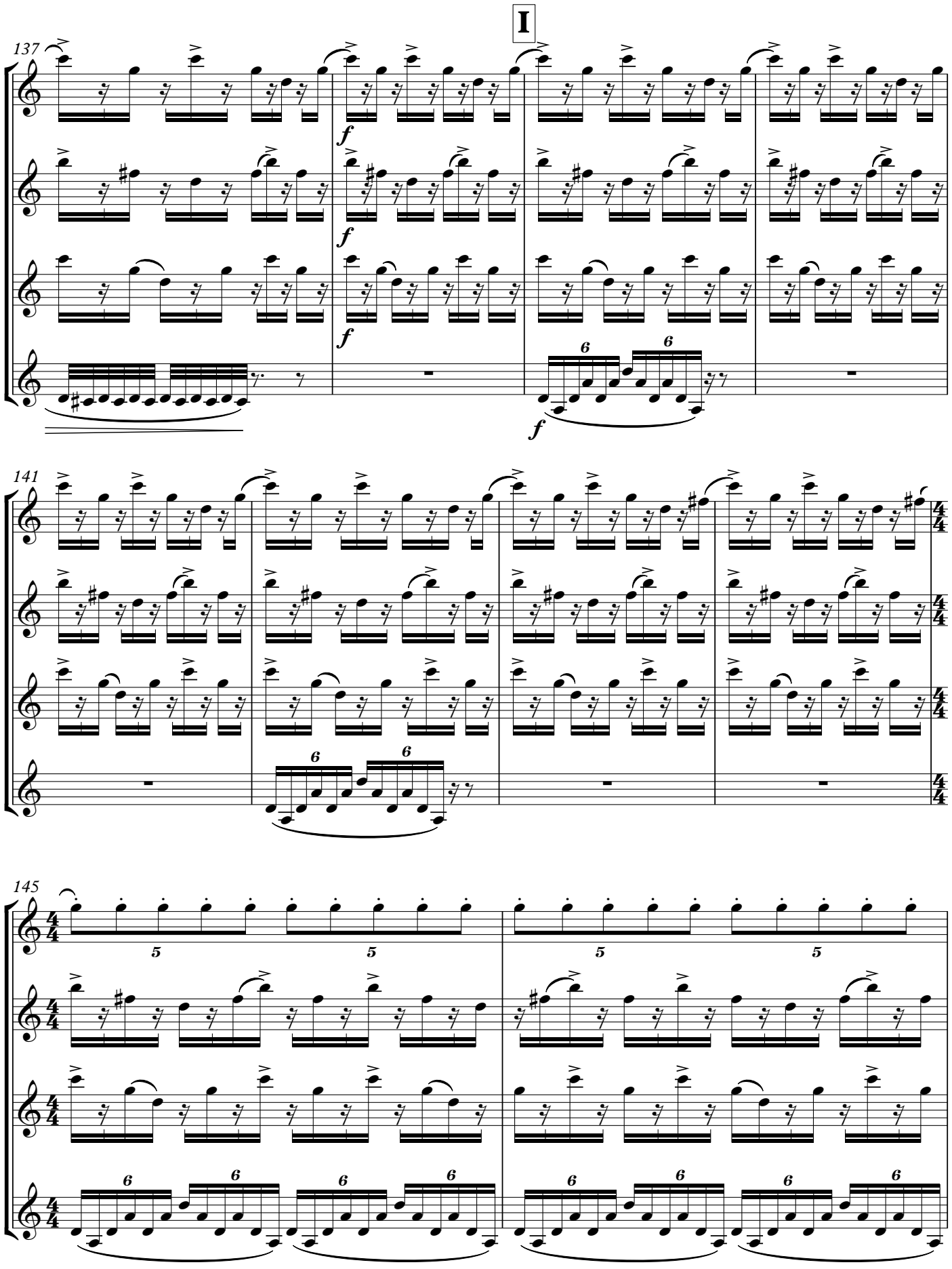

97
G
99
101

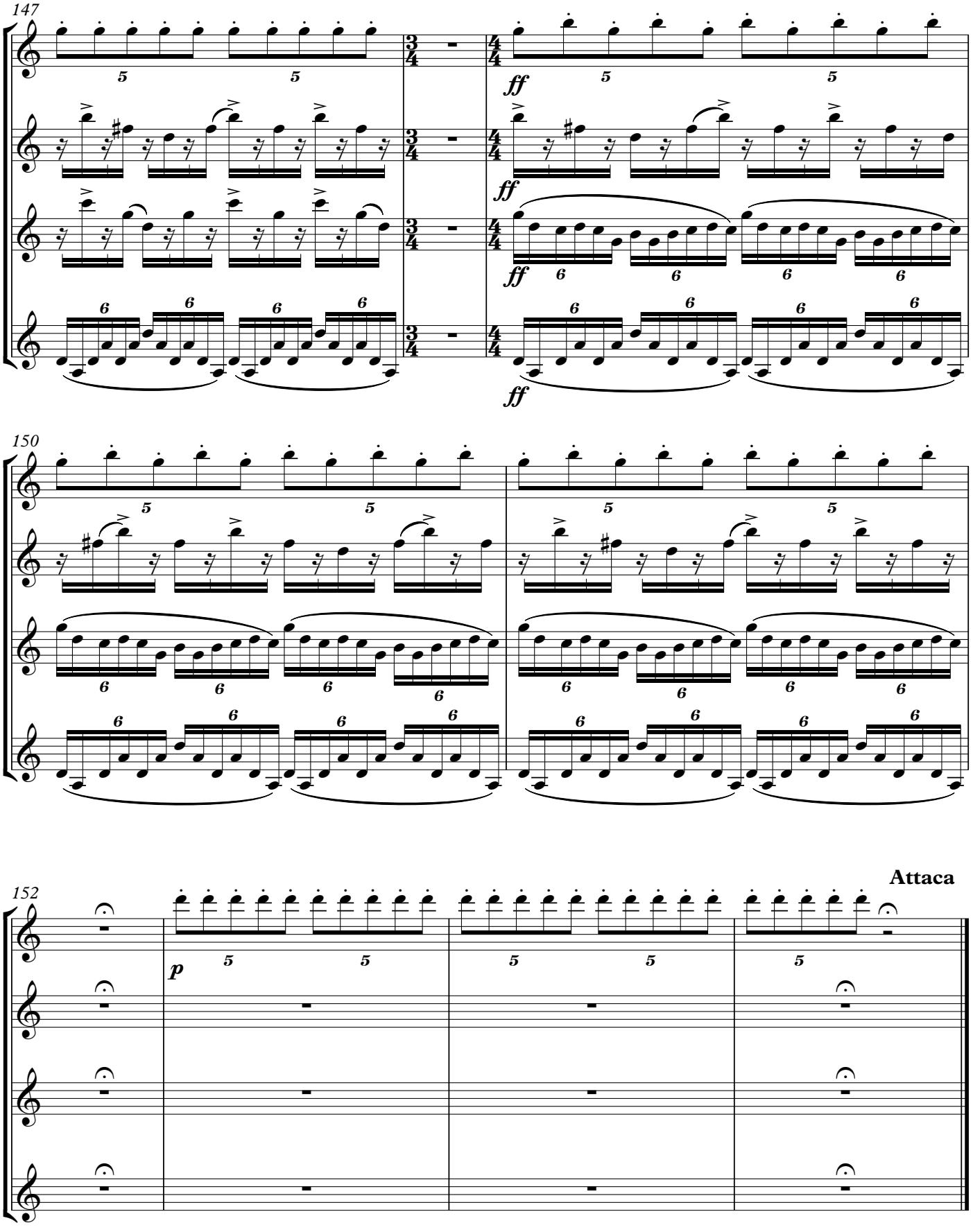

103
105
107


110
112
114
H
mf
mp
f
ff


117
121
125
p
mp
f
mf
pp
3


129
f
132
mf
pp
135
f

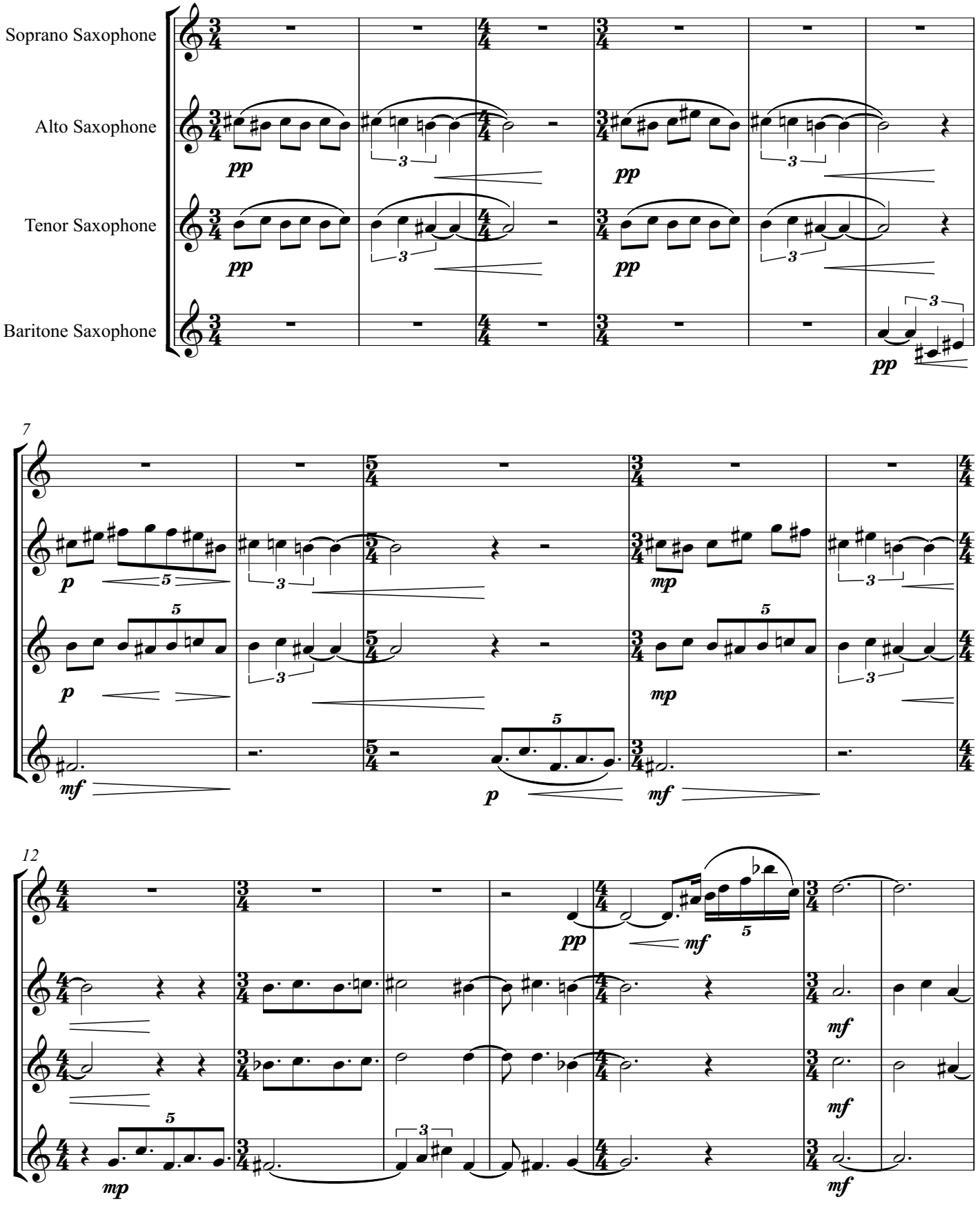

I
137
f
141
145

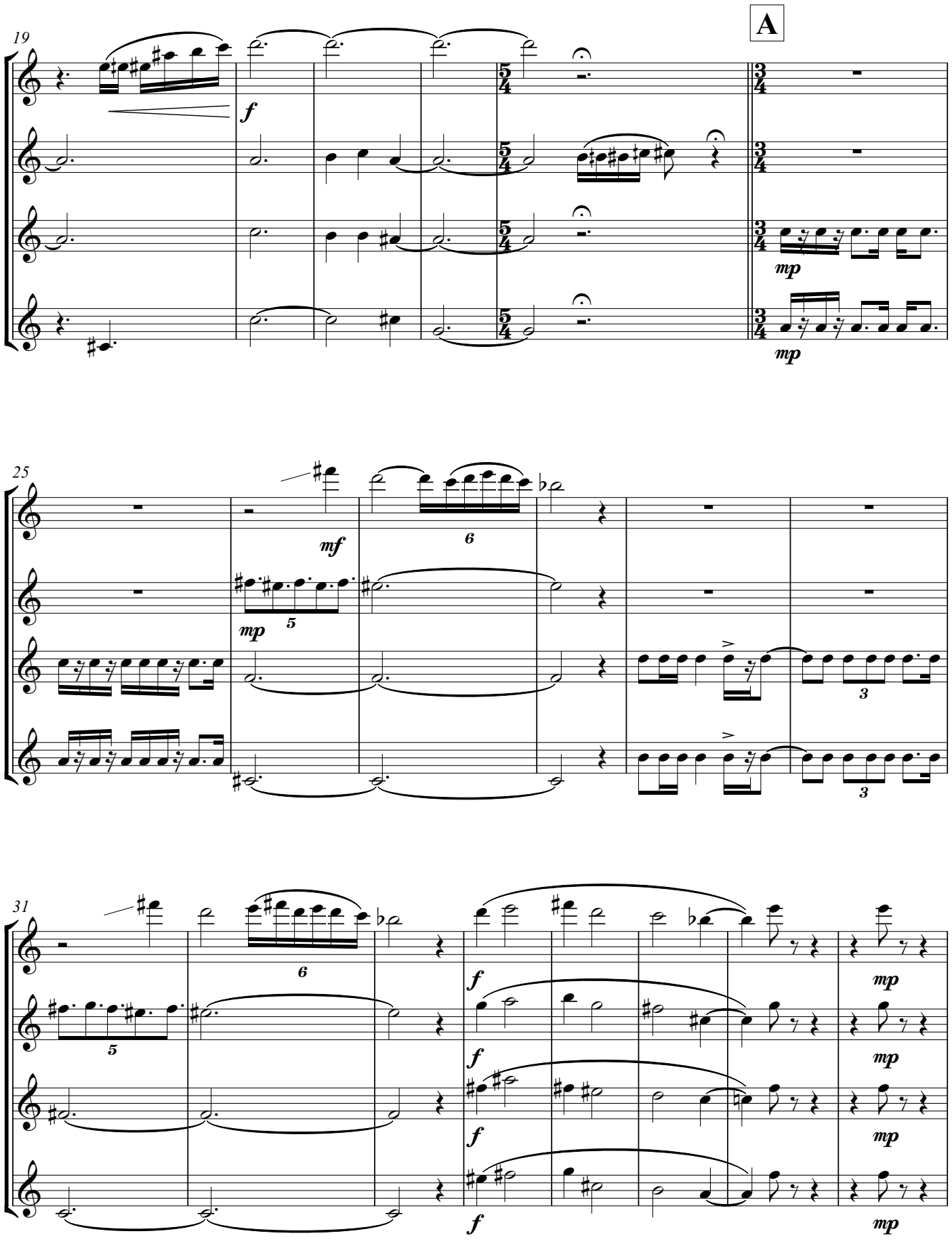

147
ff
150
152
p
Attaca

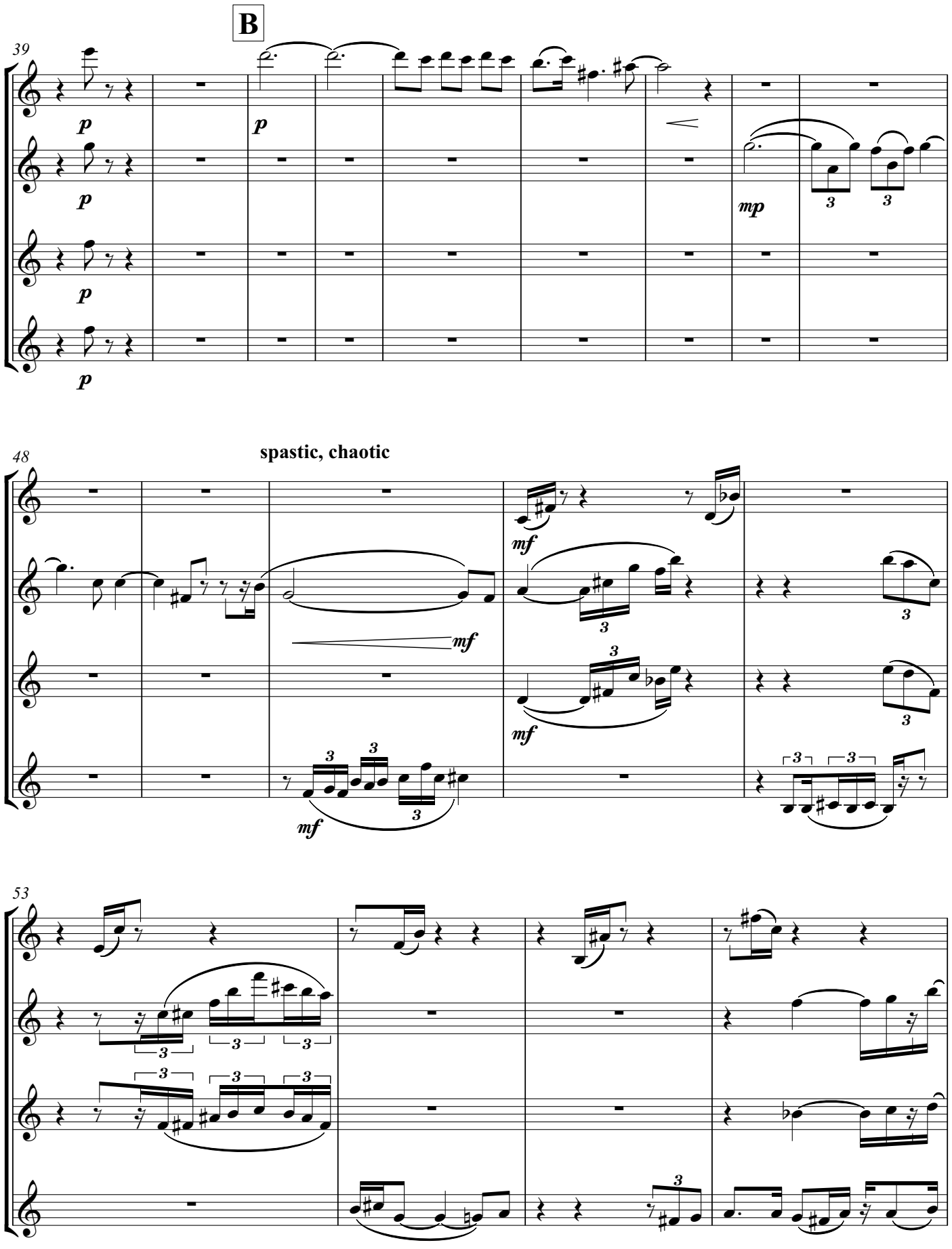
Hexagon V: Tower Mode

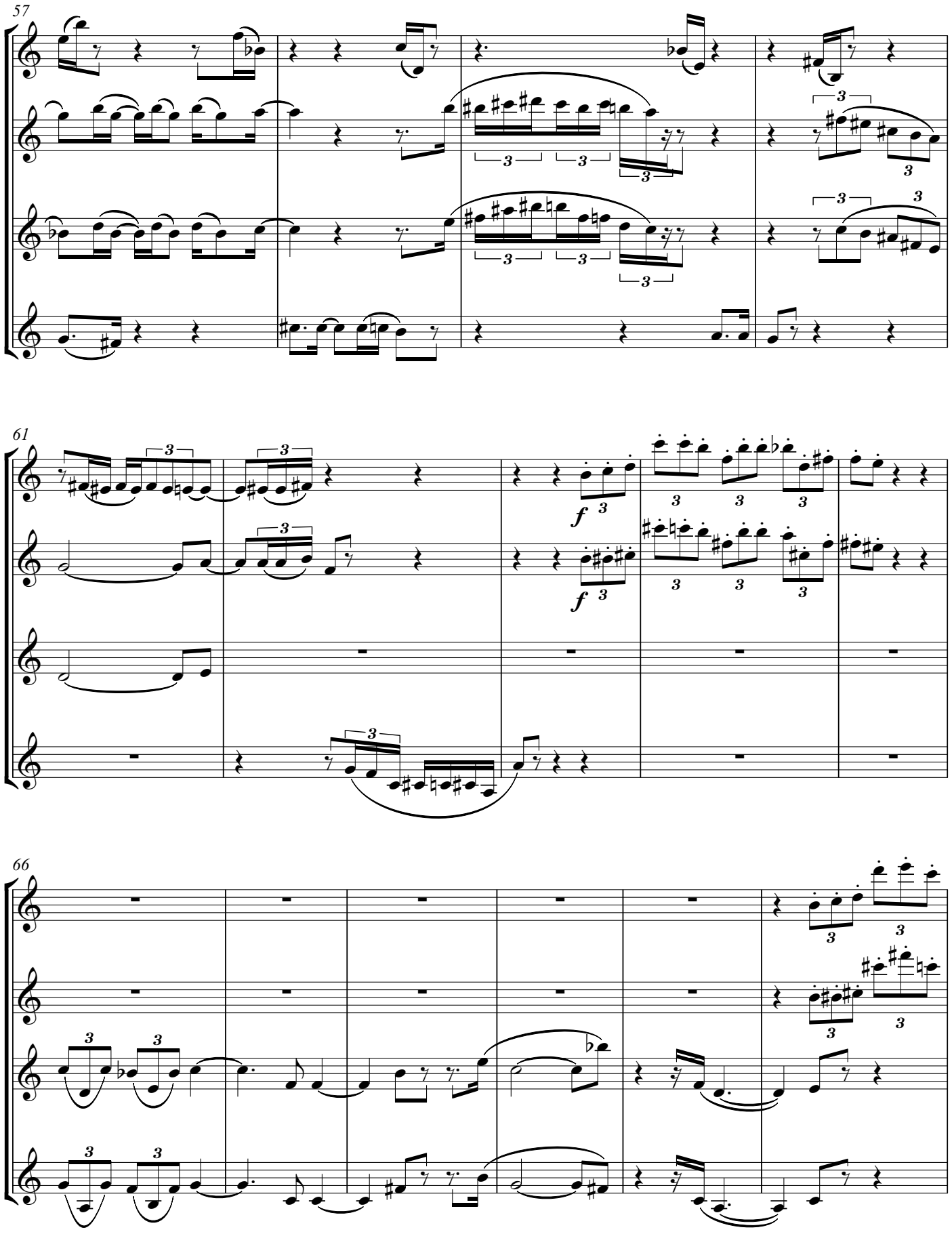
k. Scott Eggert

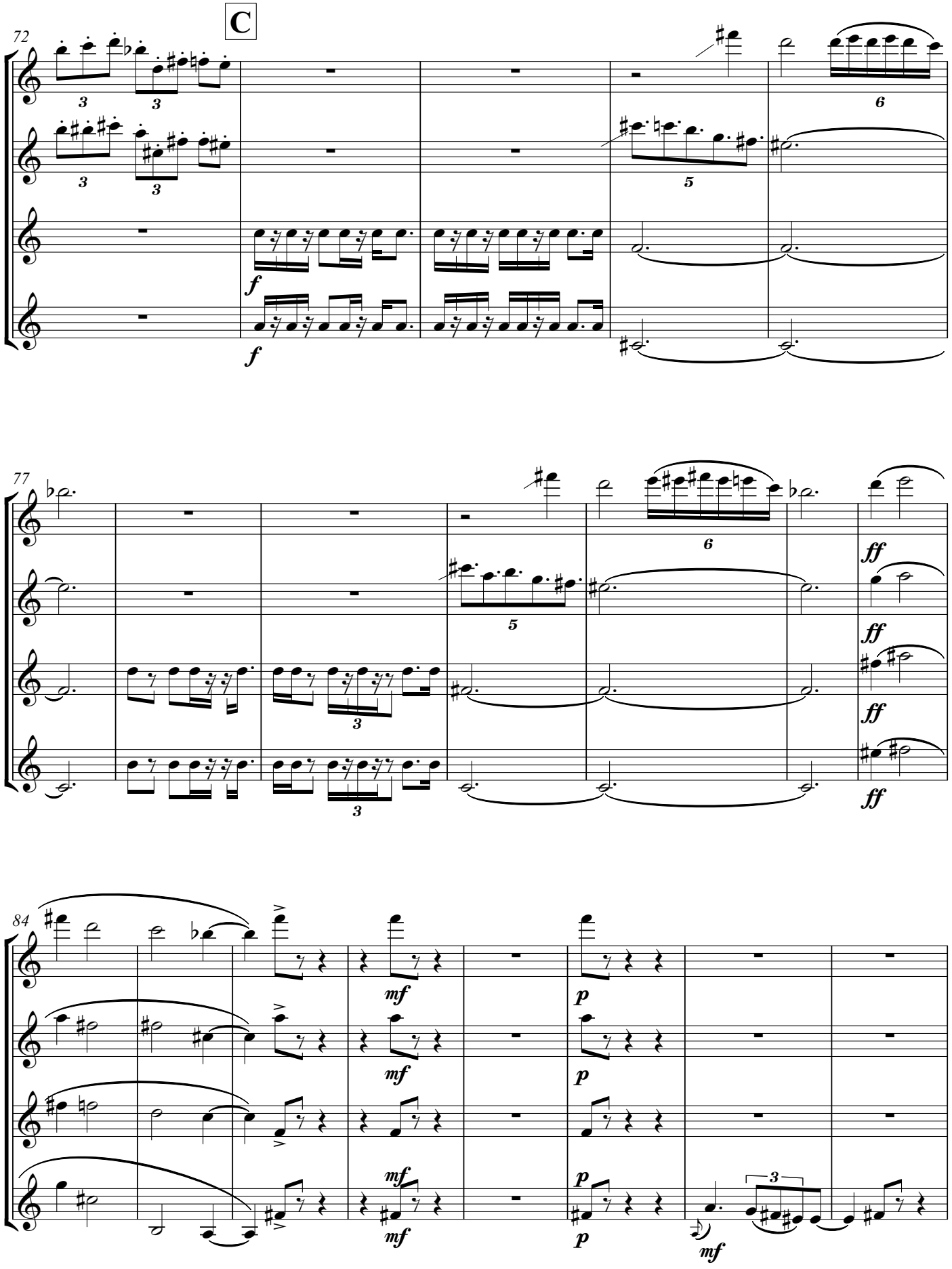
Moderato ♩=100, with bluesy inflection



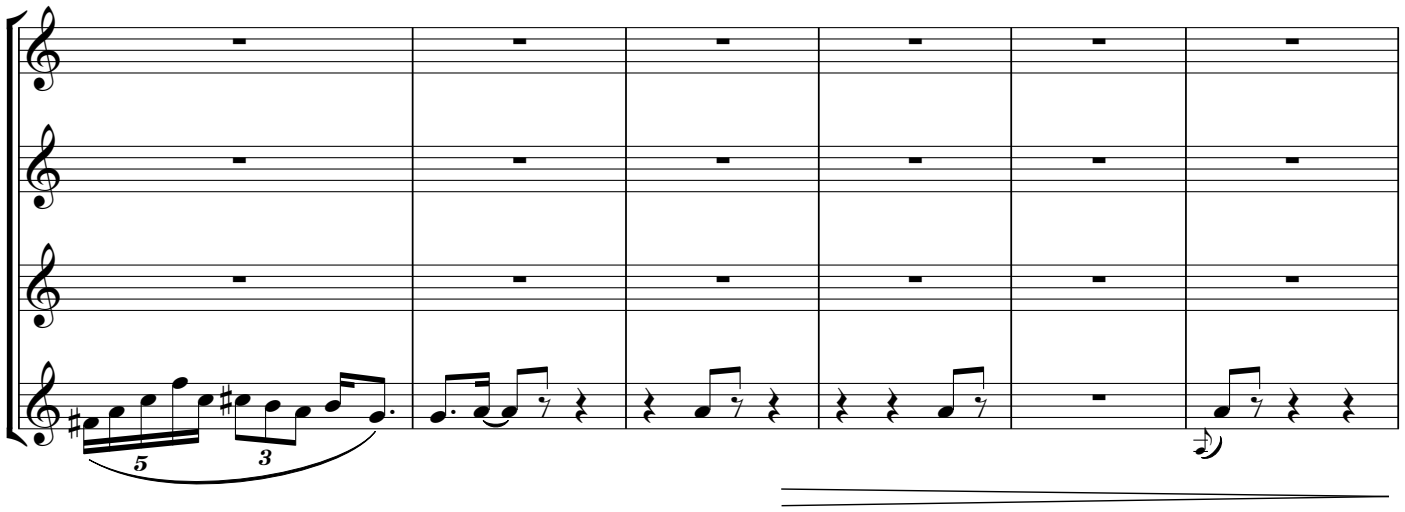

19
A
f
mp
mp
25
mf
6
mp
5
3
3
31
6
f
mp
5
f
mp
f
mp
f
mp


B
39
p
mp
48
spastic, chaotic
mf
53


57
61
f
f
66

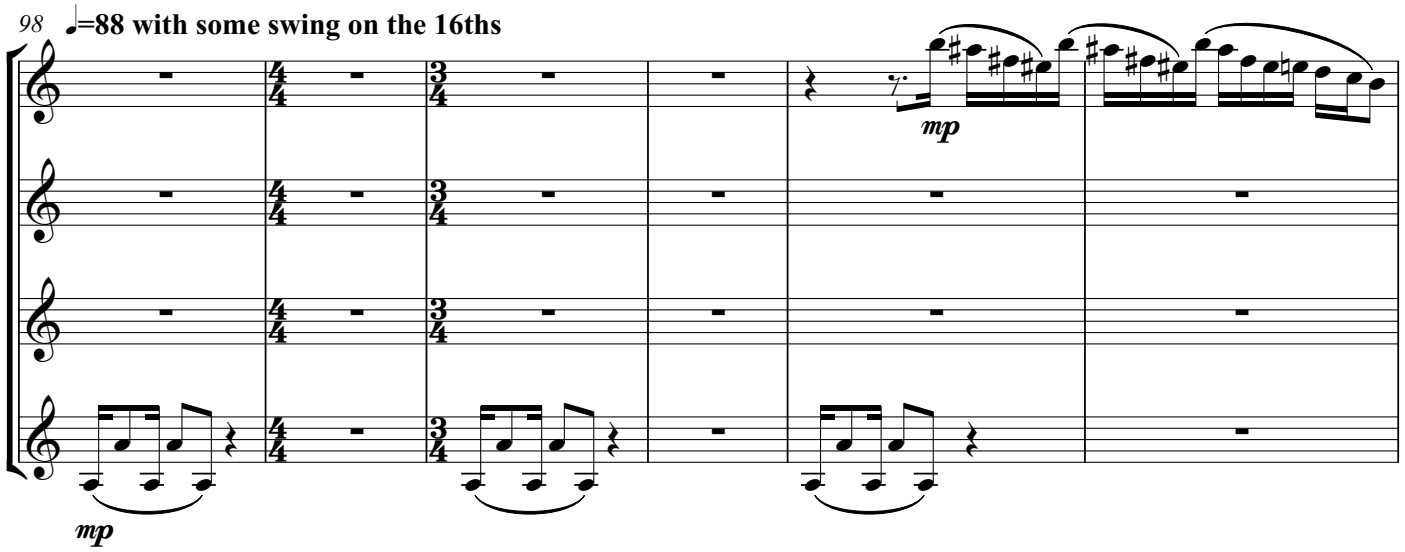

C
72
77
84
f
ff
mf
p

92

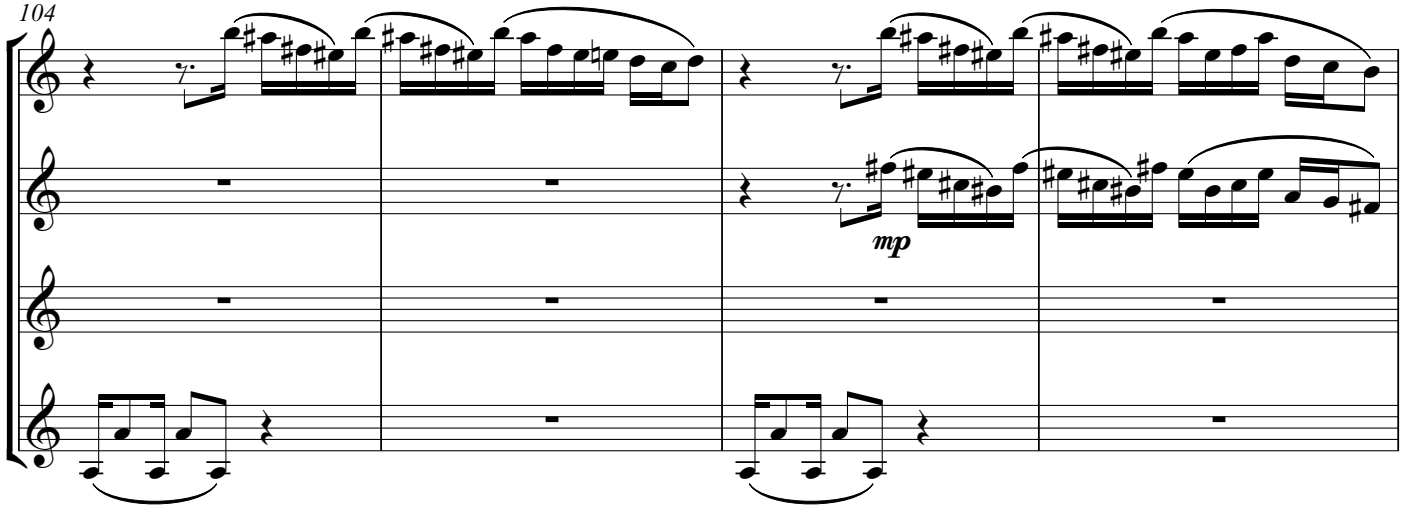


D

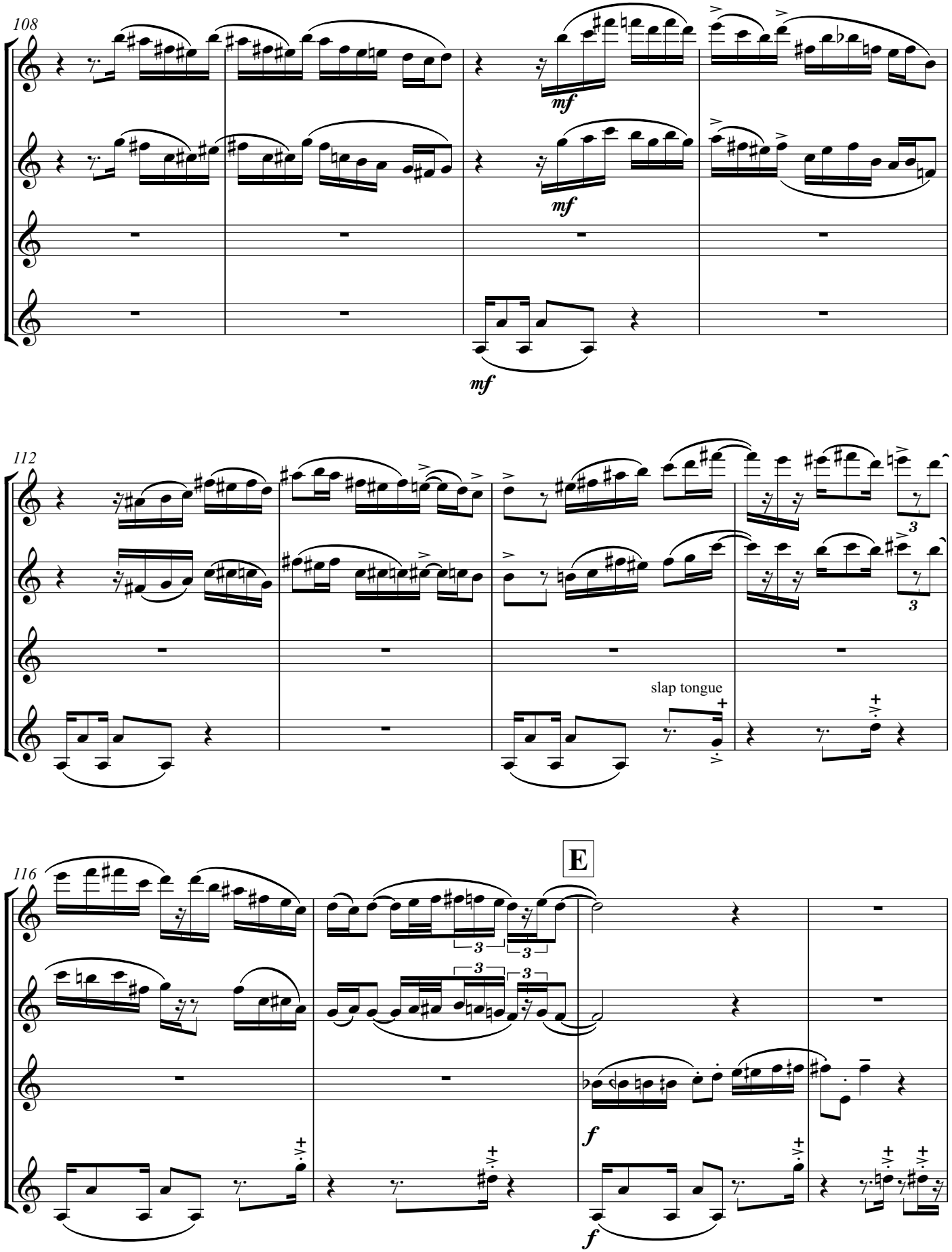
98 **♩=88 with some swing on the 16ths**

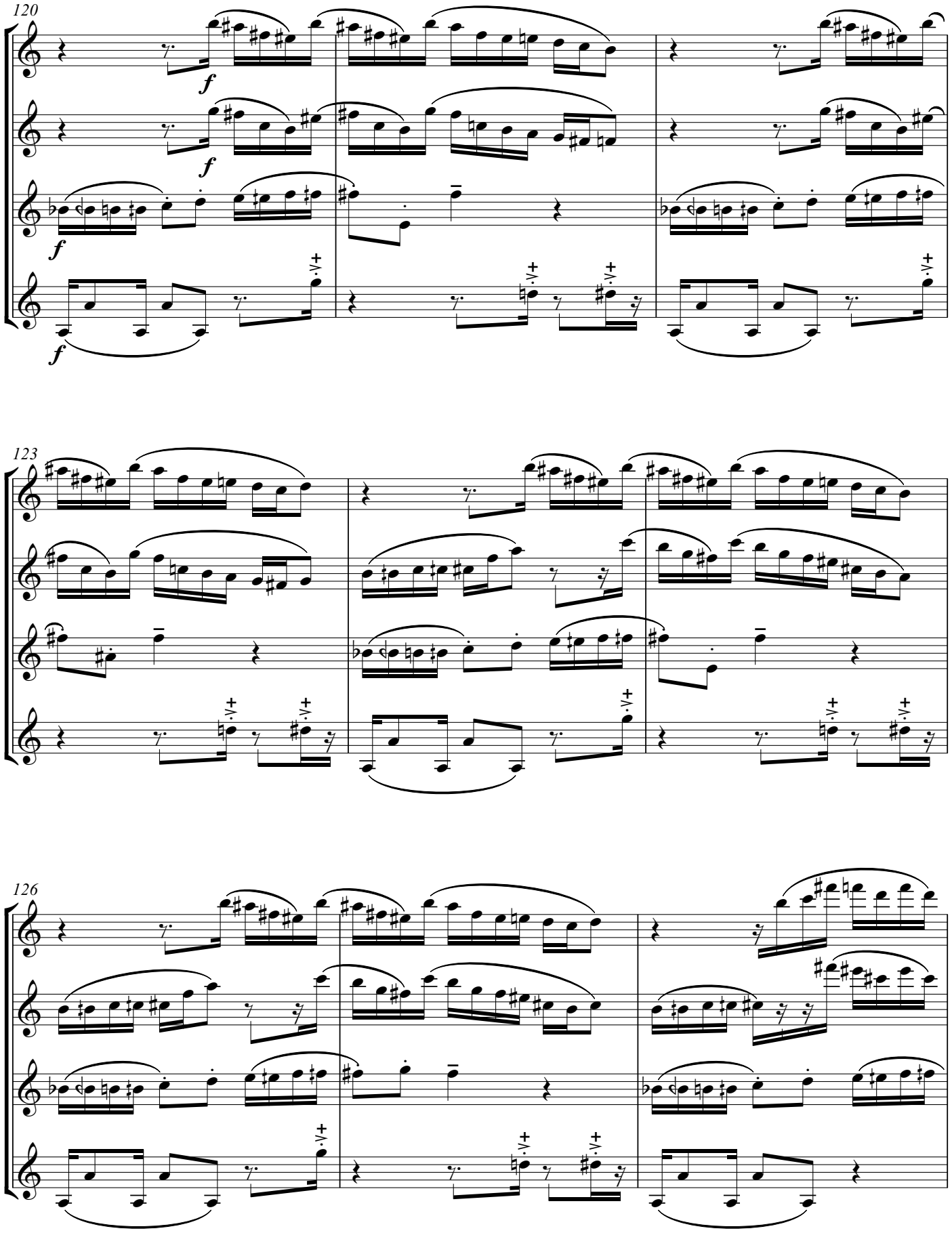


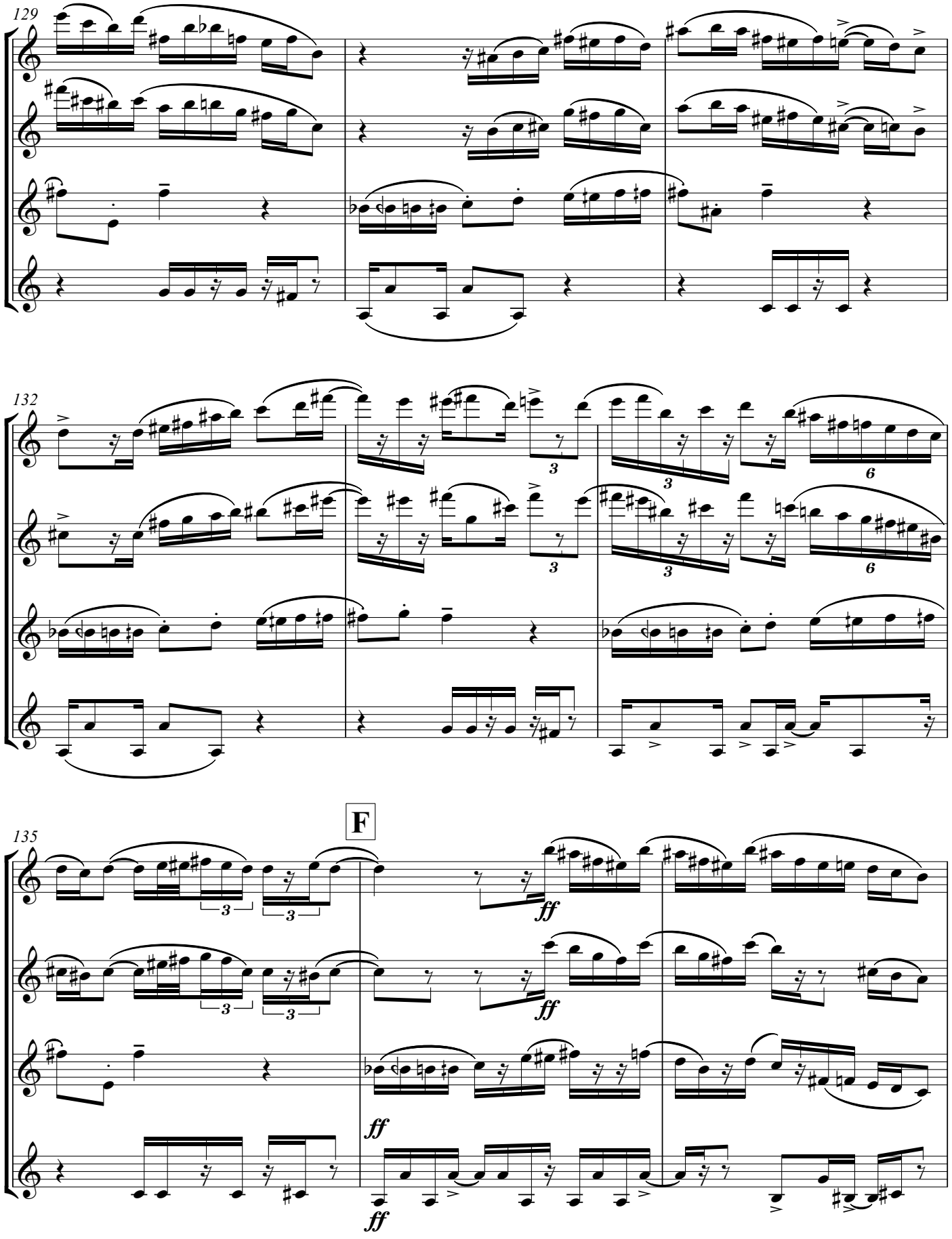
104

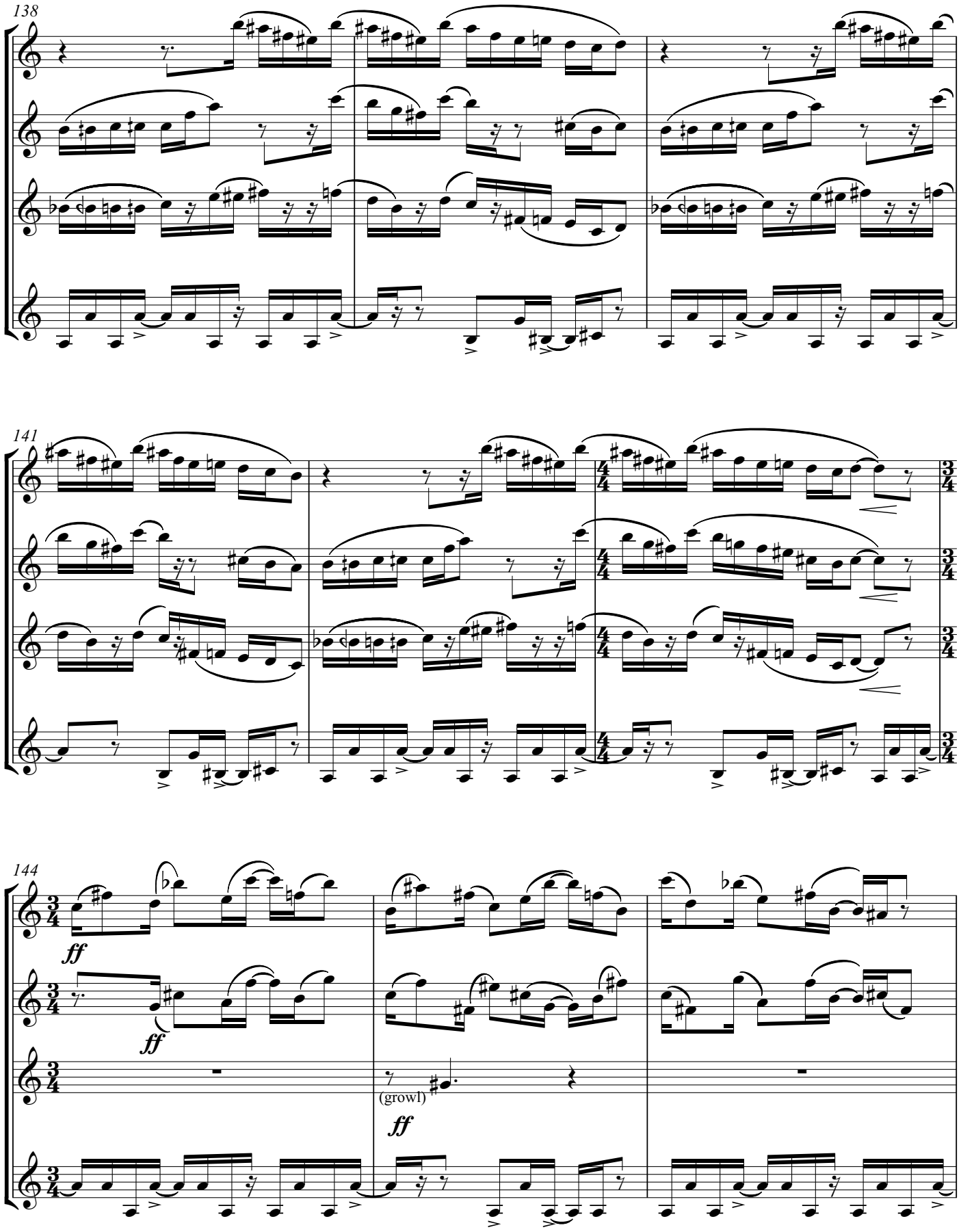


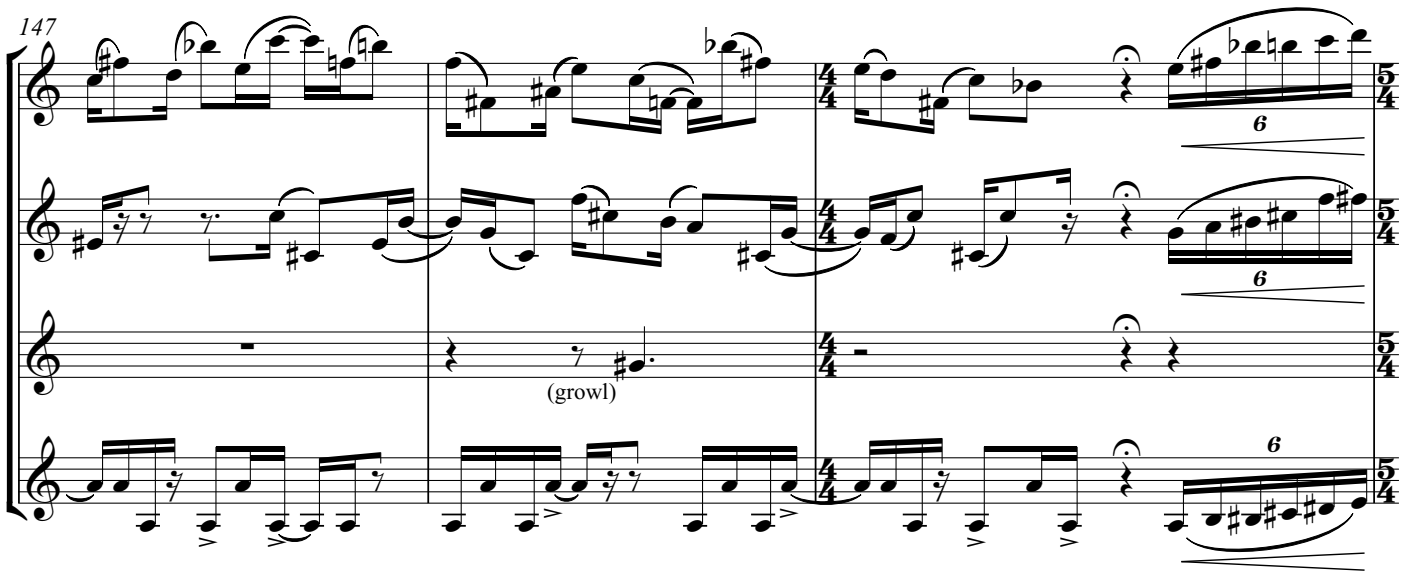
like a gleeful, malicious machine, but funky



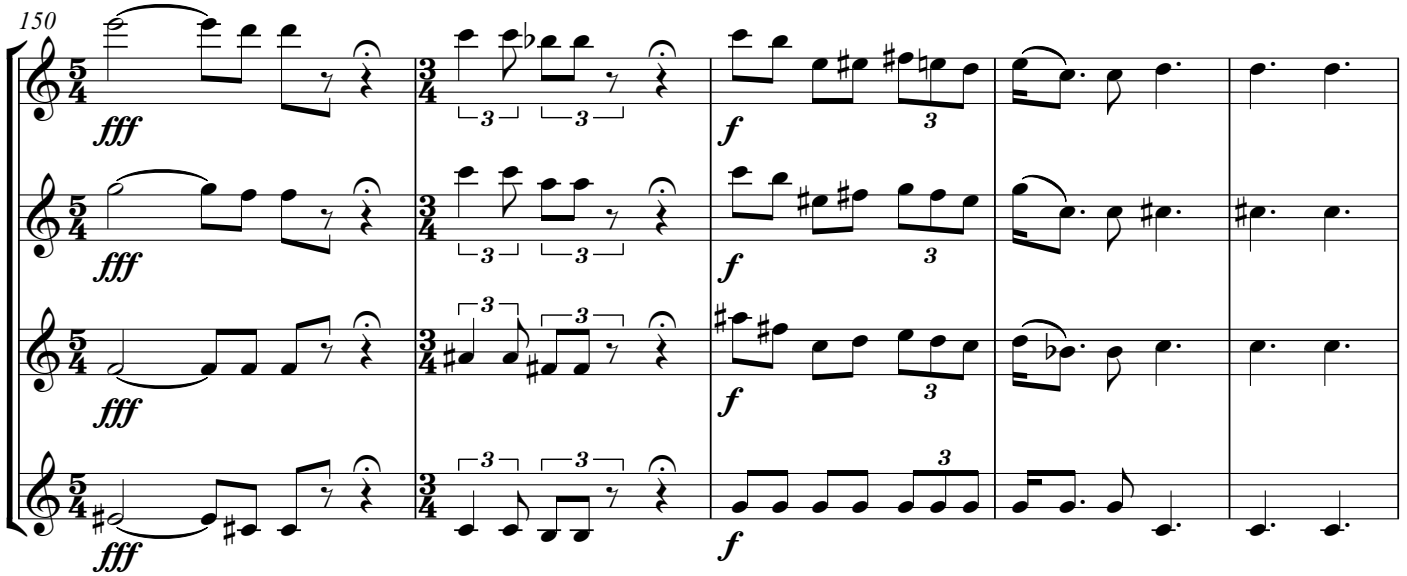

120
123
126


129
132
135
F
ff
ff
ff
ff

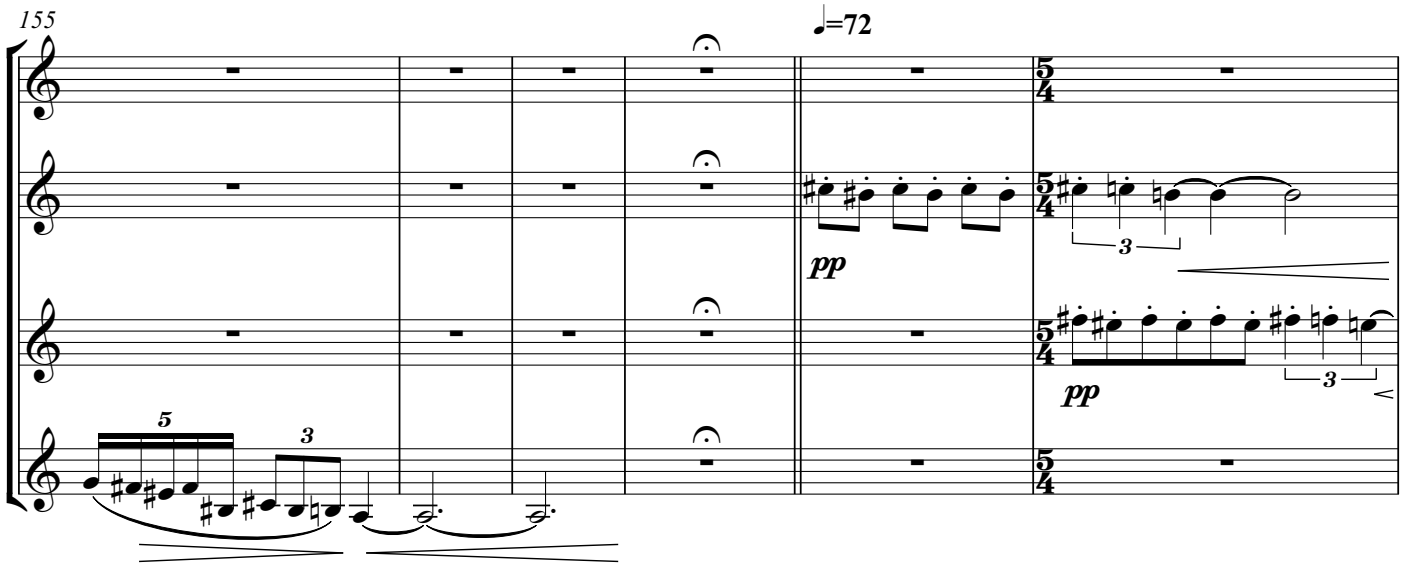

138
141
144
ff
ff
(growl)
ff

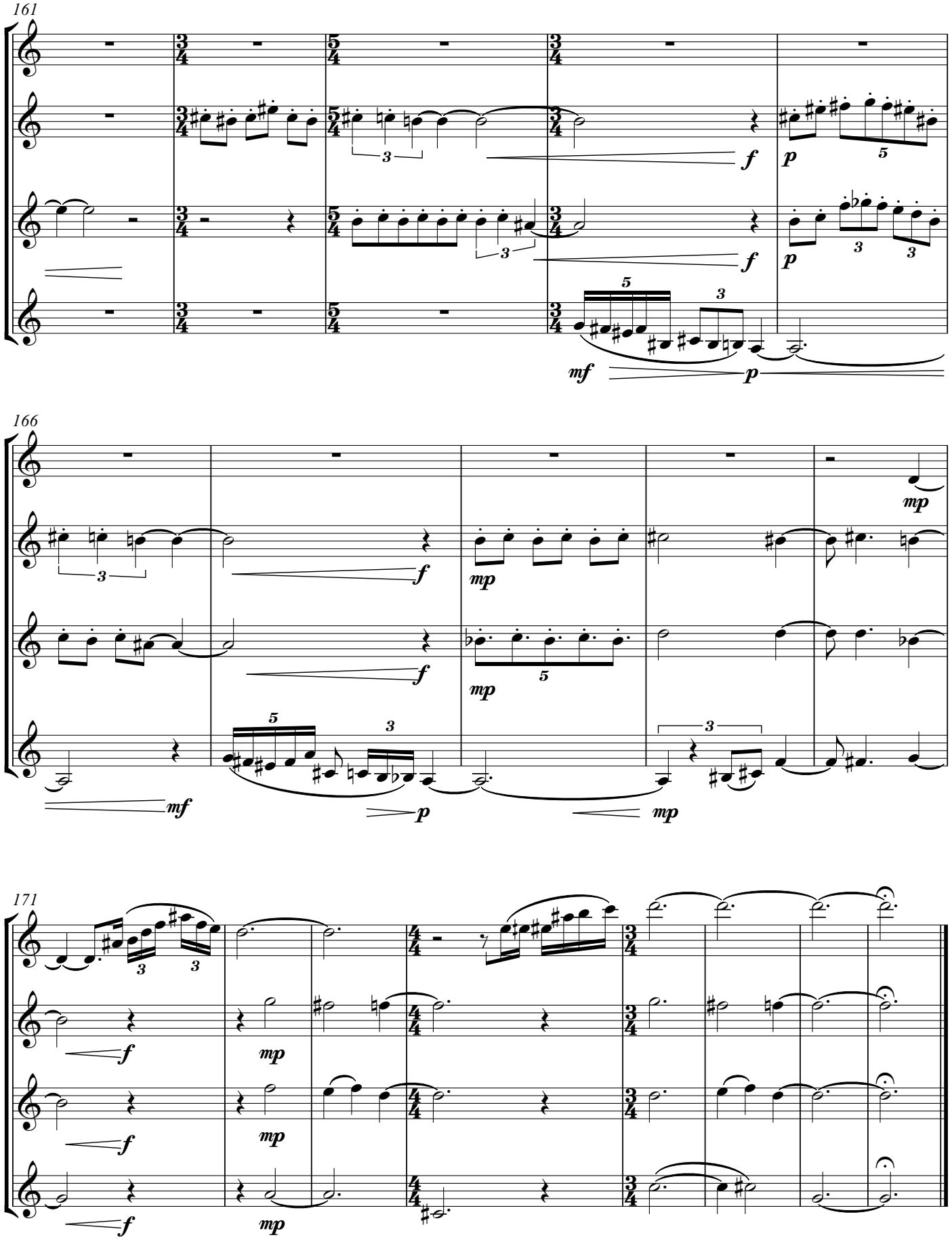


Straight tempo



G

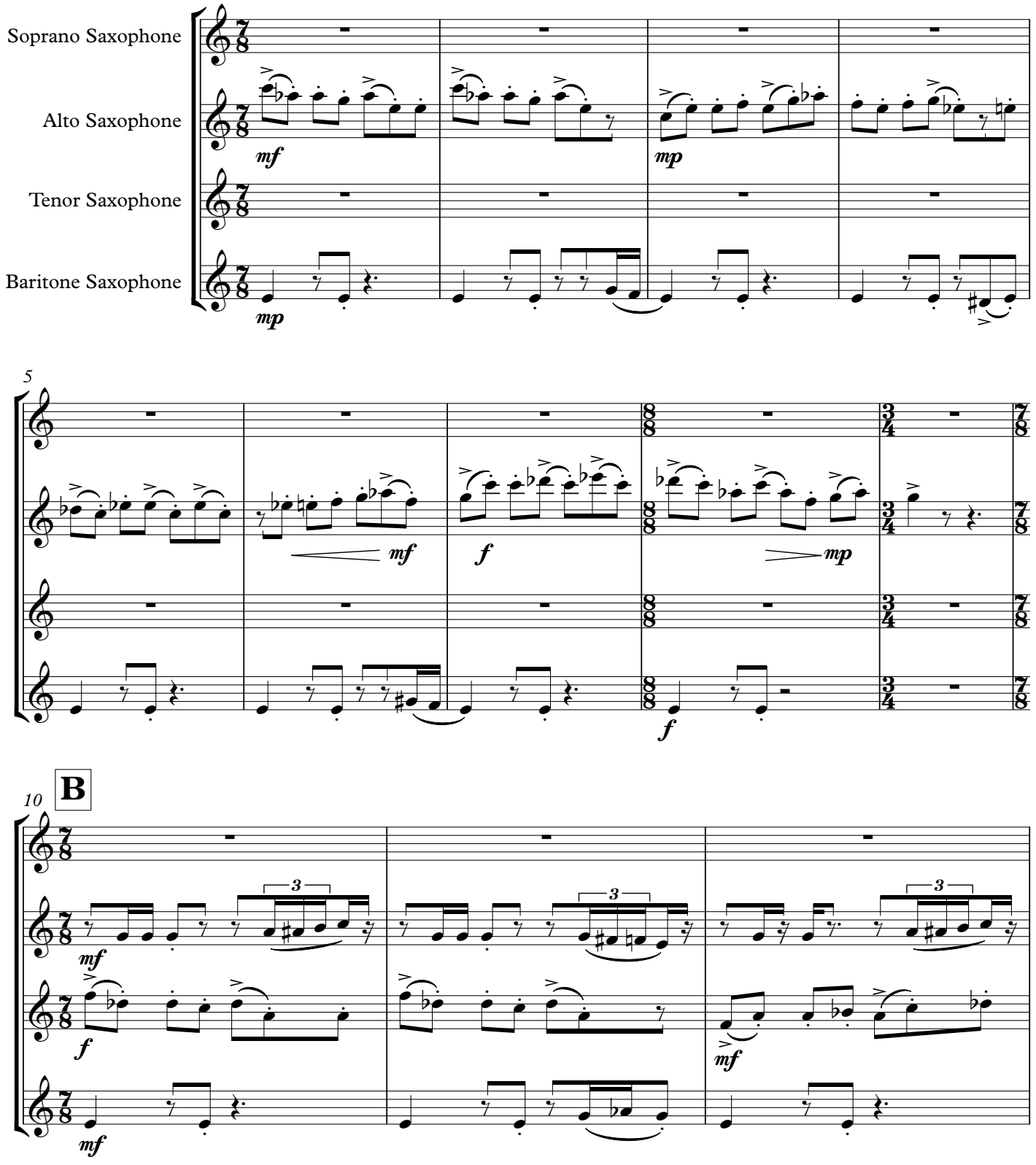


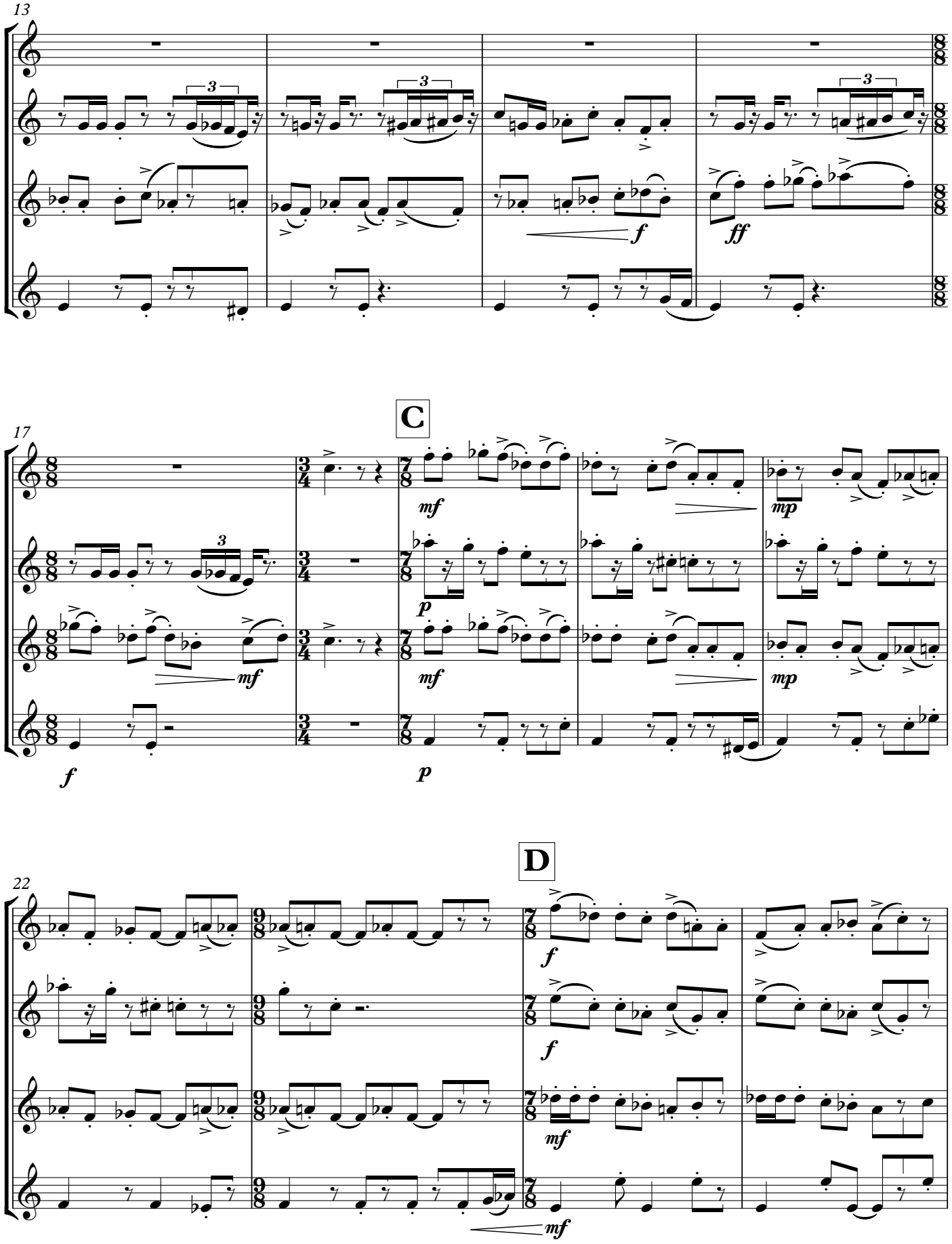

161
166
171

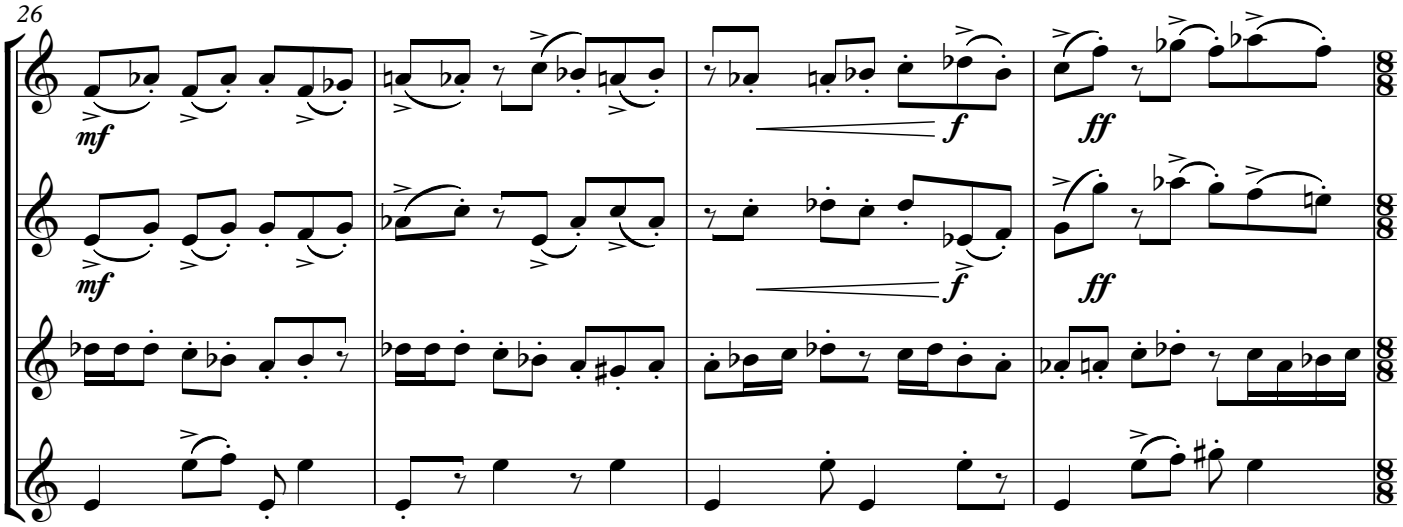
Hexagon IV: Mikrokosmik

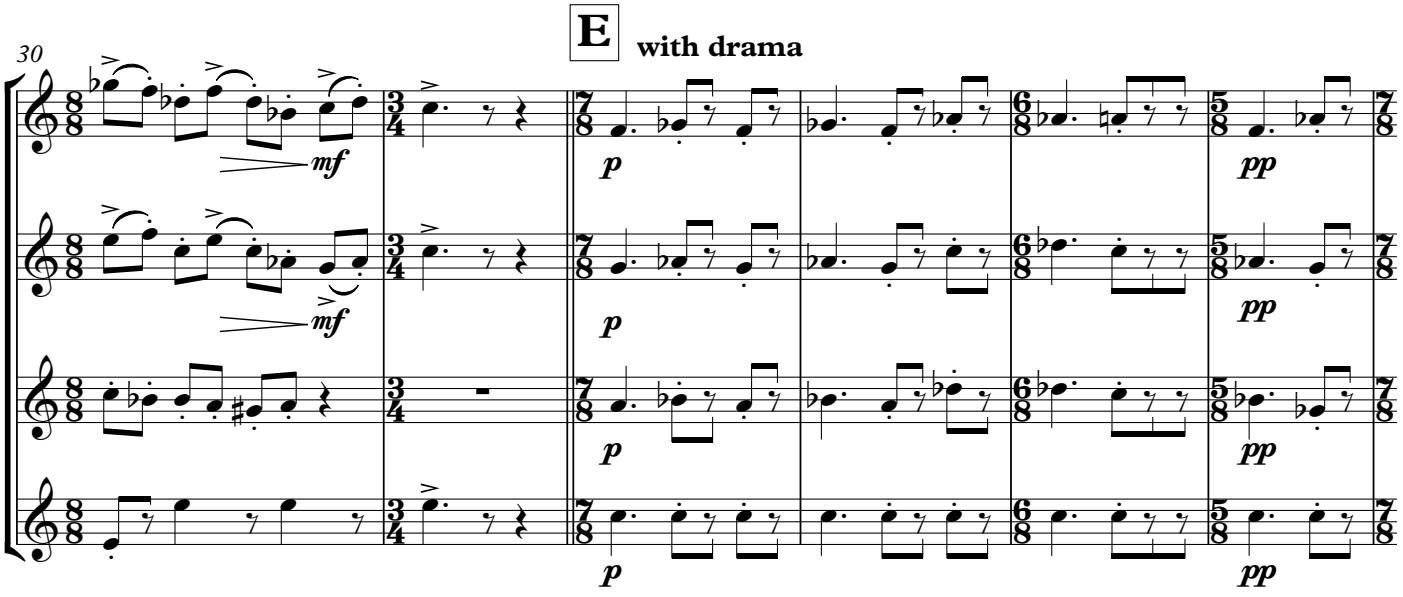
k. Scott Eggert

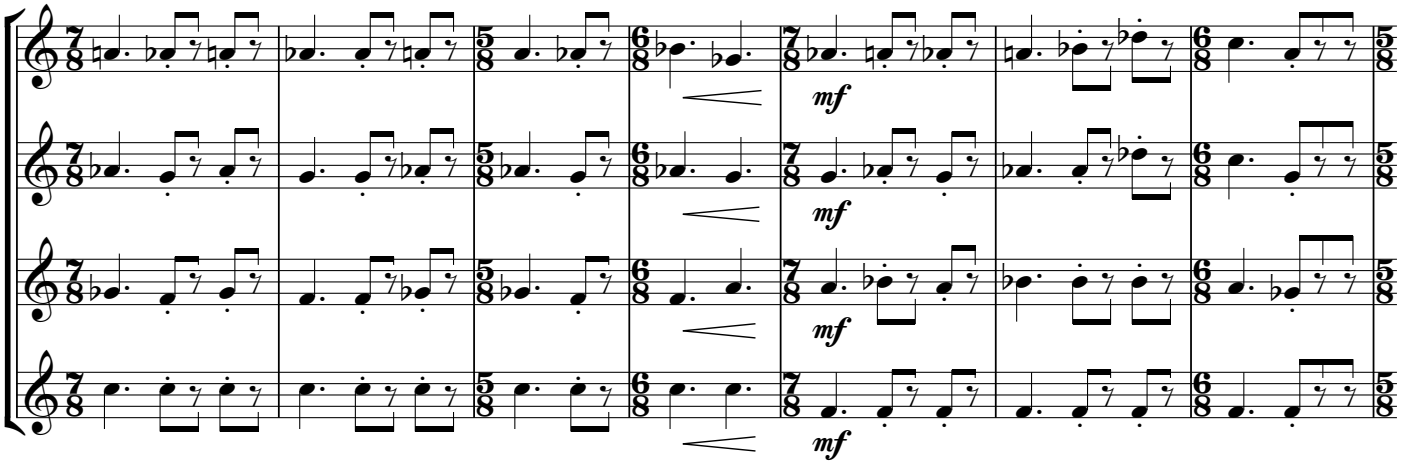
A ♪=266 **Like an ancient dance melody, crisp and rhythmic throughout**

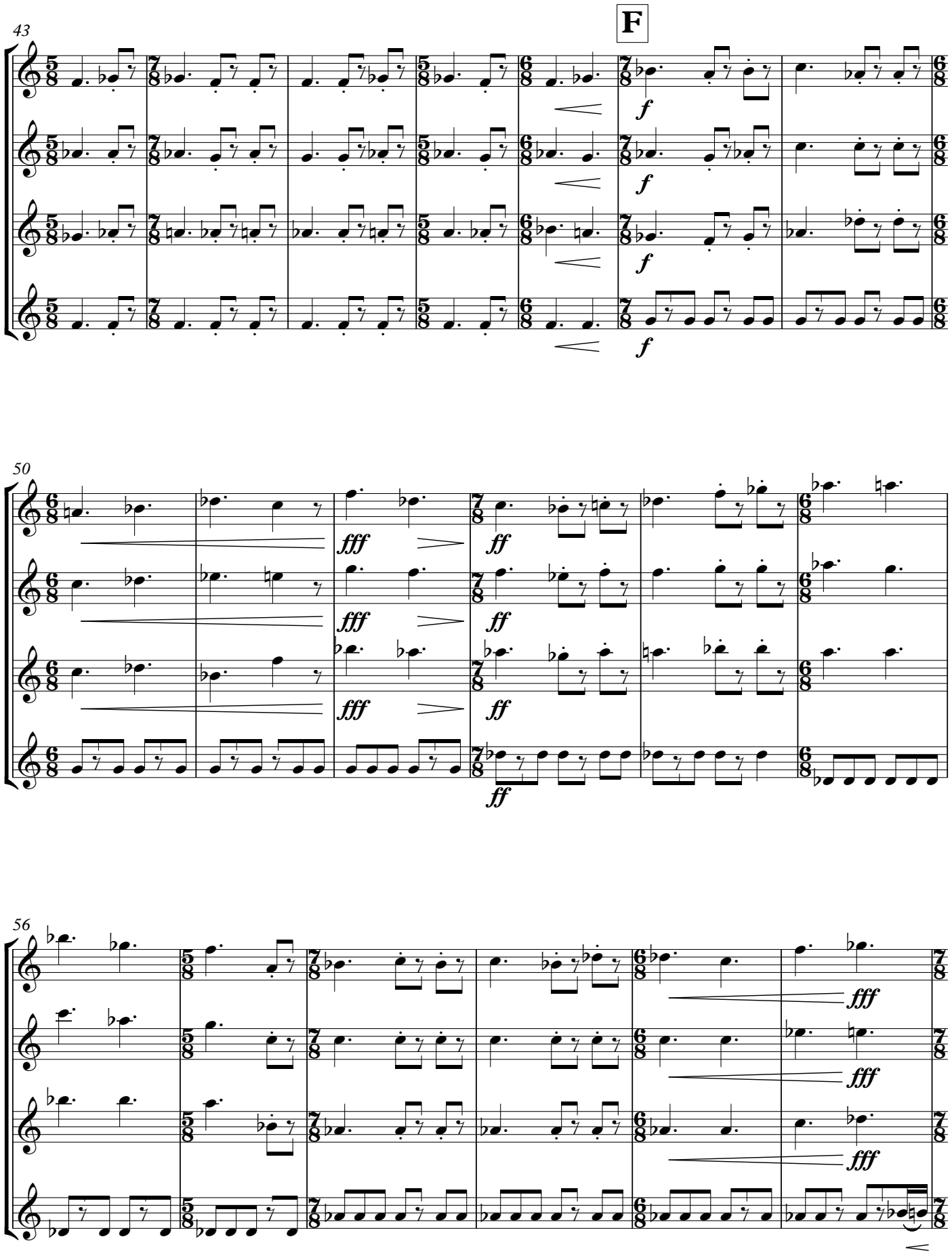



13
17
C
22
D


26
mf
f
ff


30
E
with drama
mf
p
pp


36
mf


F
43
f
50
fff
ff
56
fff

return to the dance,
with feverish intensity

G

62

mp

mp

f

mf

H

(countermelody)

67

fp≤*ff*

fp≤*ff*

mf legato, con brio

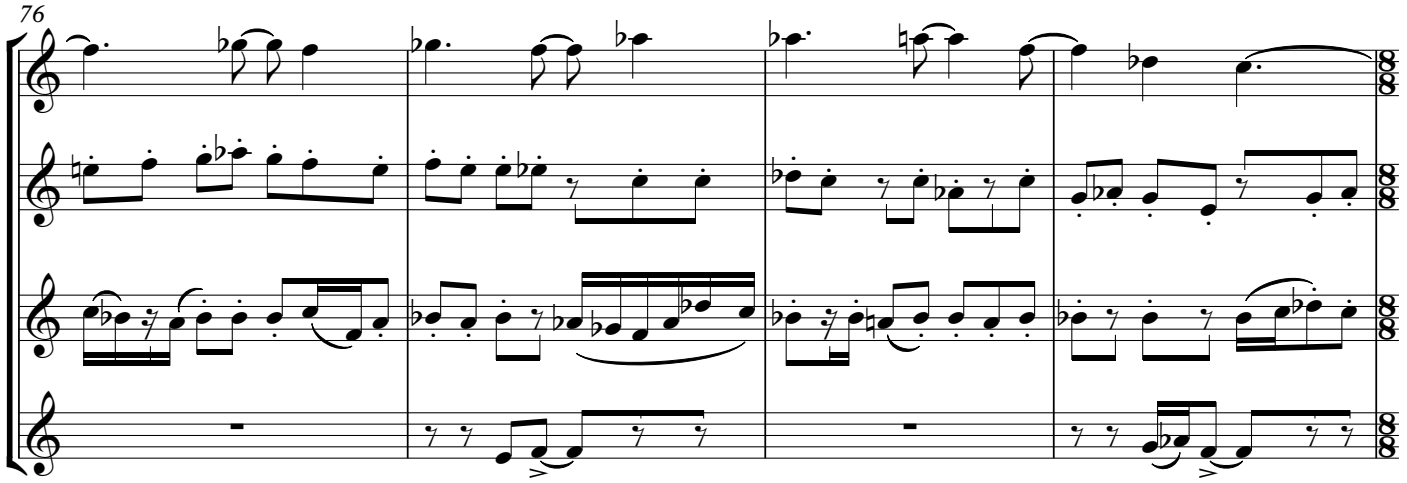
mp

f

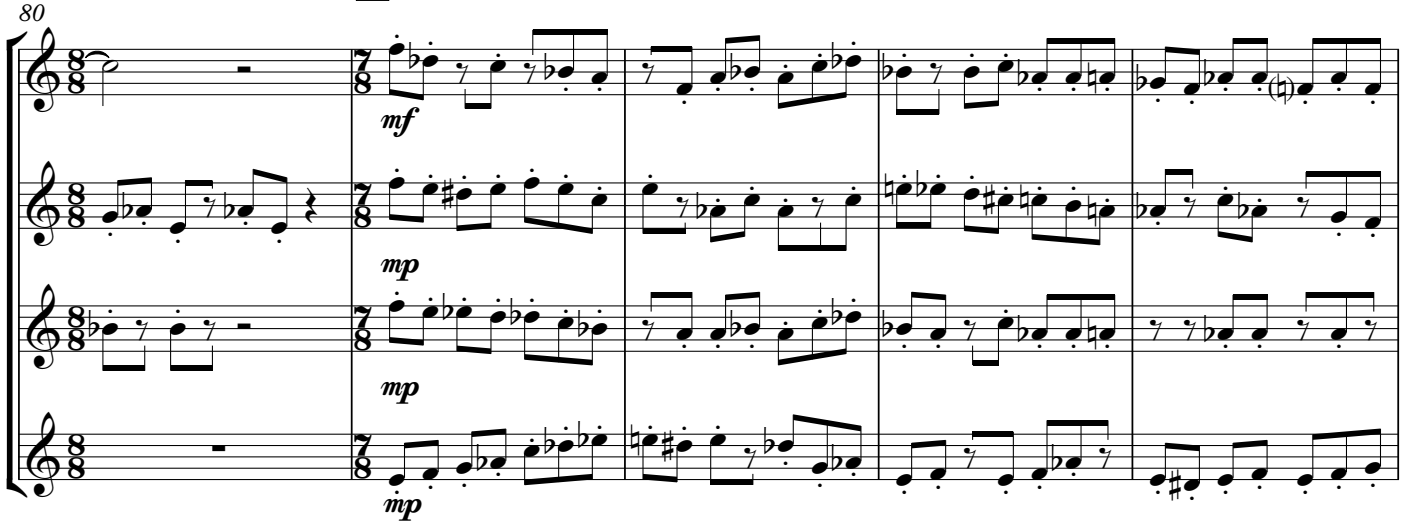
f

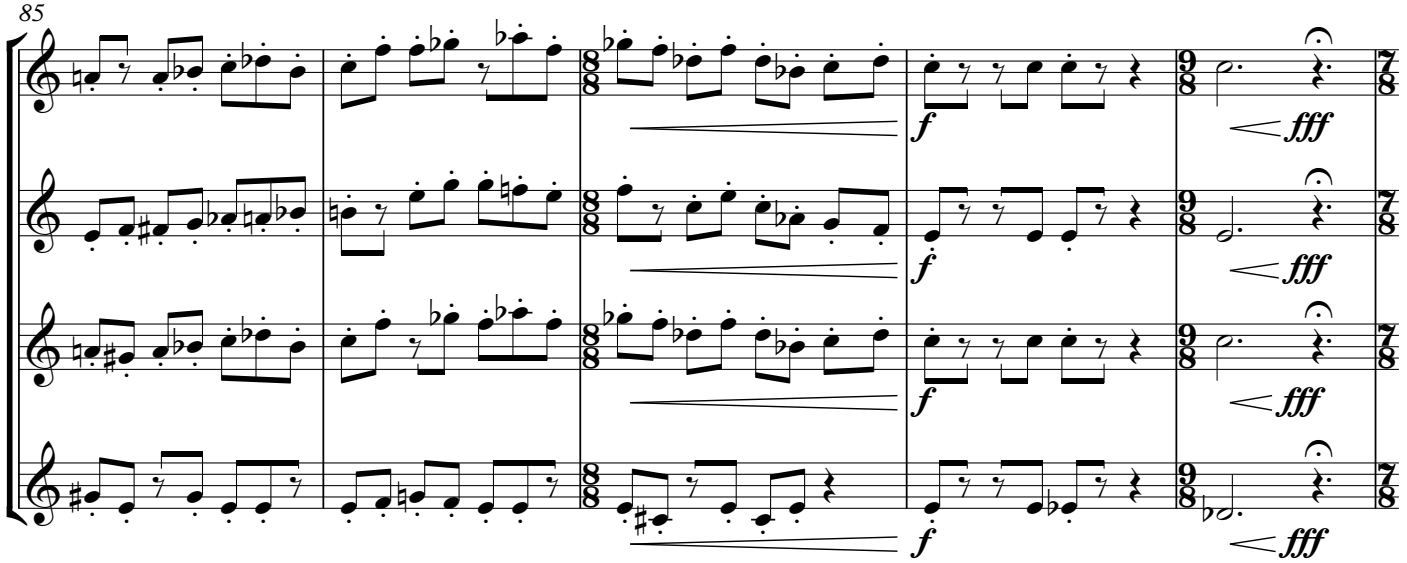
fp≤*ff*

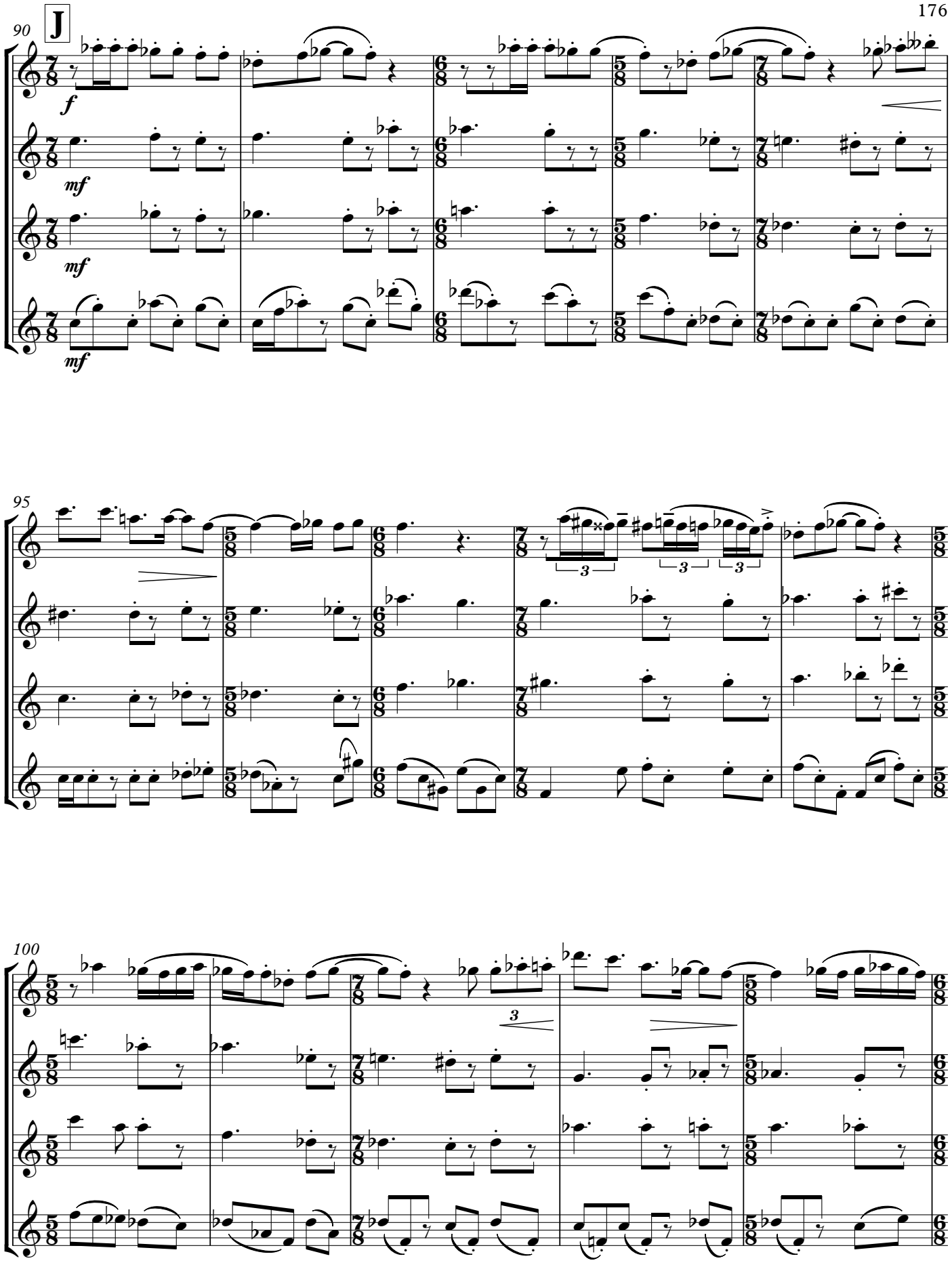
72

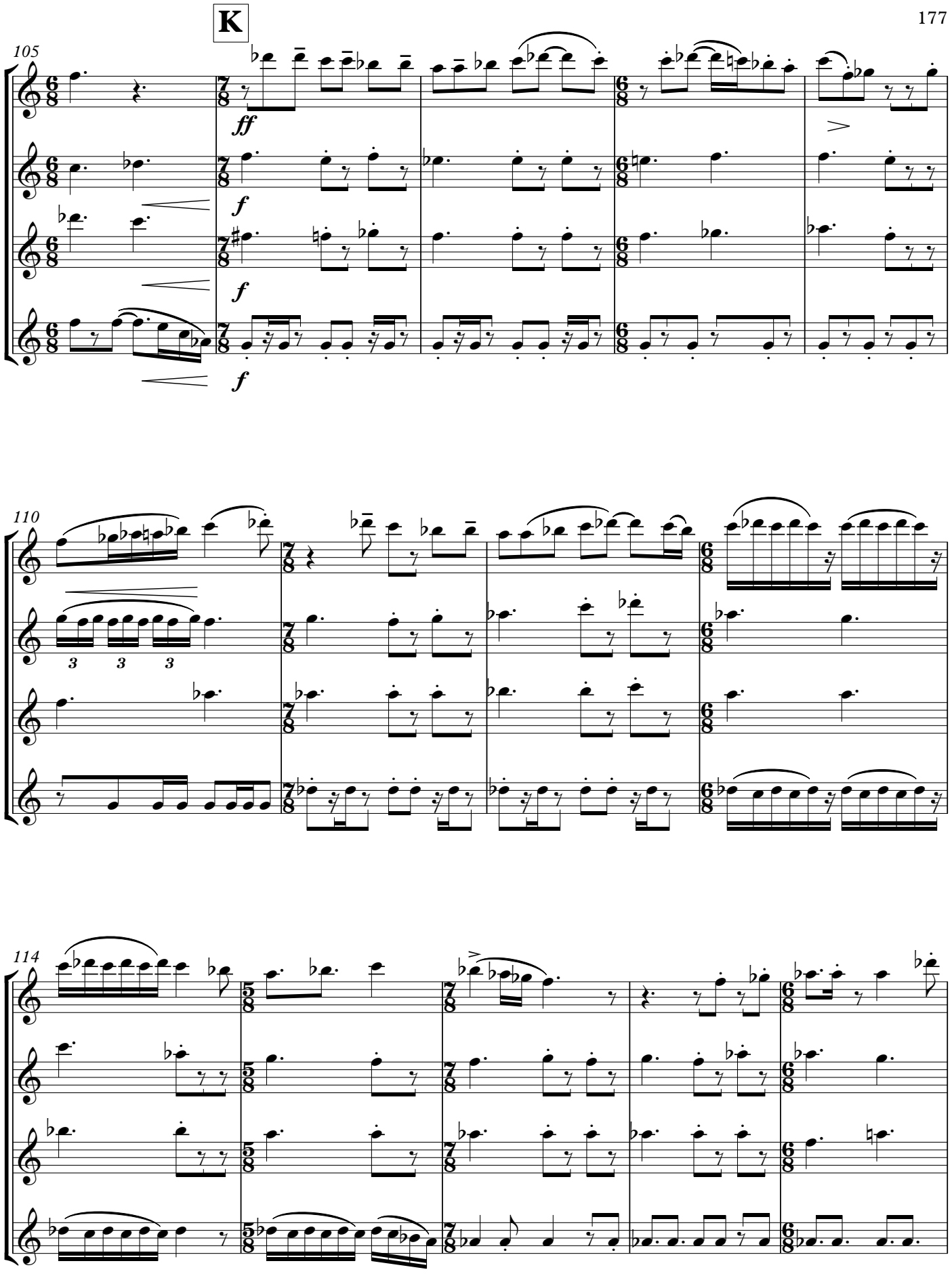


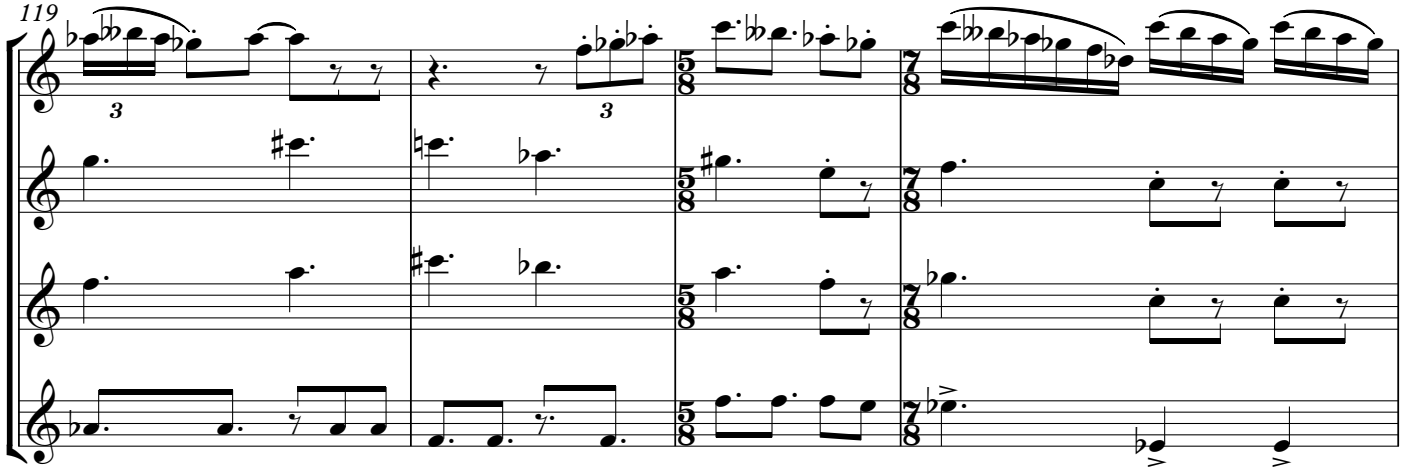
I **like a drumming to restore calm**

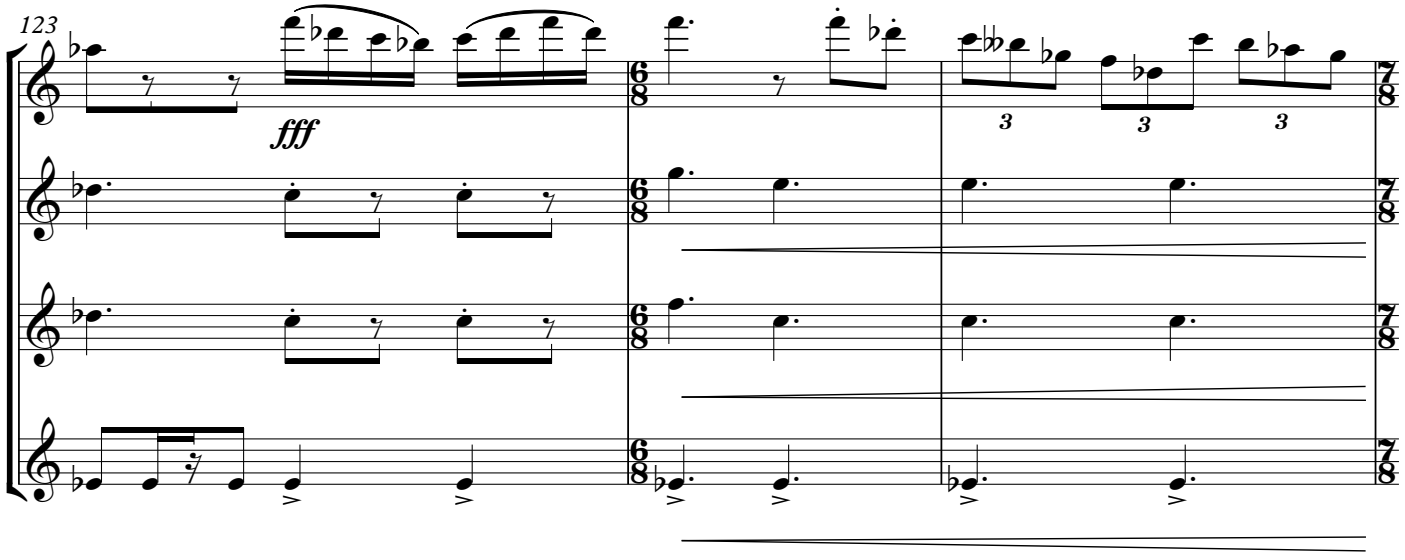




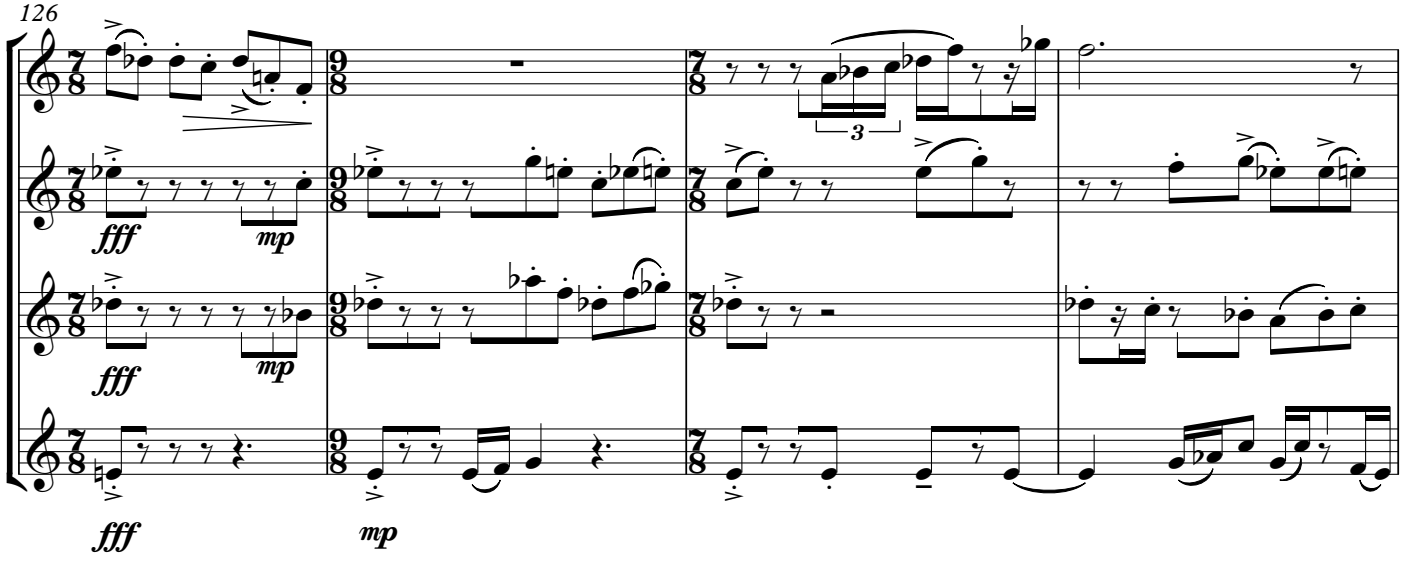

90
J
f
mf
mf
mf
95
3
3
3
100
3

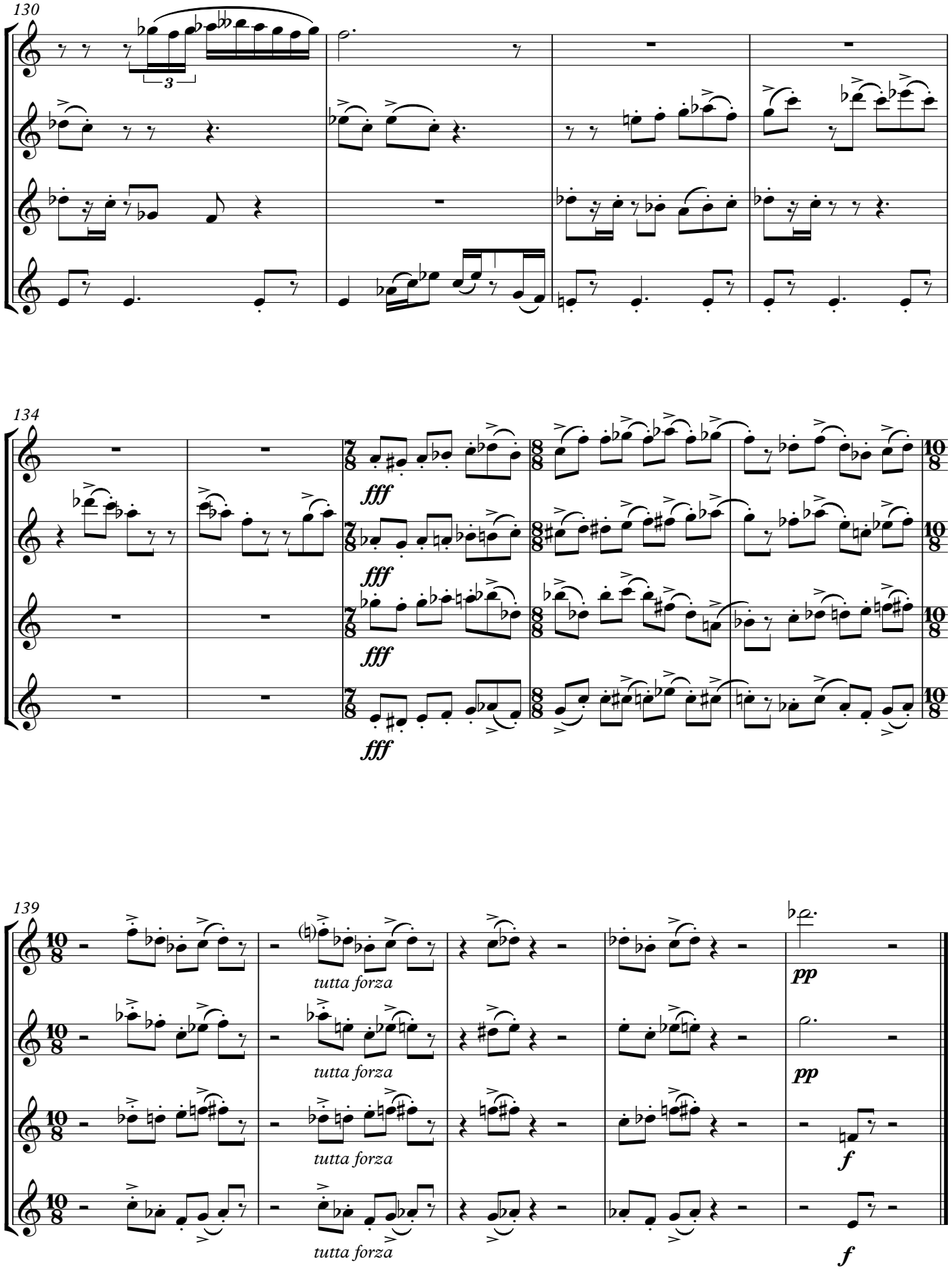

K
105
ff
f
f
f
110
3
3
3
114





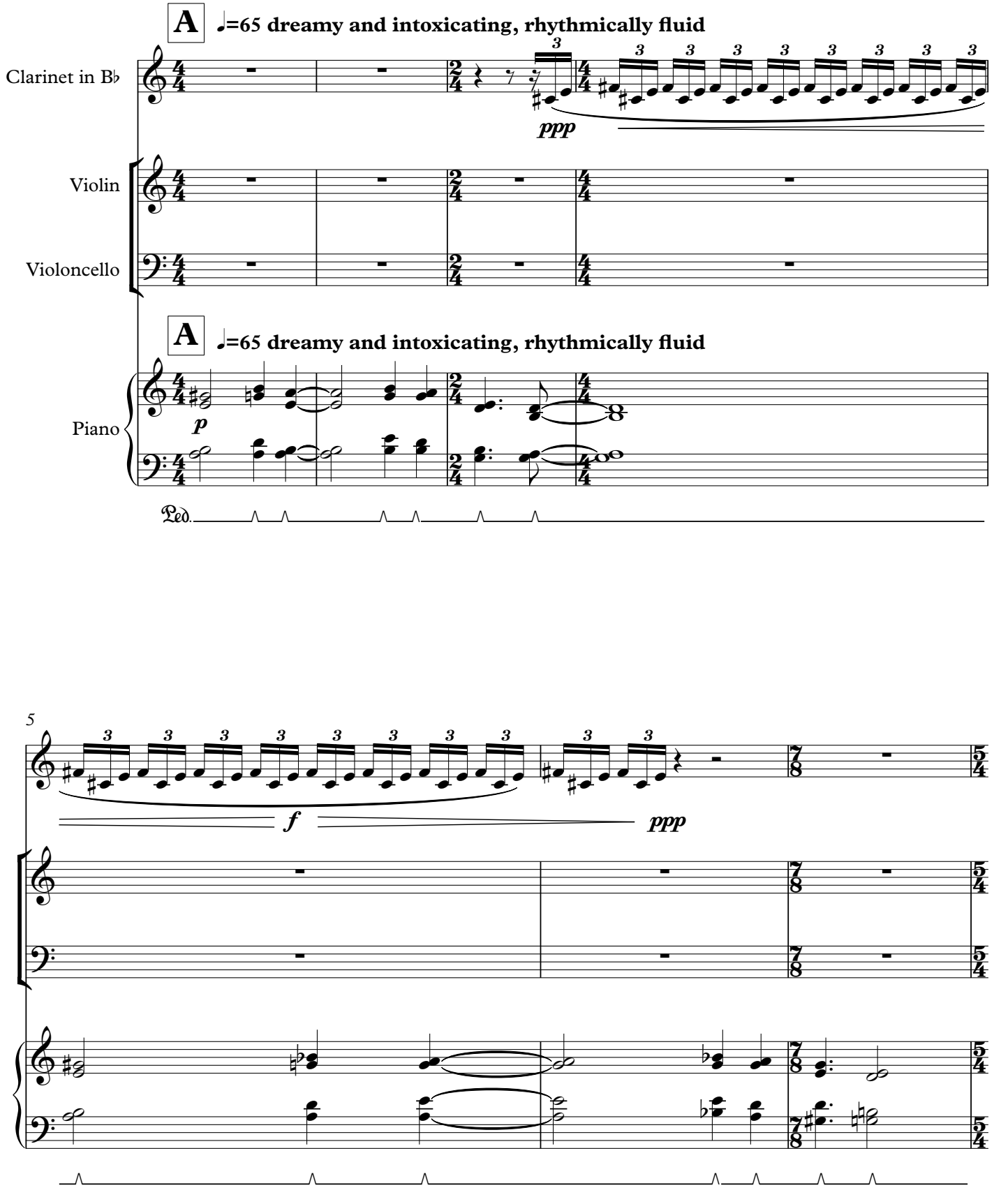
L

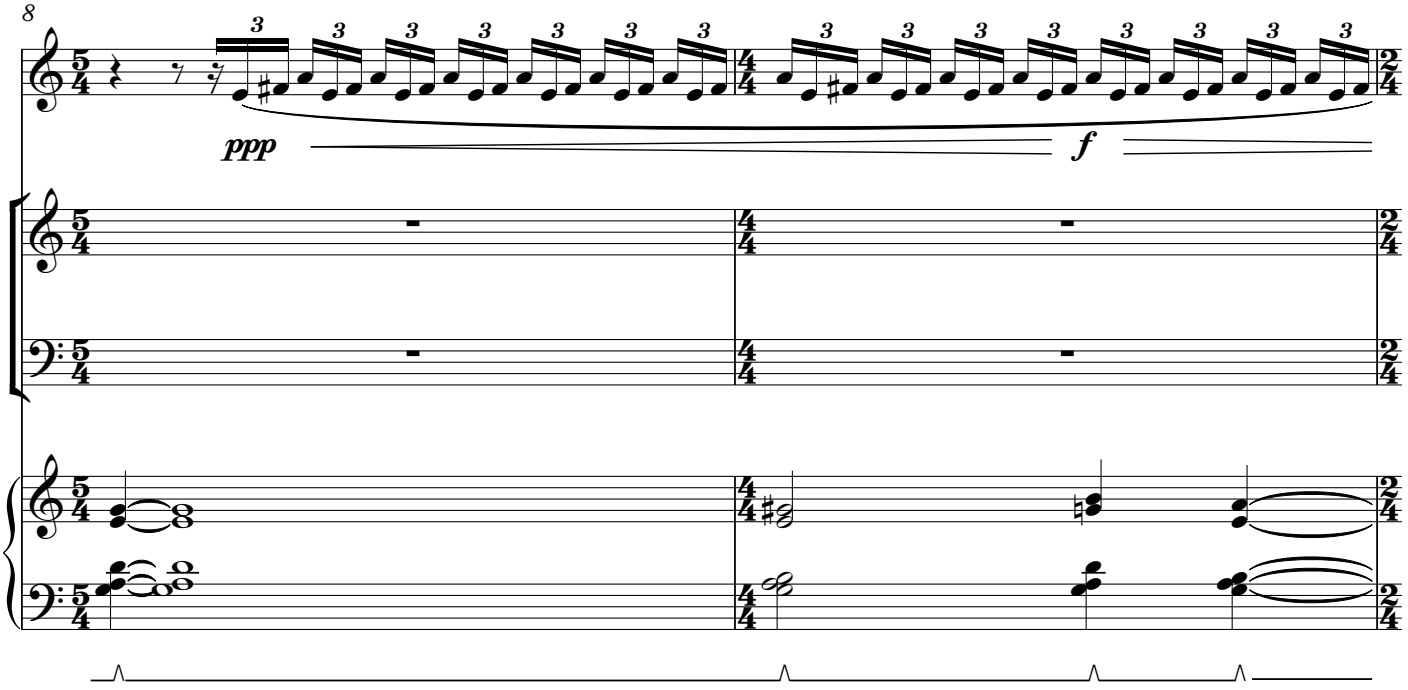


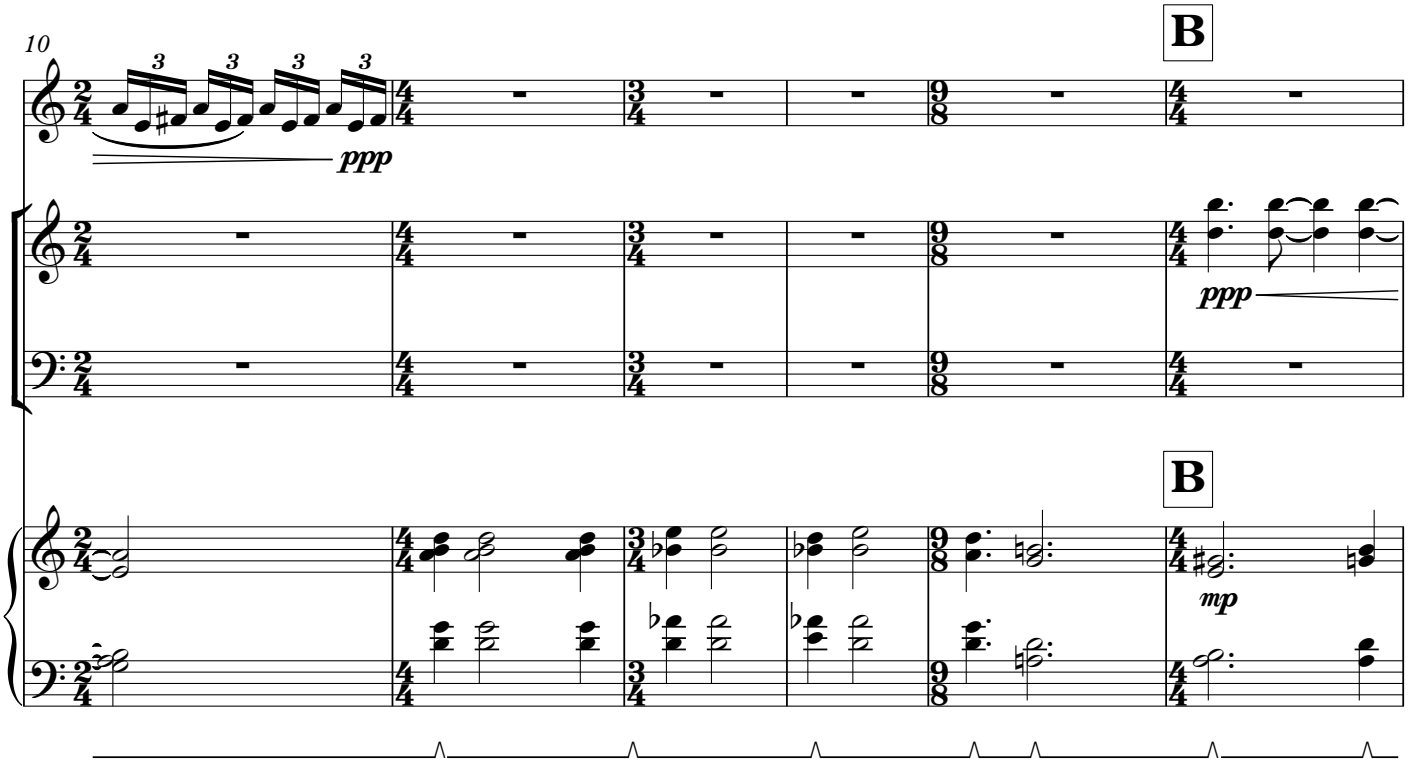

130
3
134
fff
fff
fff
fff
139
tutta forza
tutta forza
tutta forza
tutta forza
pp
pp
f
f

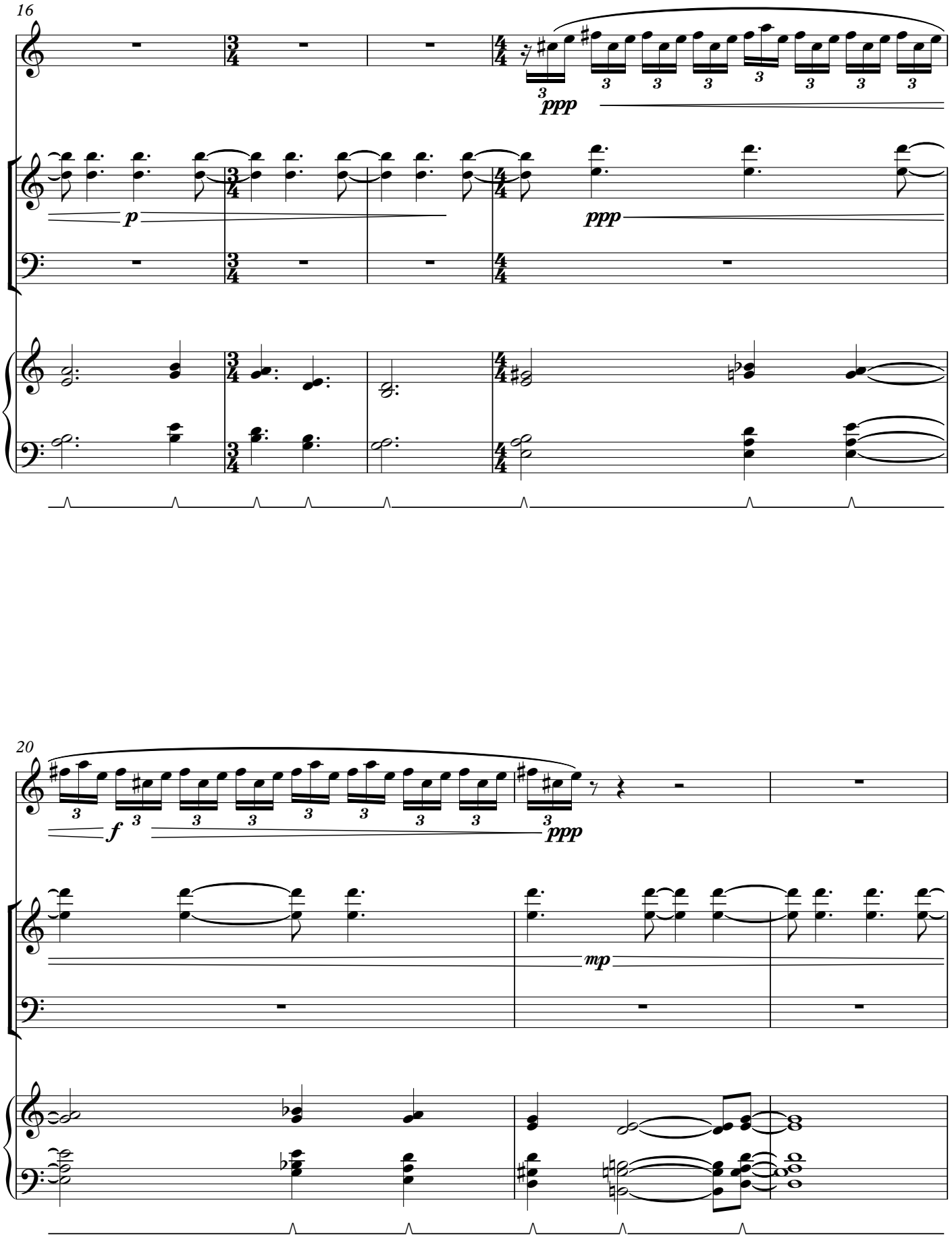
Hexagon III: Penta-Plus

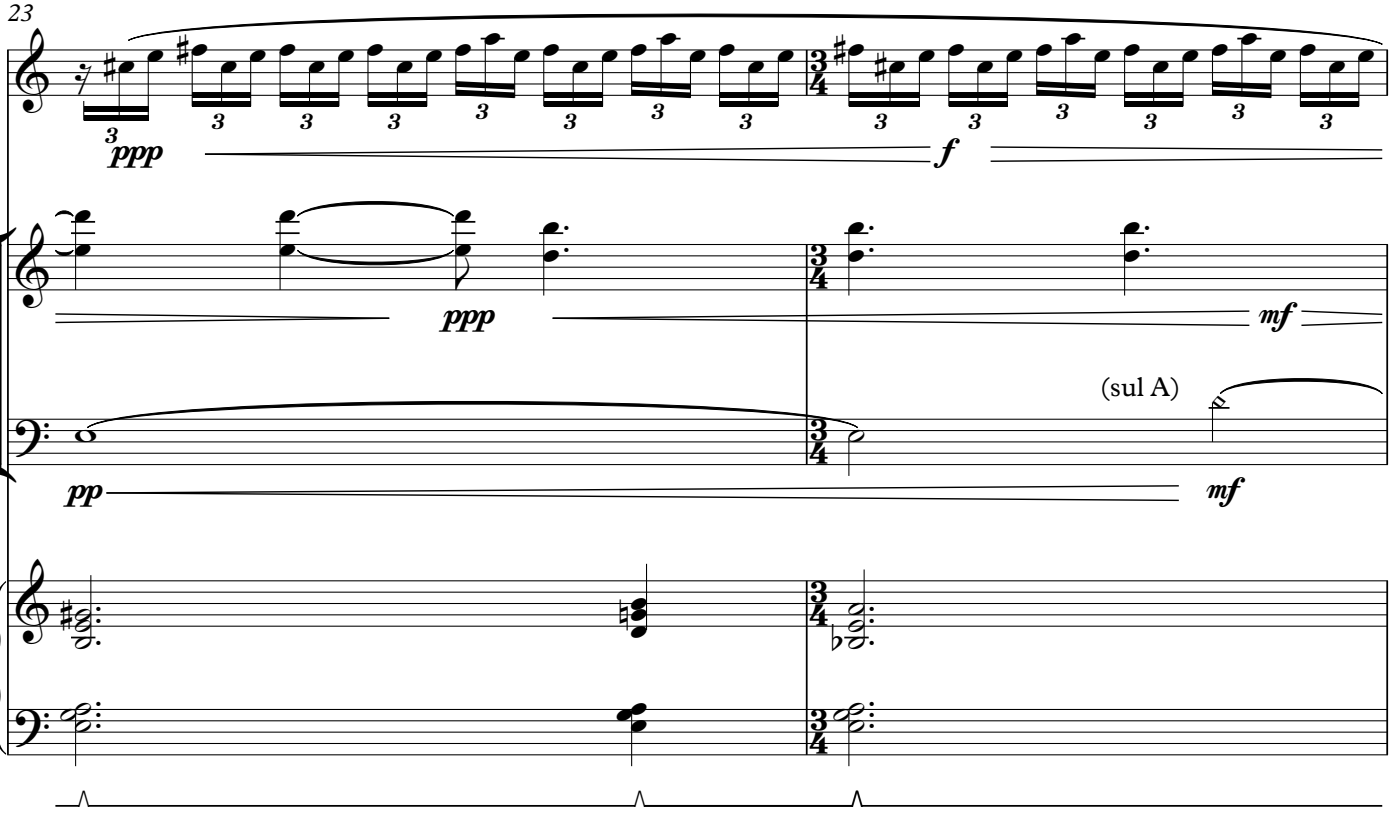
k. Scott Eggert

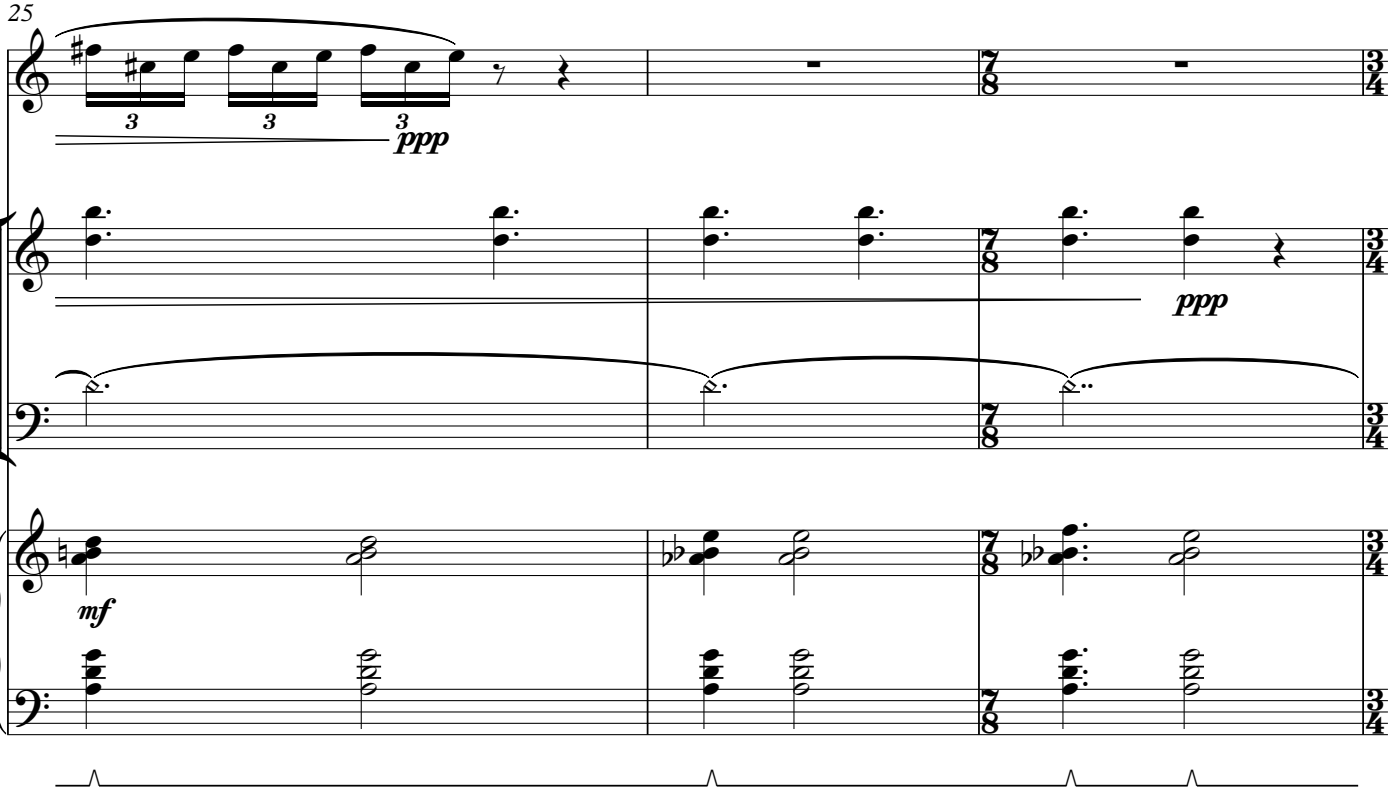


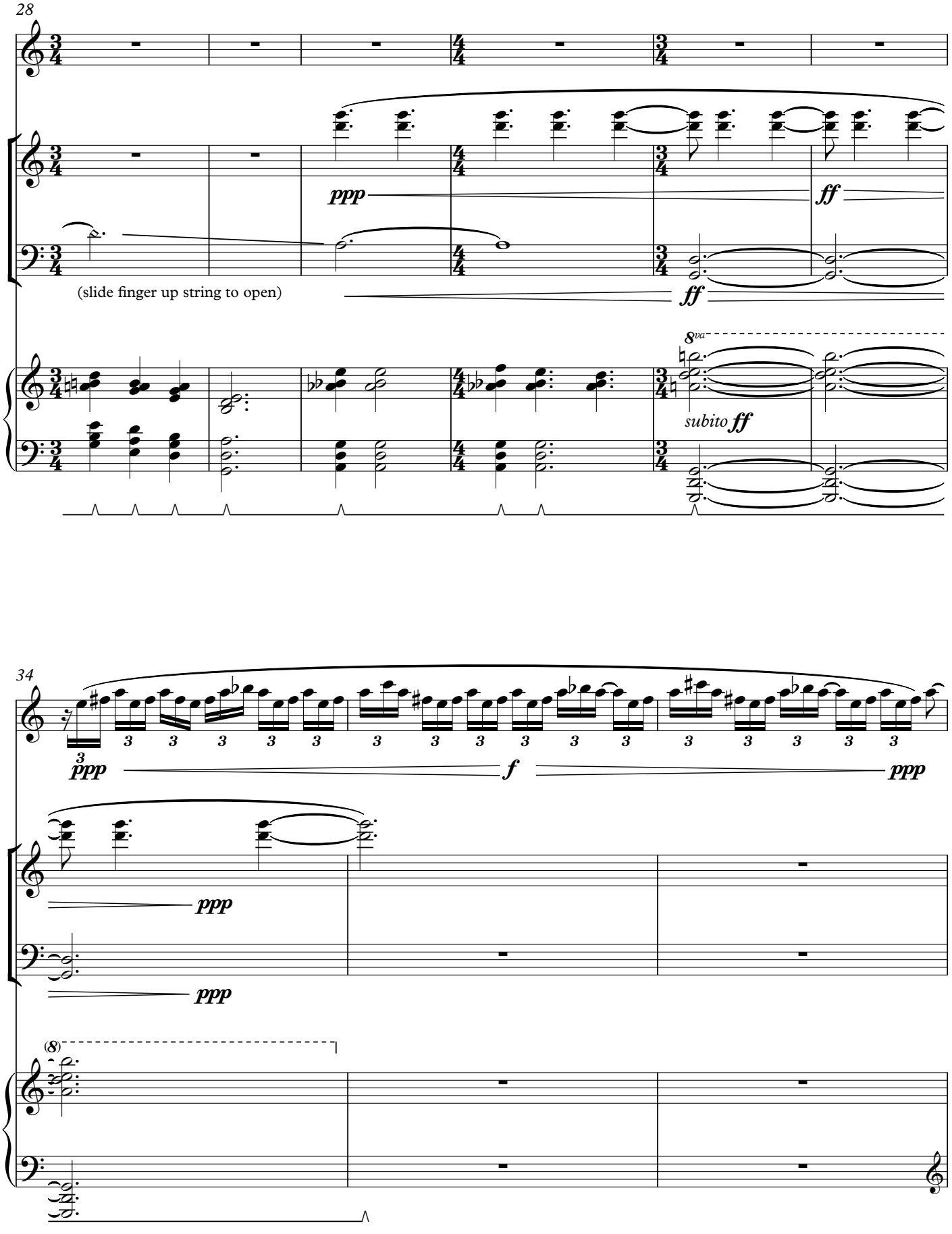

8
ppp
f

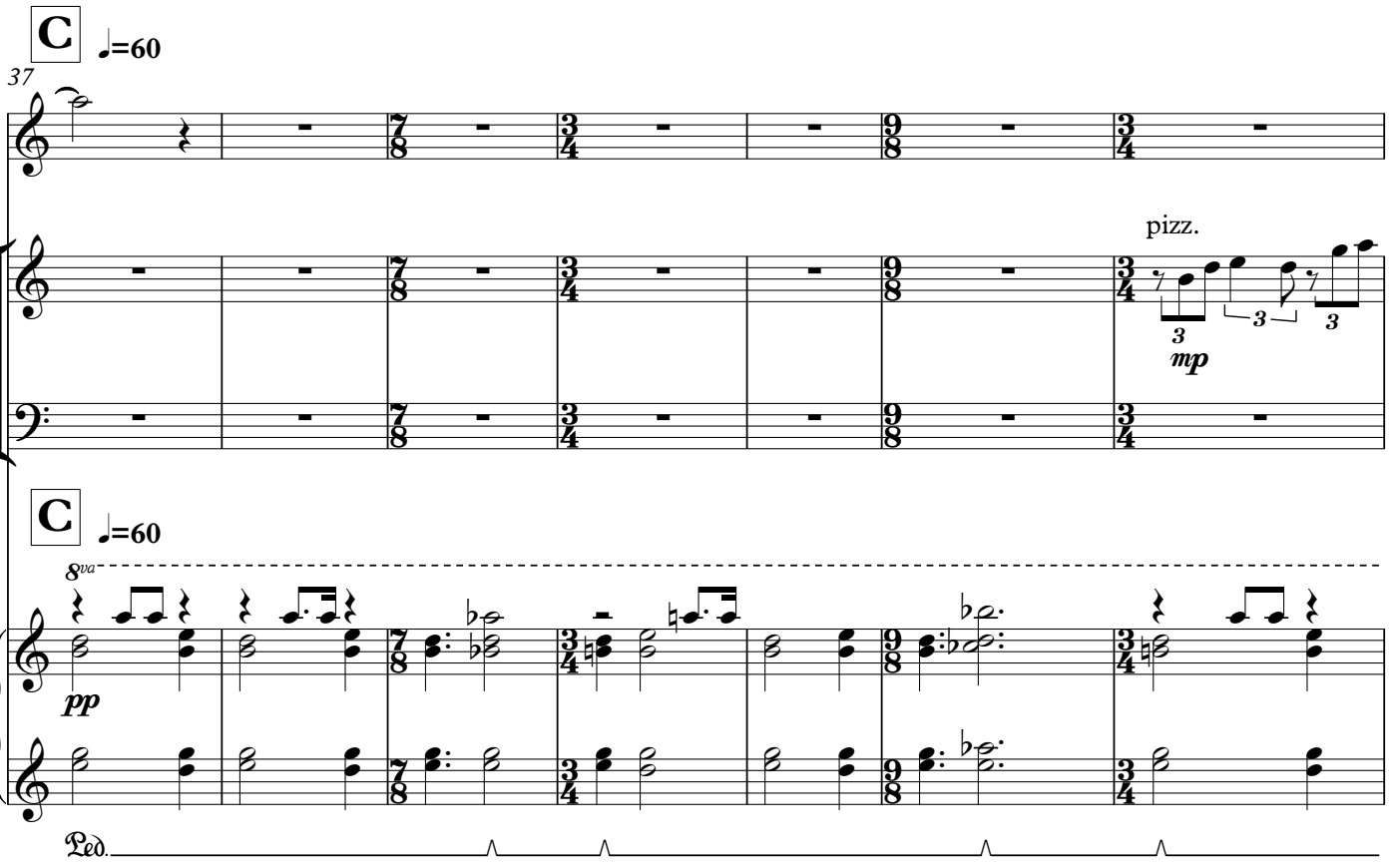

10
B
ppp
B
ppp
mp

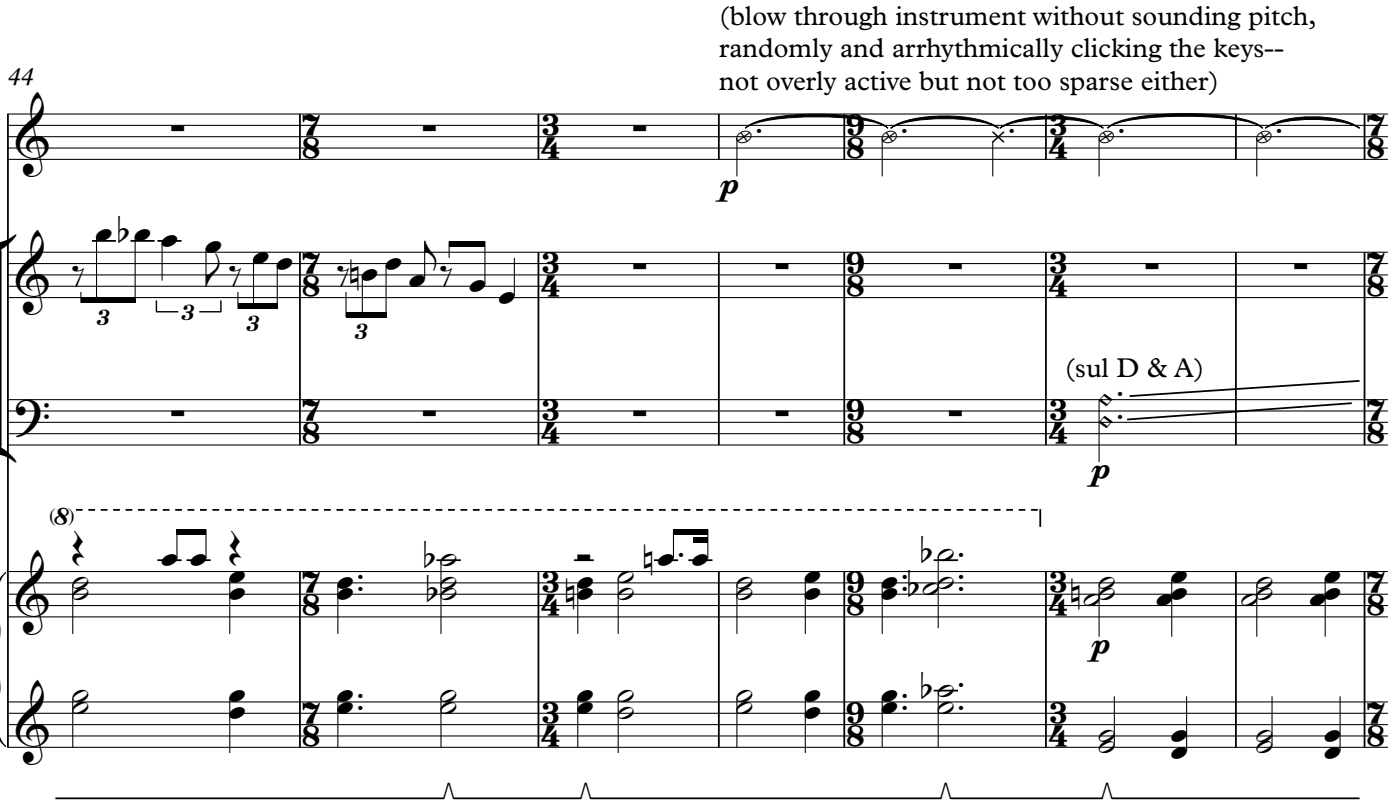

16
ppp
p
ppp
20
f
ppp
mp

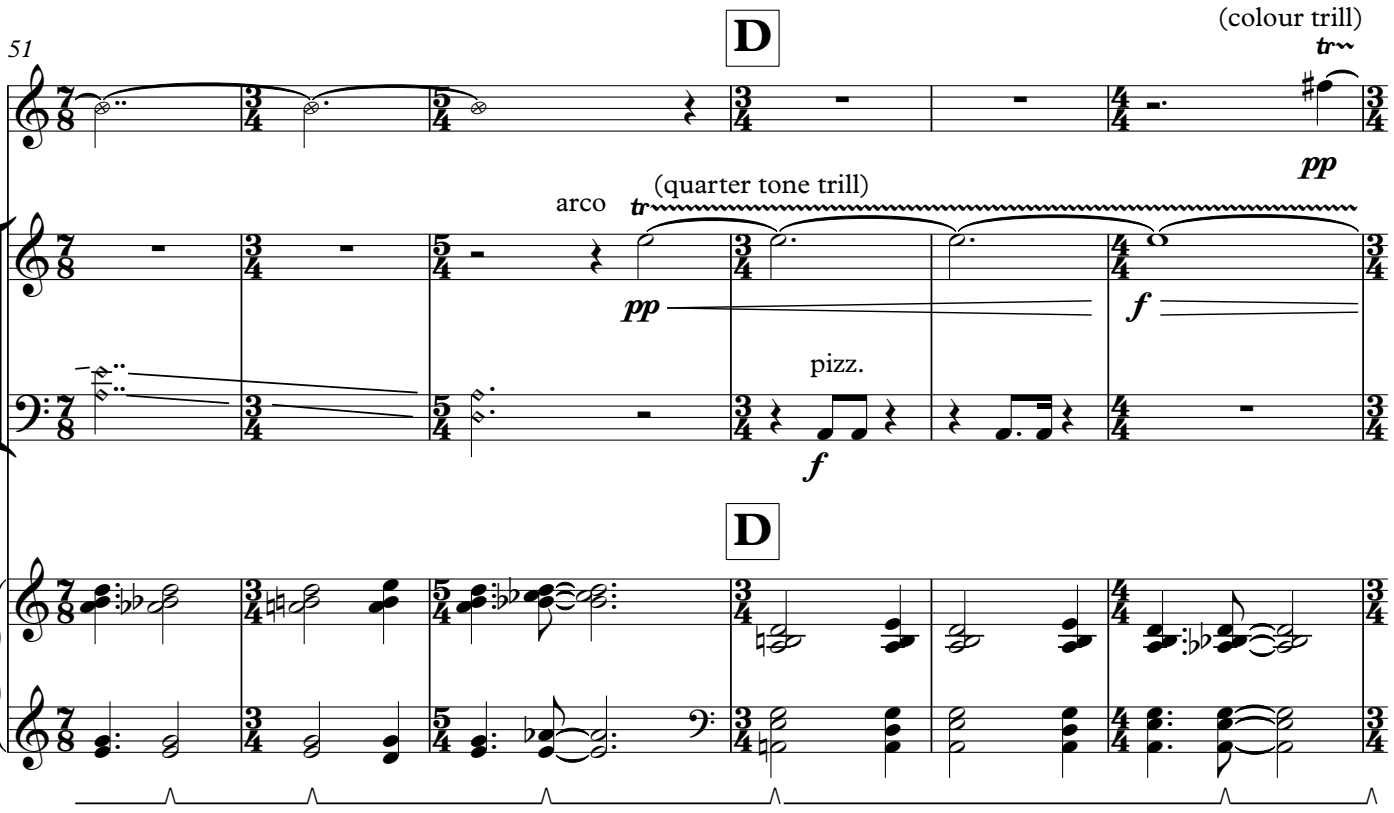

23
ppp
f
ppp
mf
(sul A)
pp
mf

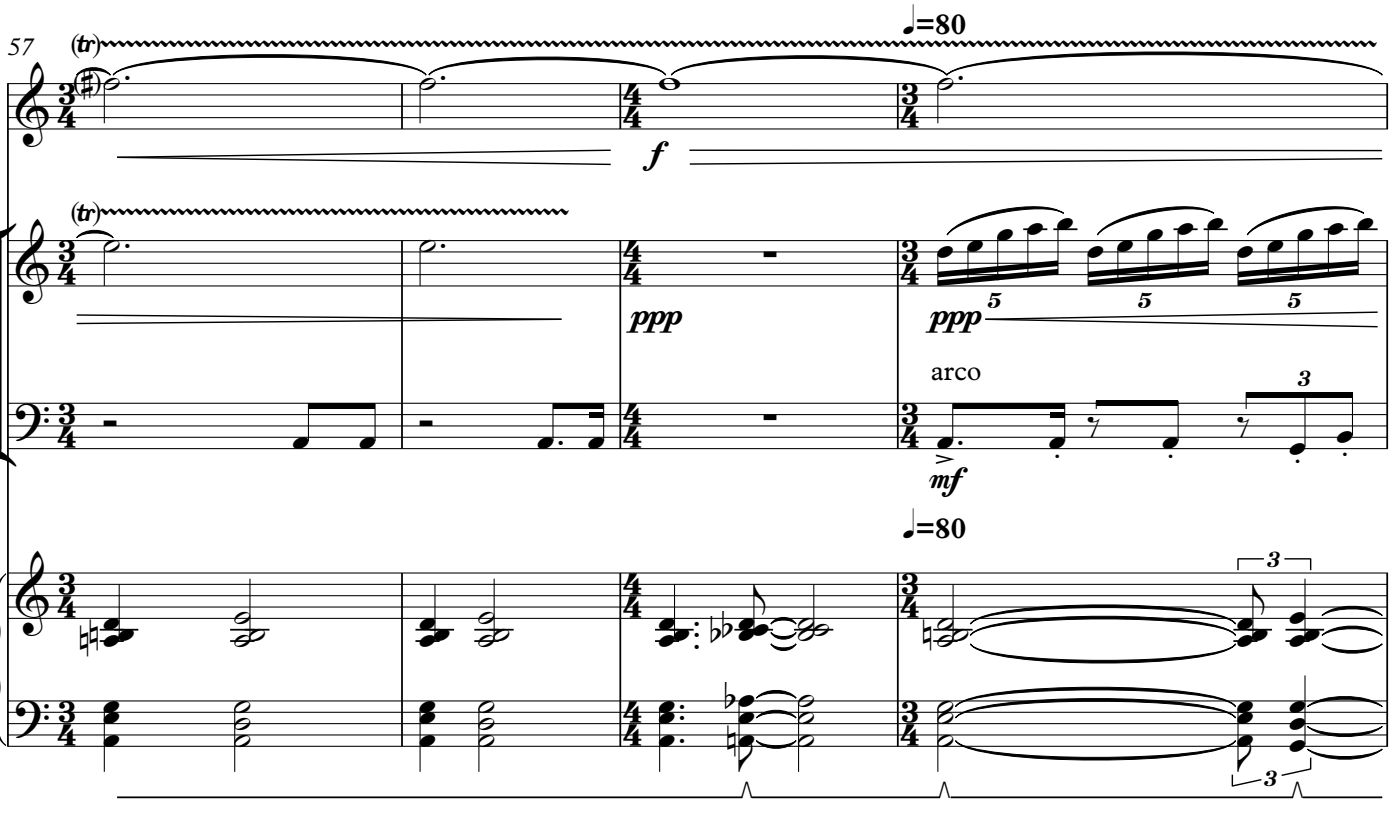

25
ppp
ppp
mf

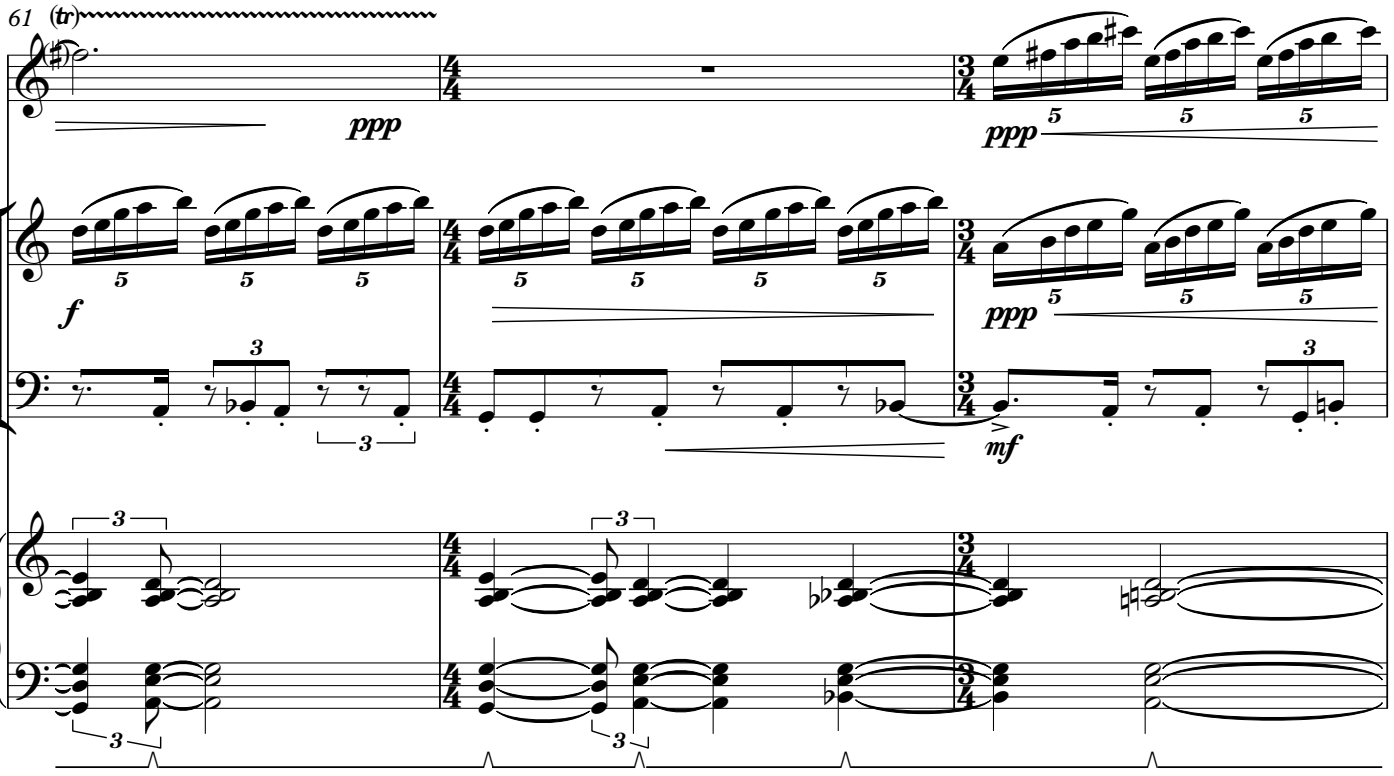

28
ppp
ff
(slide finger up string to open)
ff
8va
subito ff
34
ppp
f
ppp
ppp
ppp
(8)

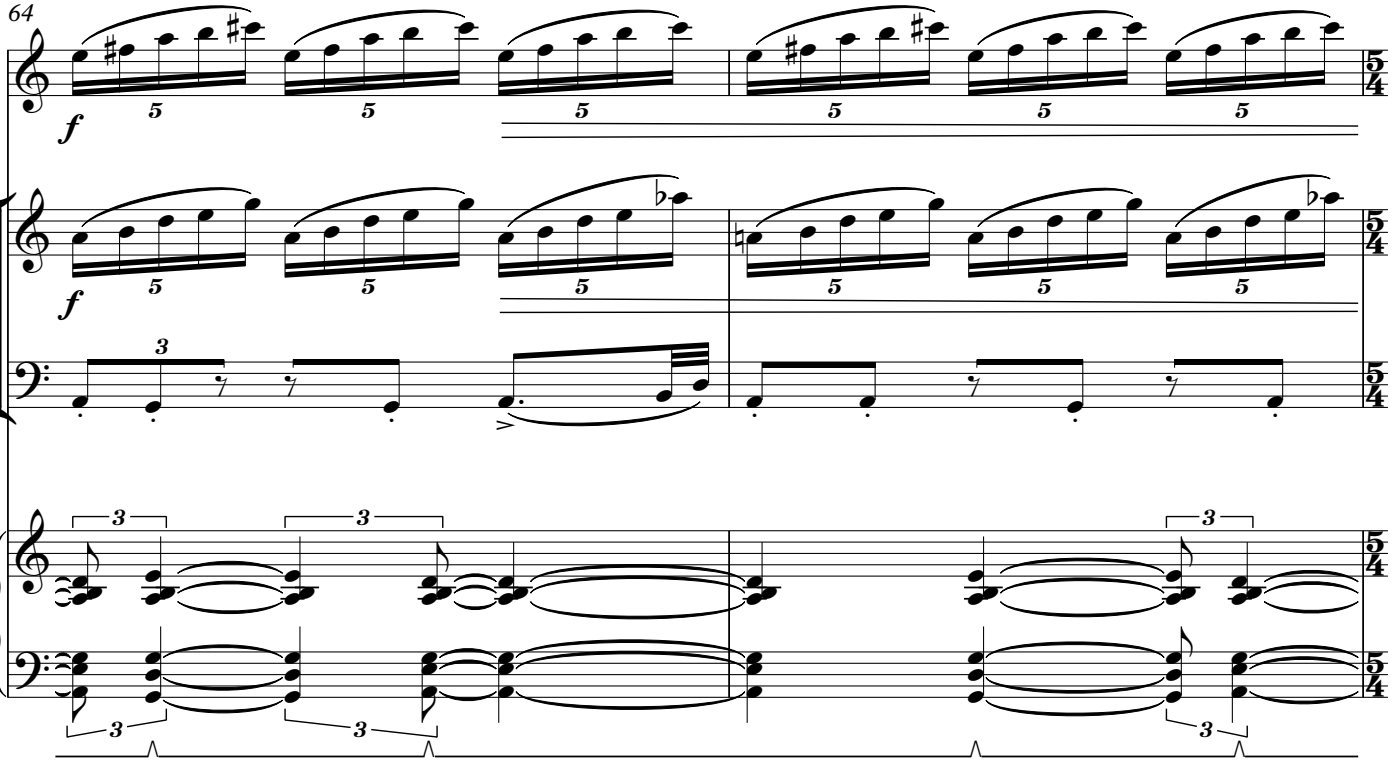

C
♩=60
37
pizz.
3
mp
C
♩=60
8va
pp
Ped.

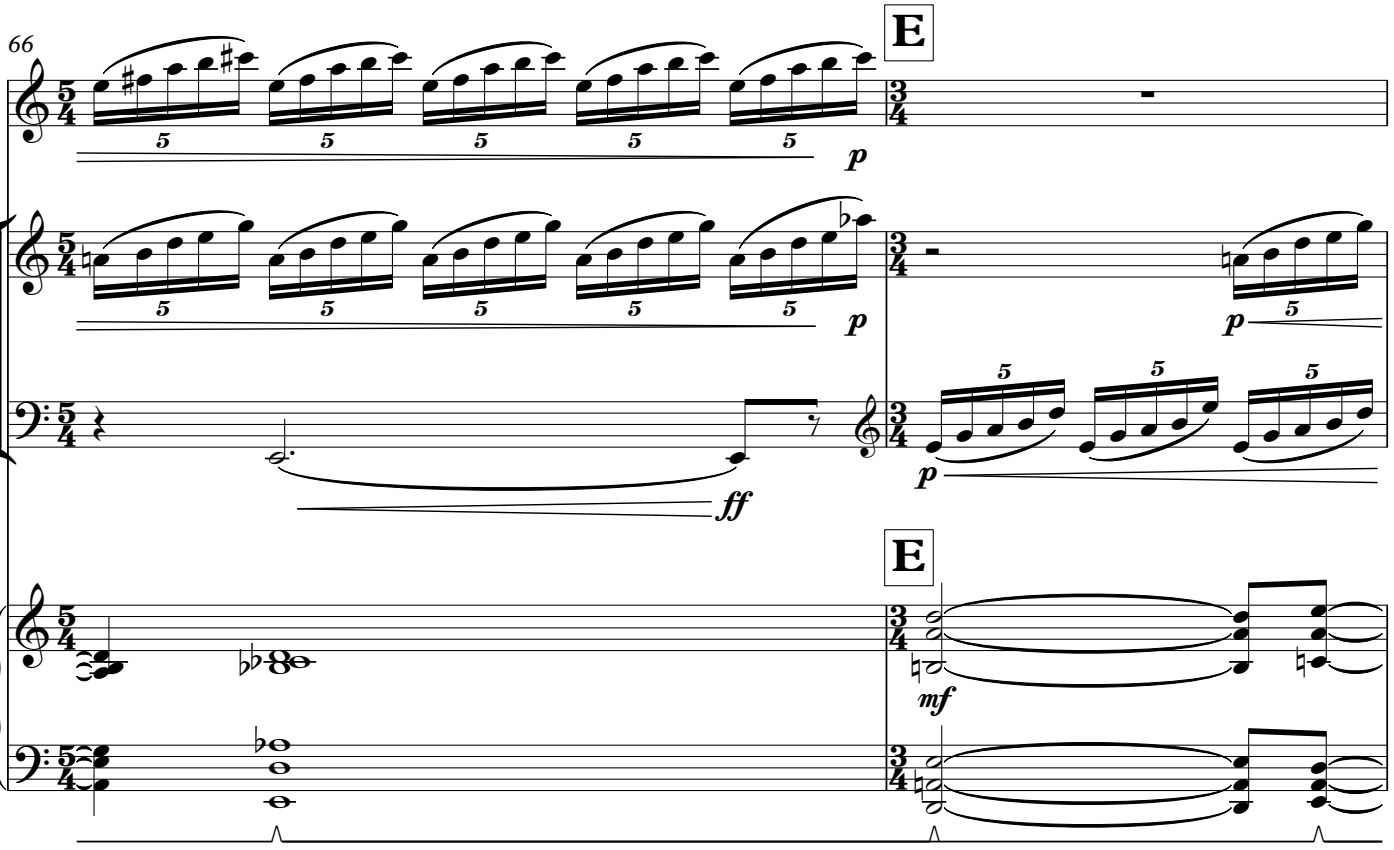

(blow through instrument without sounding pitch,
randomly and arrhythmically clicking the keys--
not overly active but not too sparse either)
44
p
(sul D & A)
p
(8)
p

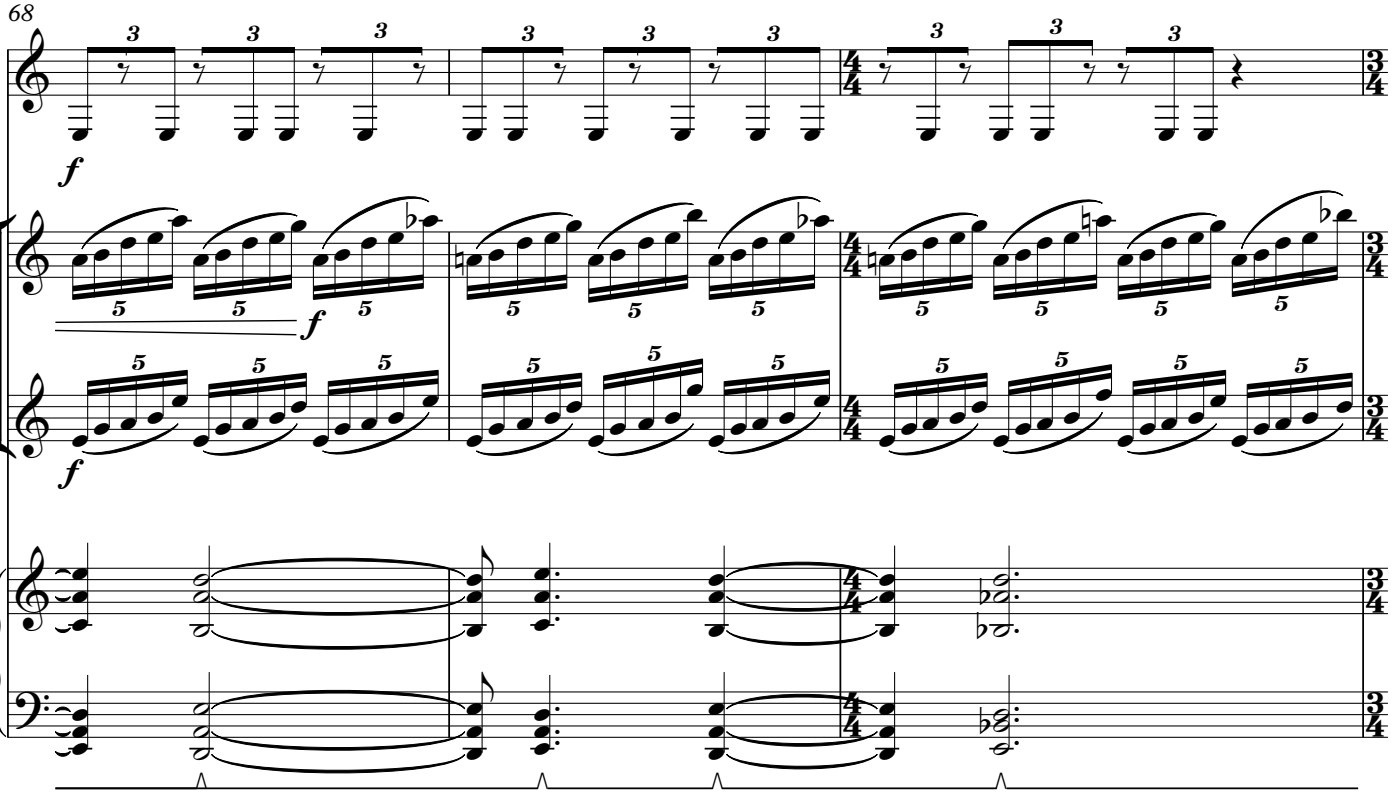

51
D
(colour trill)
tr
pp
arco
(quarter tone trill)
tr
pp
f
pizz.
f
D

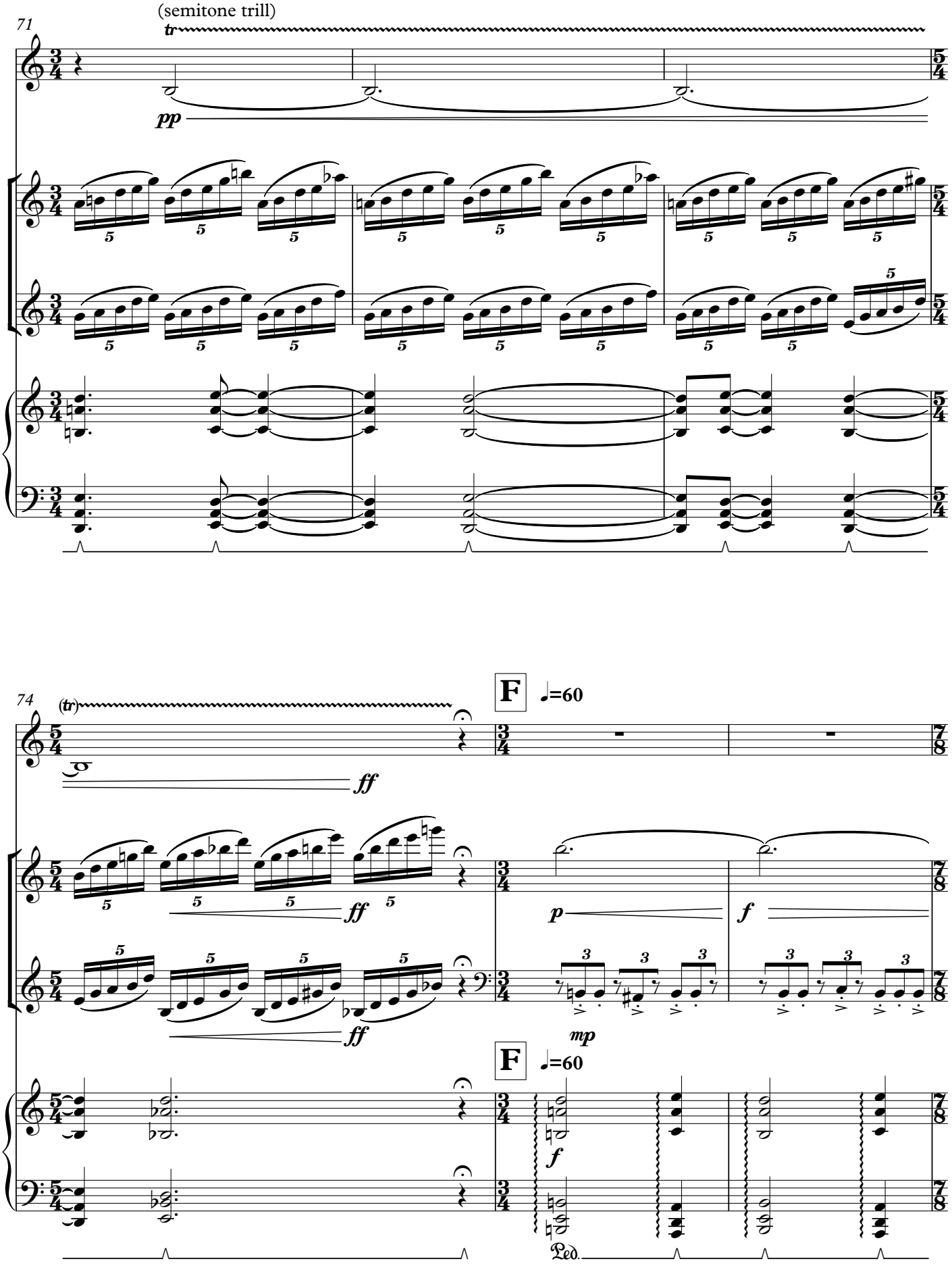

57
(tr)
♩=80
f
(tr)
ppp
ppp
5
5
5
arco
3
mf
♩=80
3
3

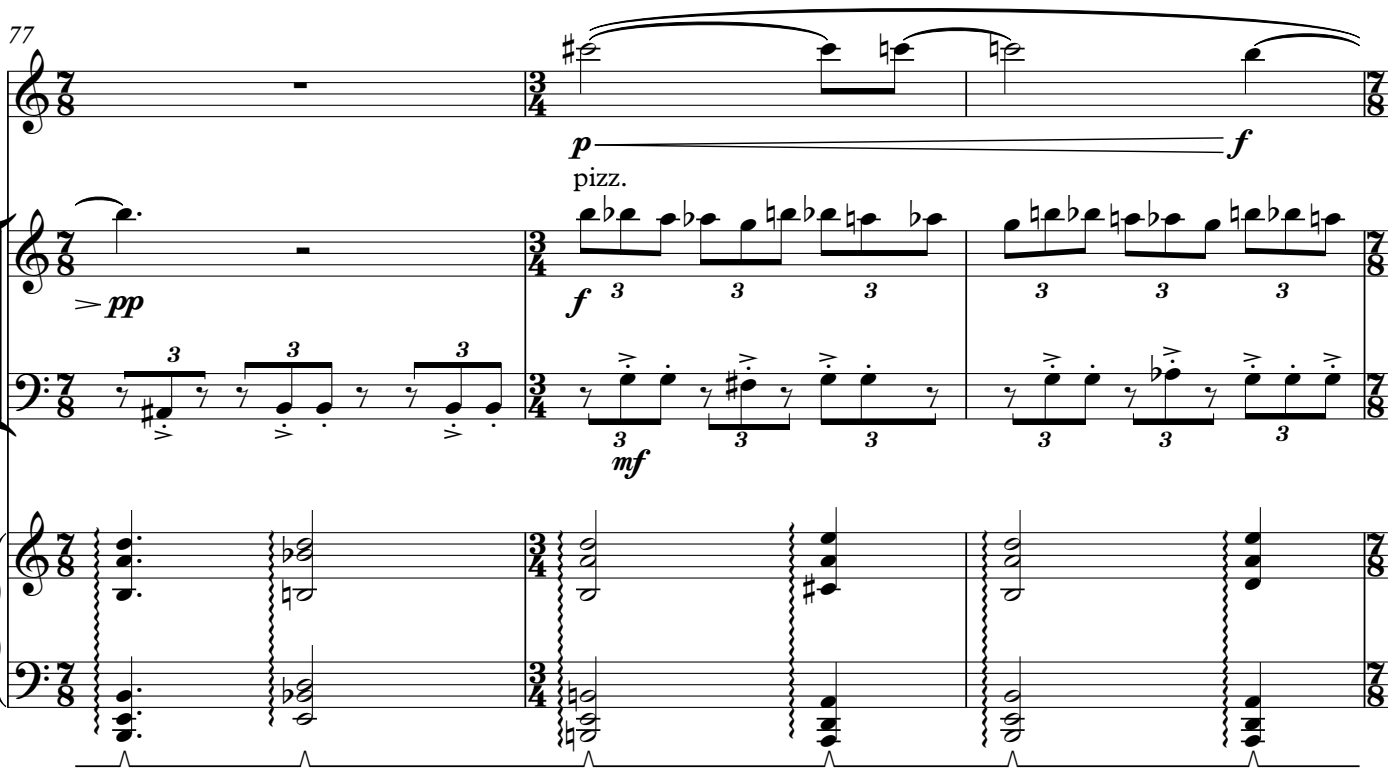

61
(tr)
ppp
ppp
f
ppp
mf

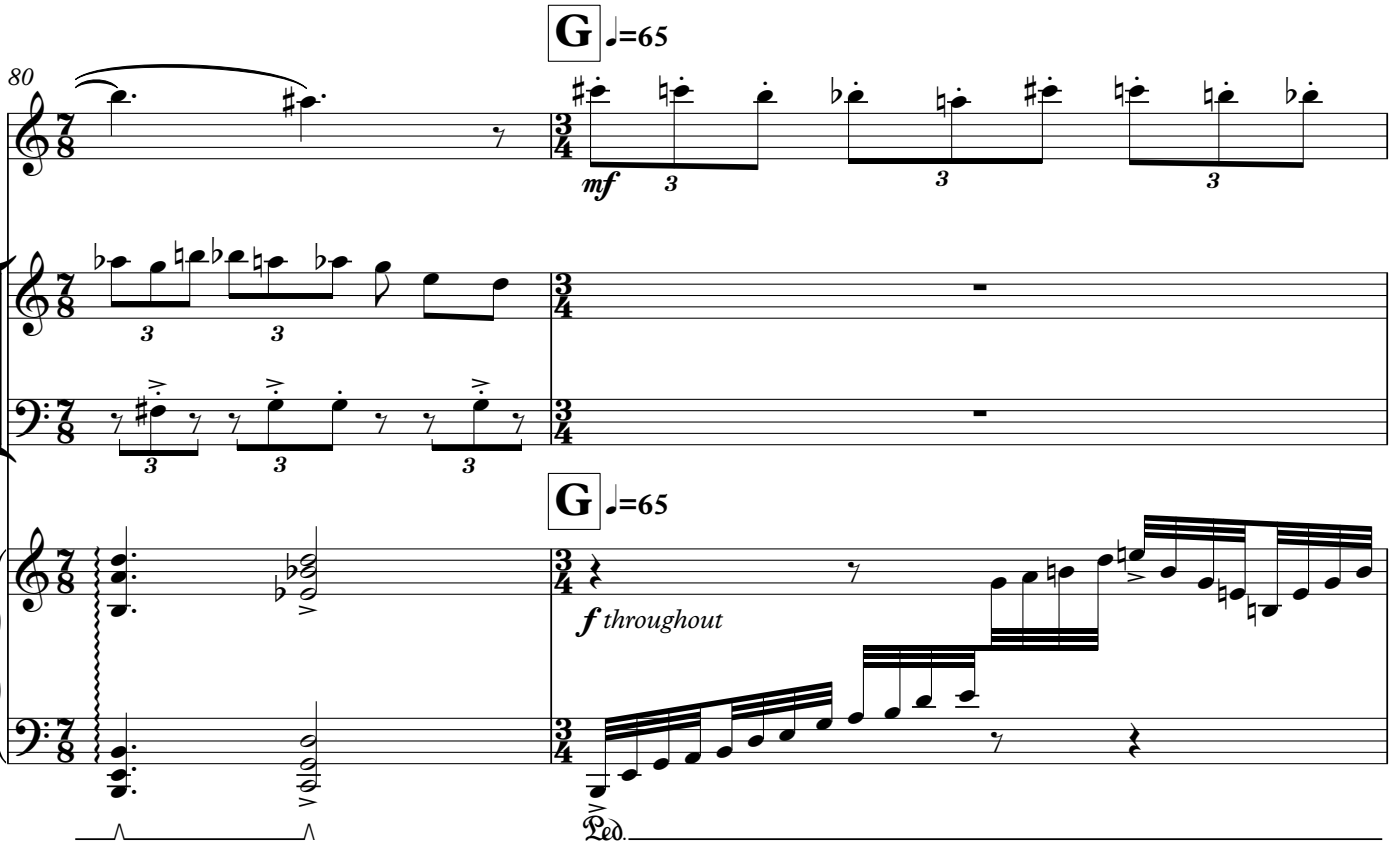

64
f
f

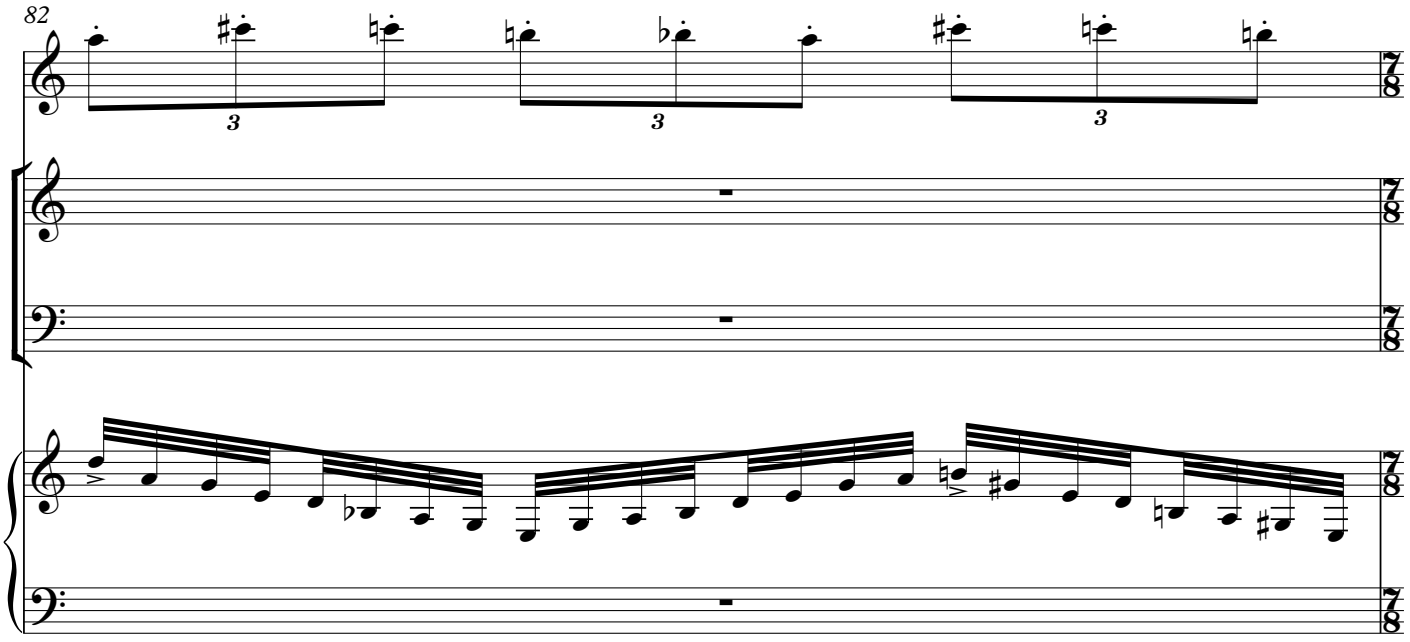

66
E
p
p
p
ff
E
mf

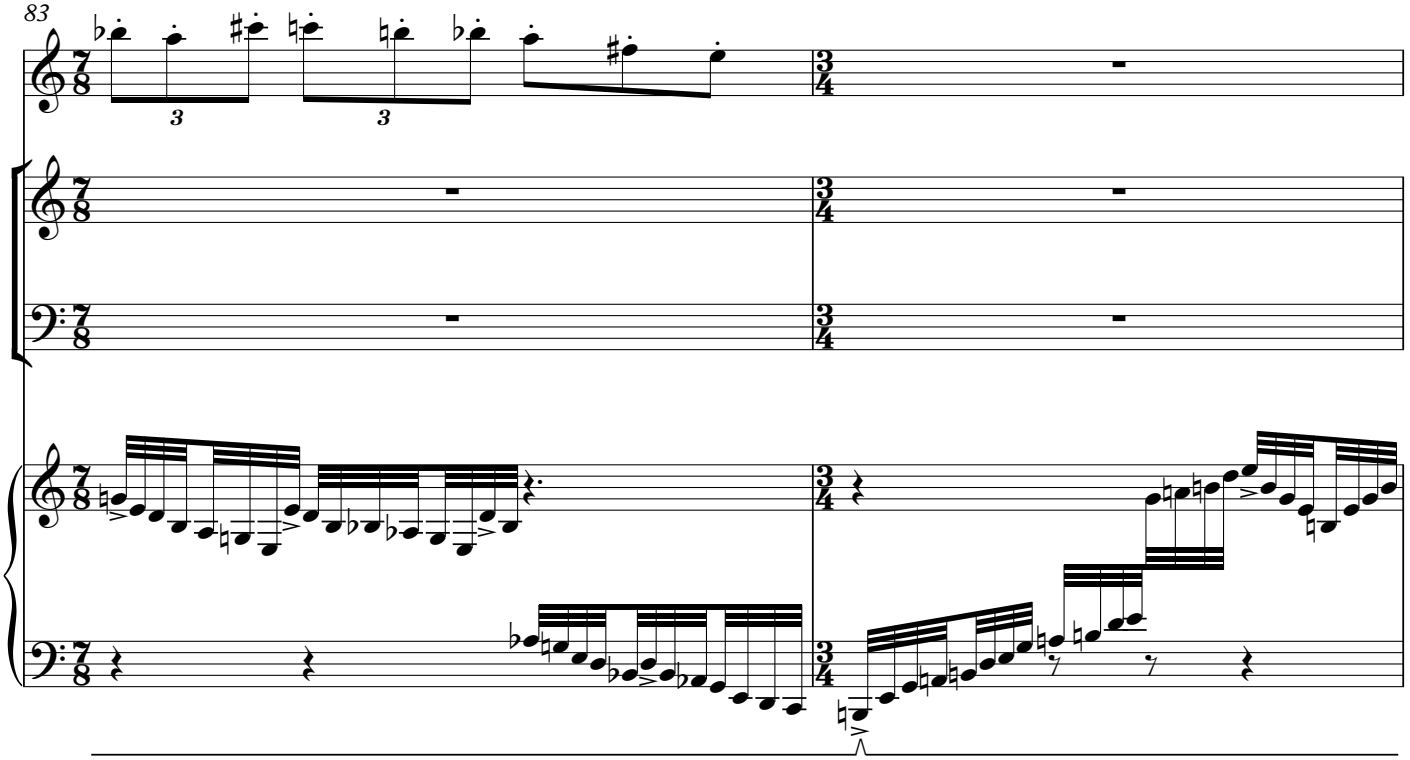

68
f
f
f

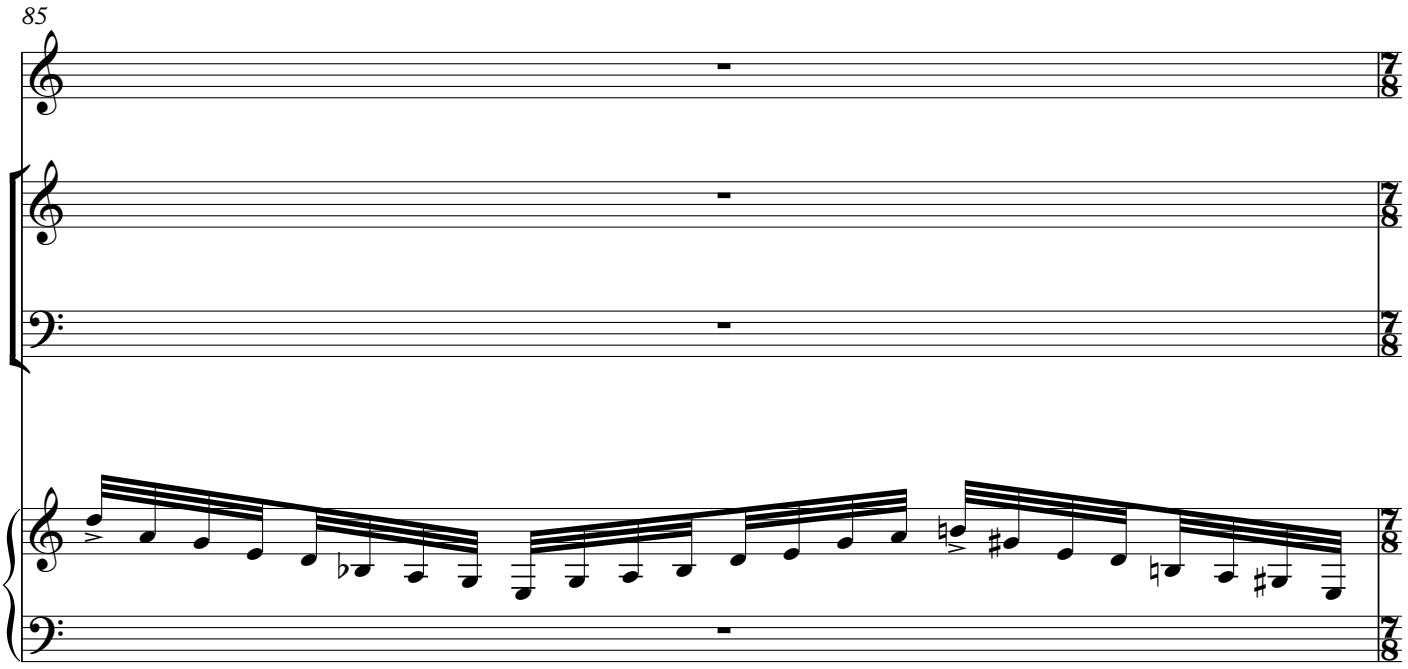

71
(semitone trill)
tr
pp
74
(tr)
ff
F
♩=60
p
f
mp
Ped.

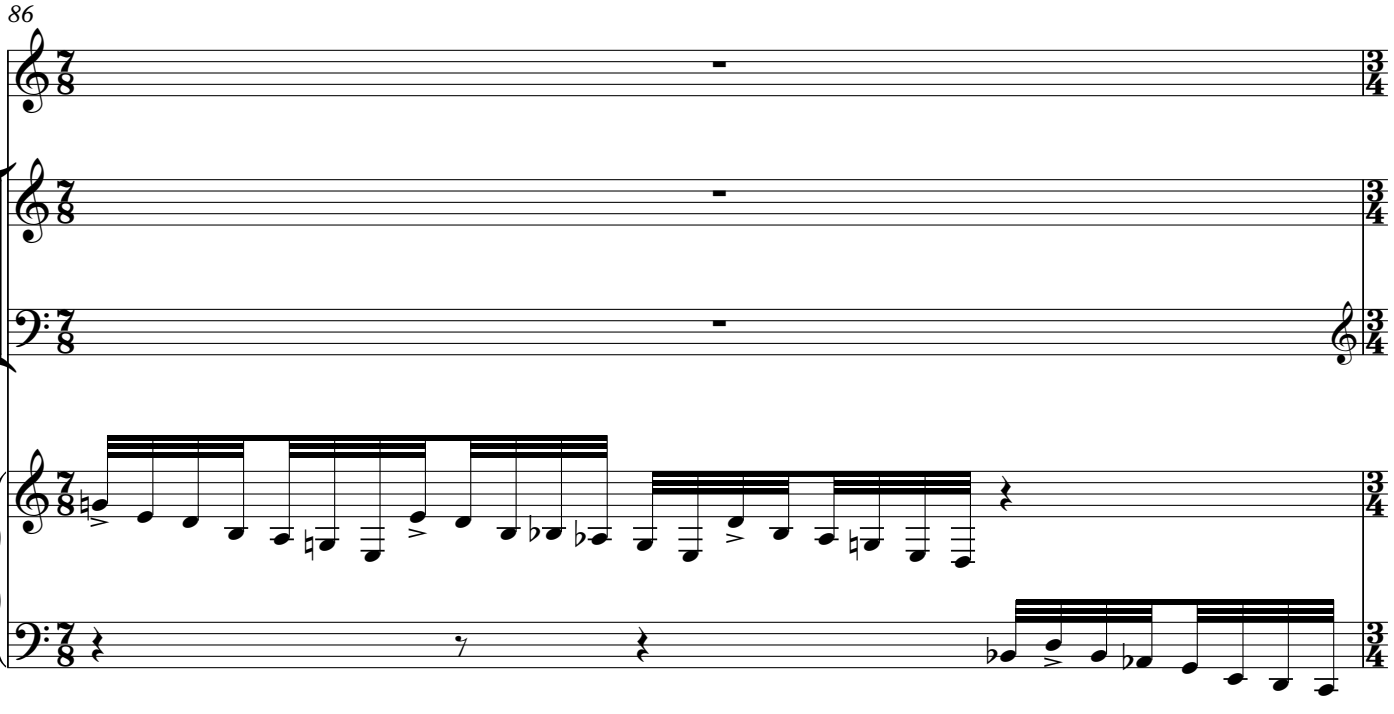

77
p
f
pizz.
pp
f
mf

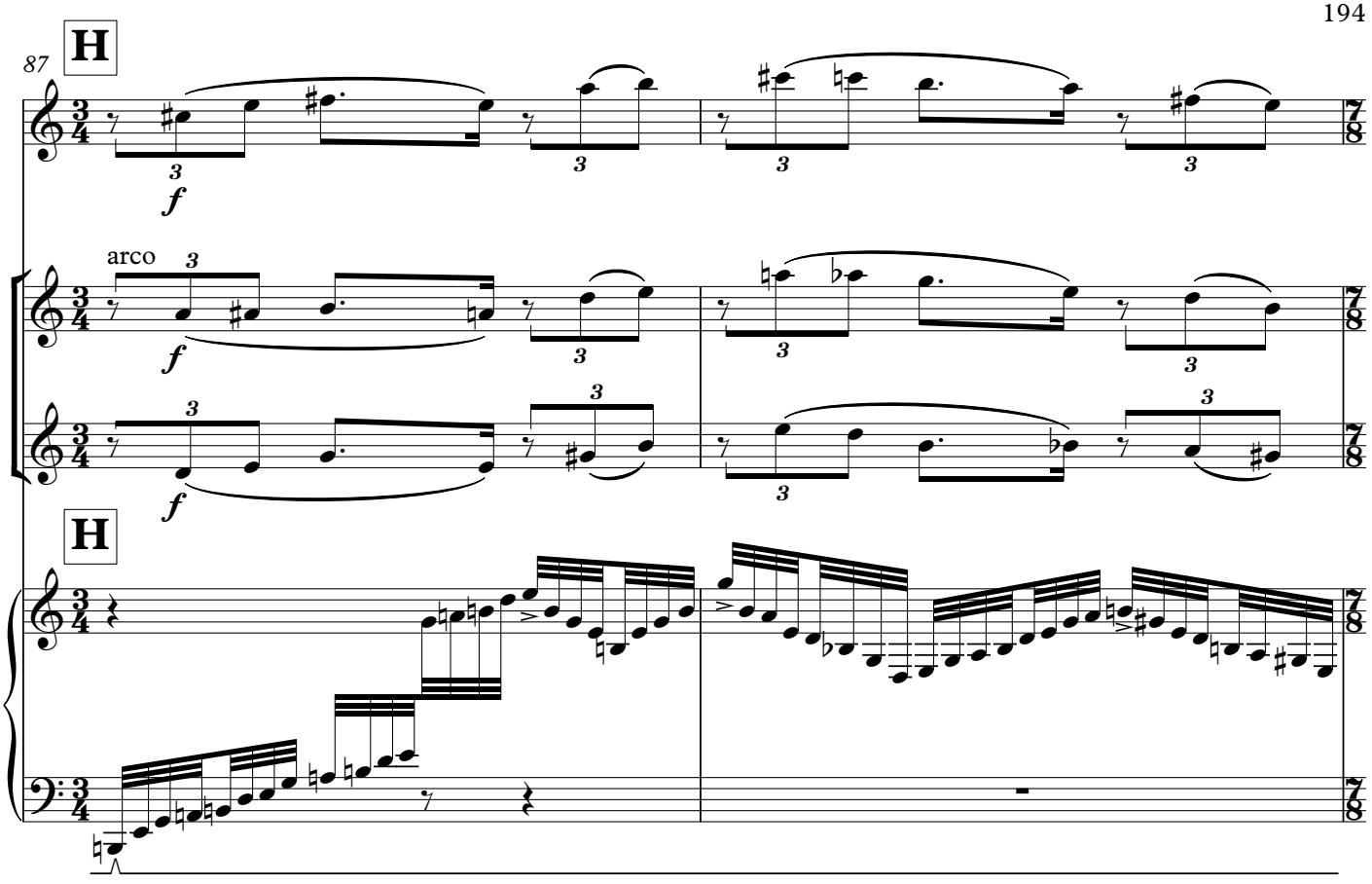

G ♩=65
80
mf
G ♩=65
f throughout
Ped.

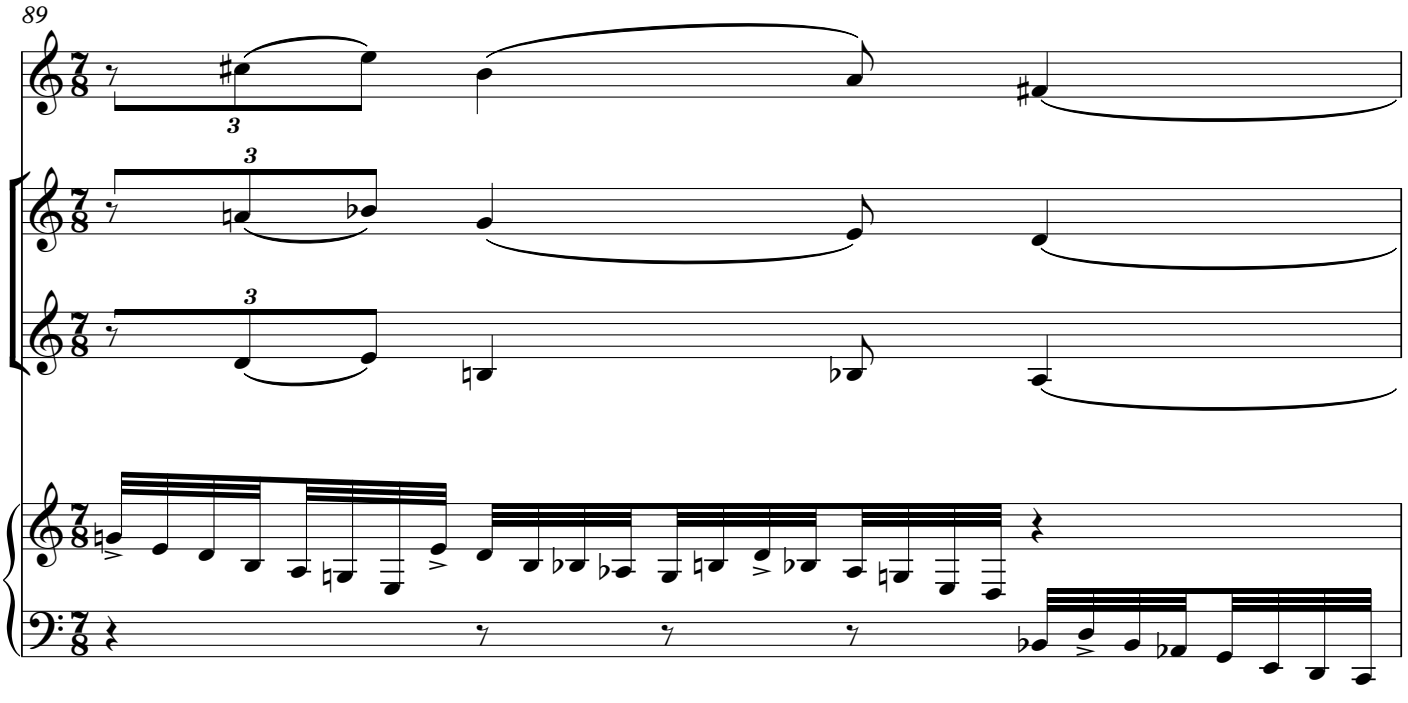

82
3
3
3

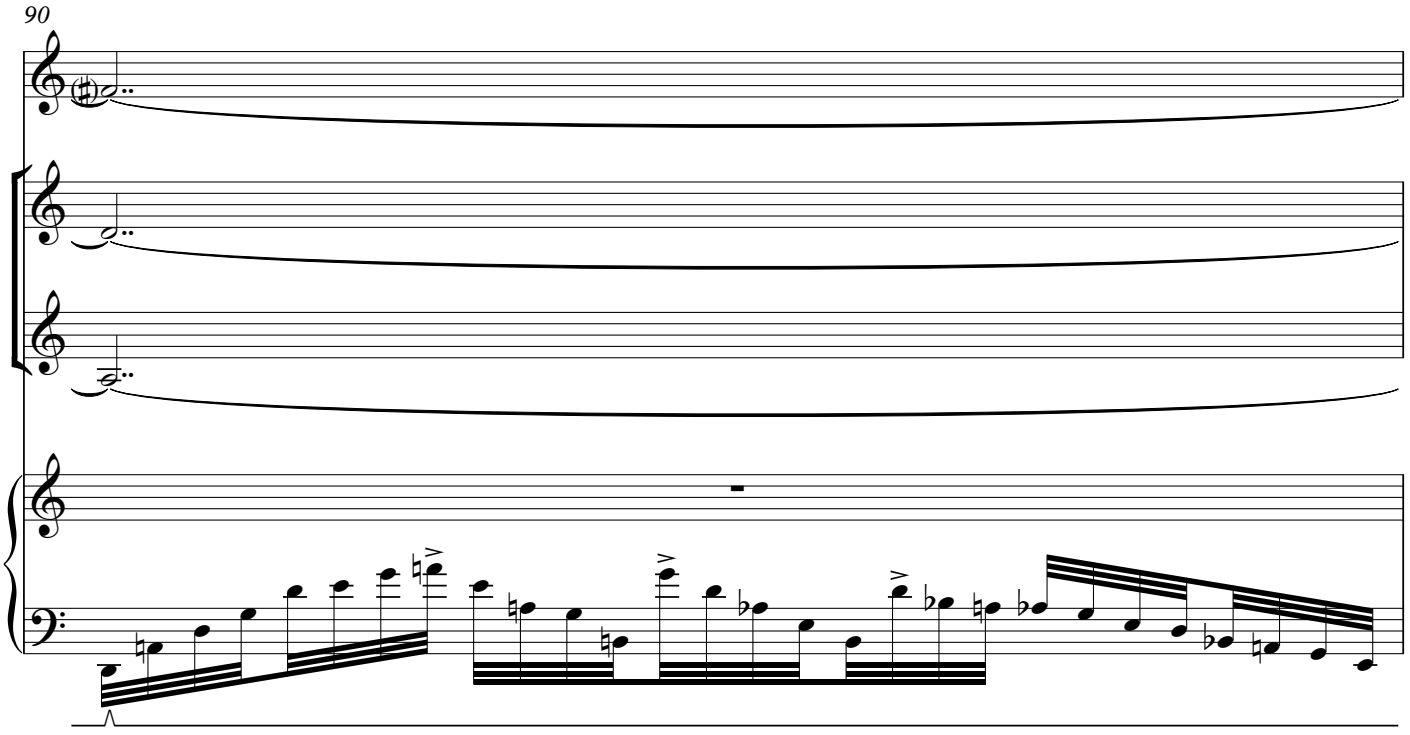

83
3
3

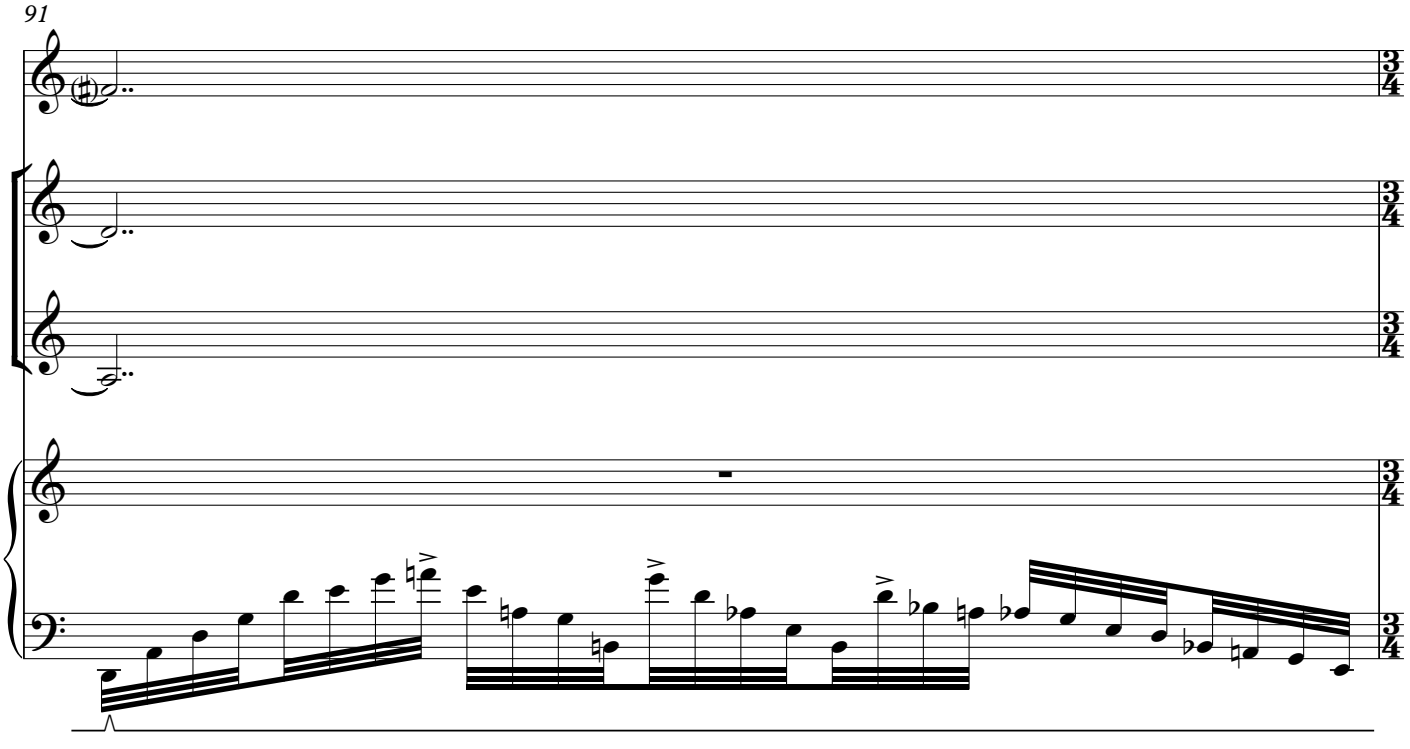

85

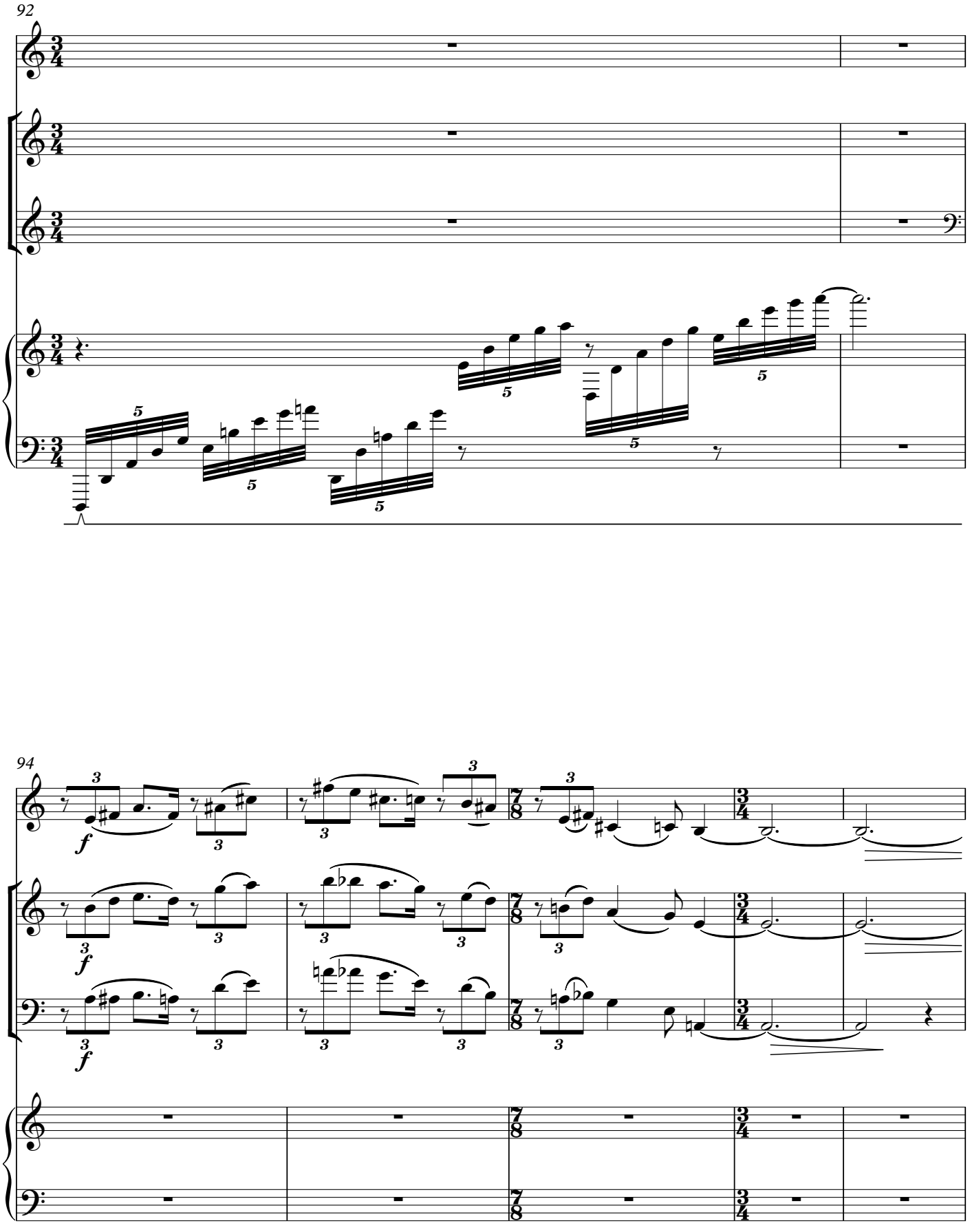

86

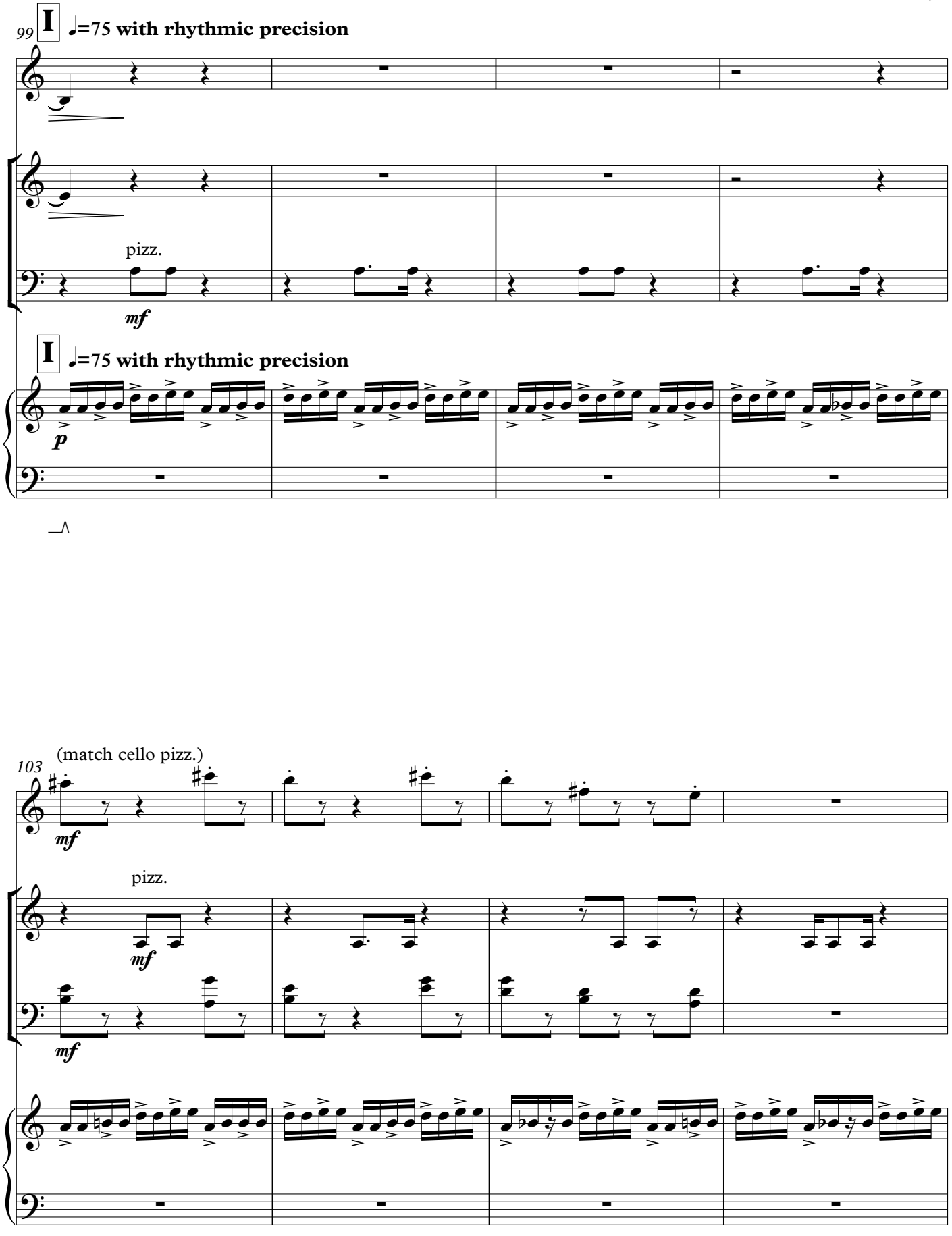

87
H
arco
H

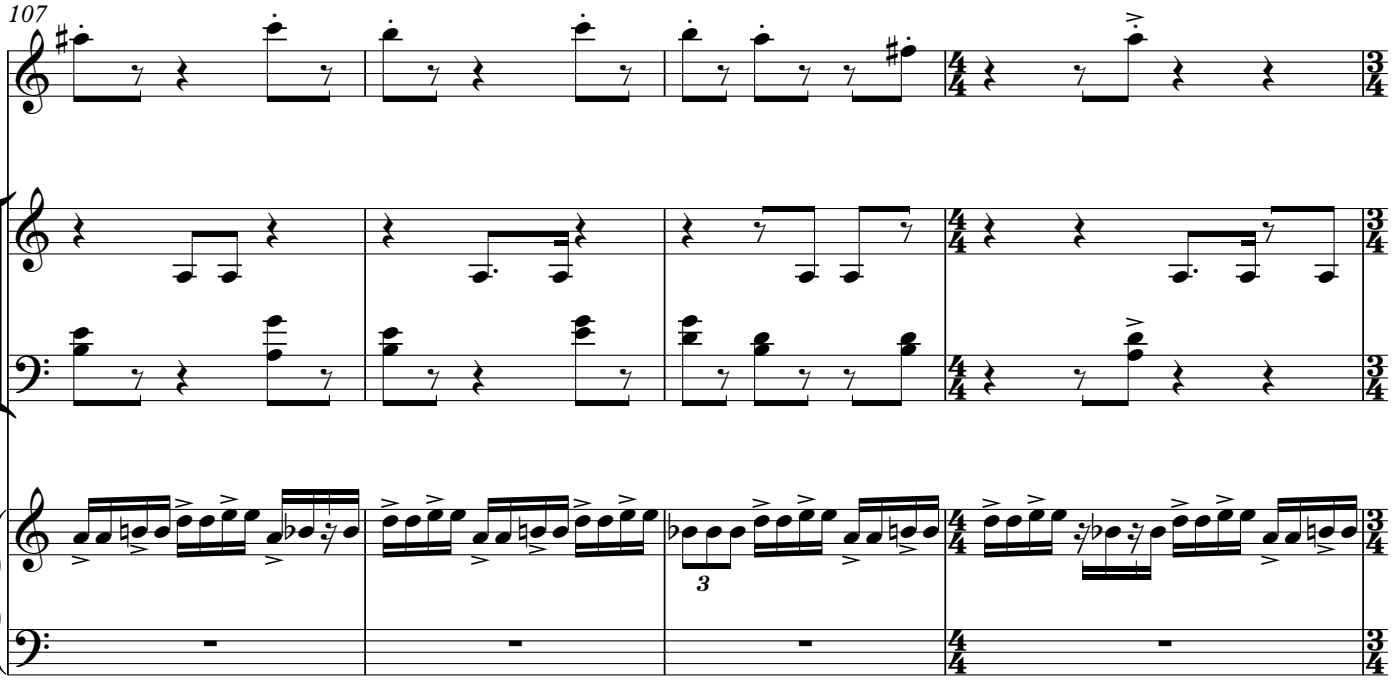

89

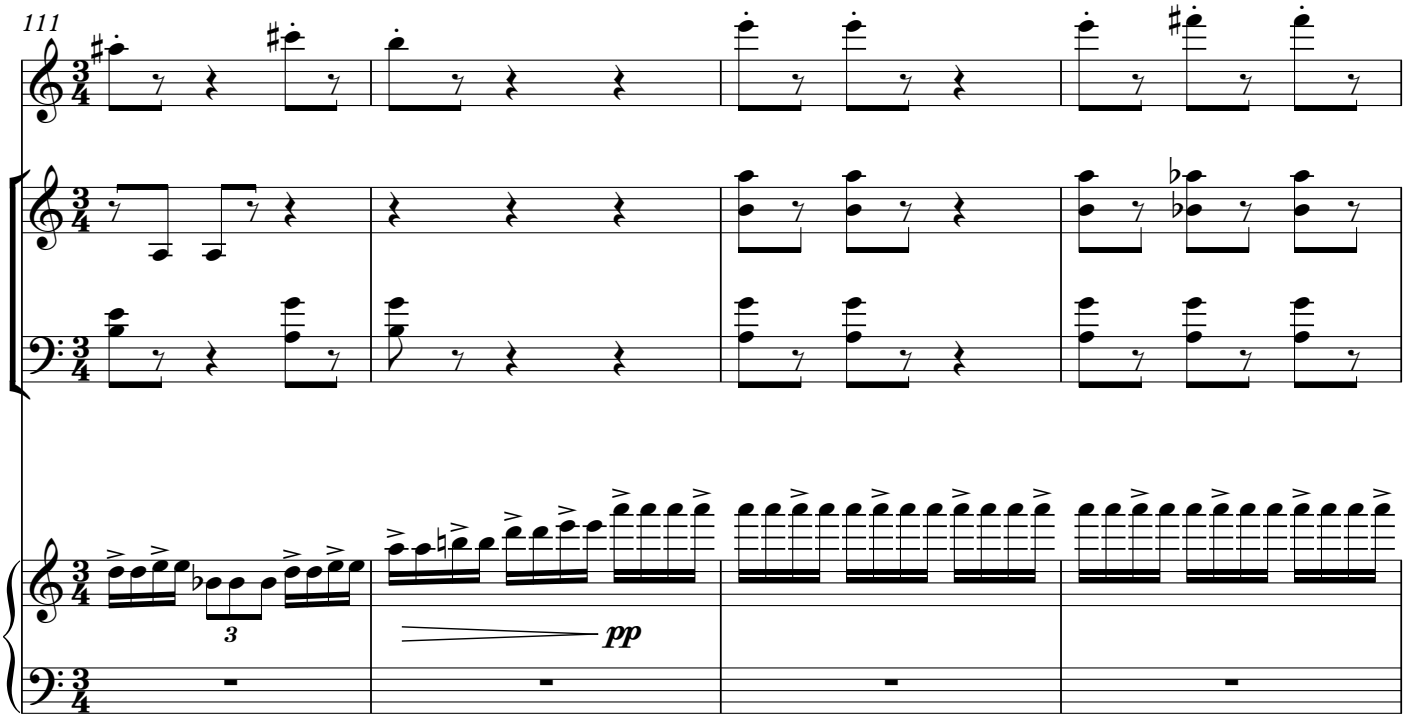

90

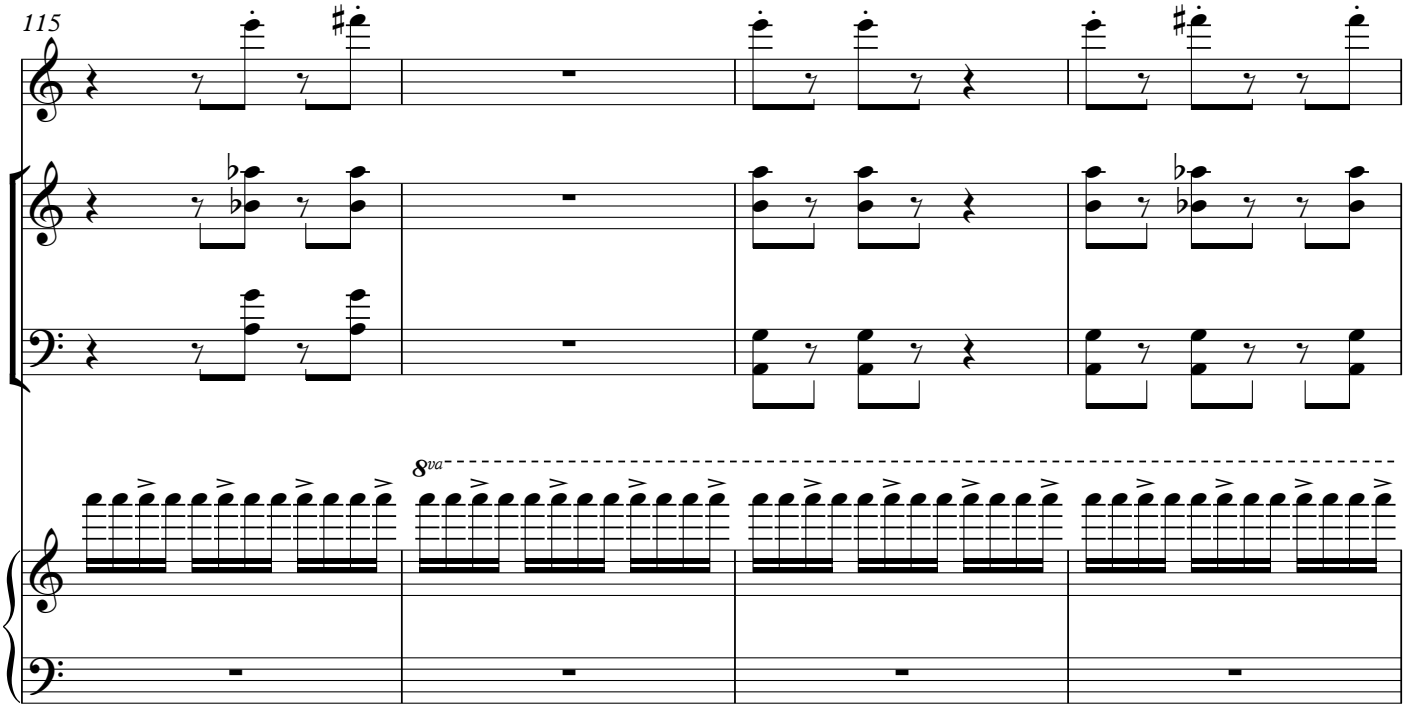

91
3
4

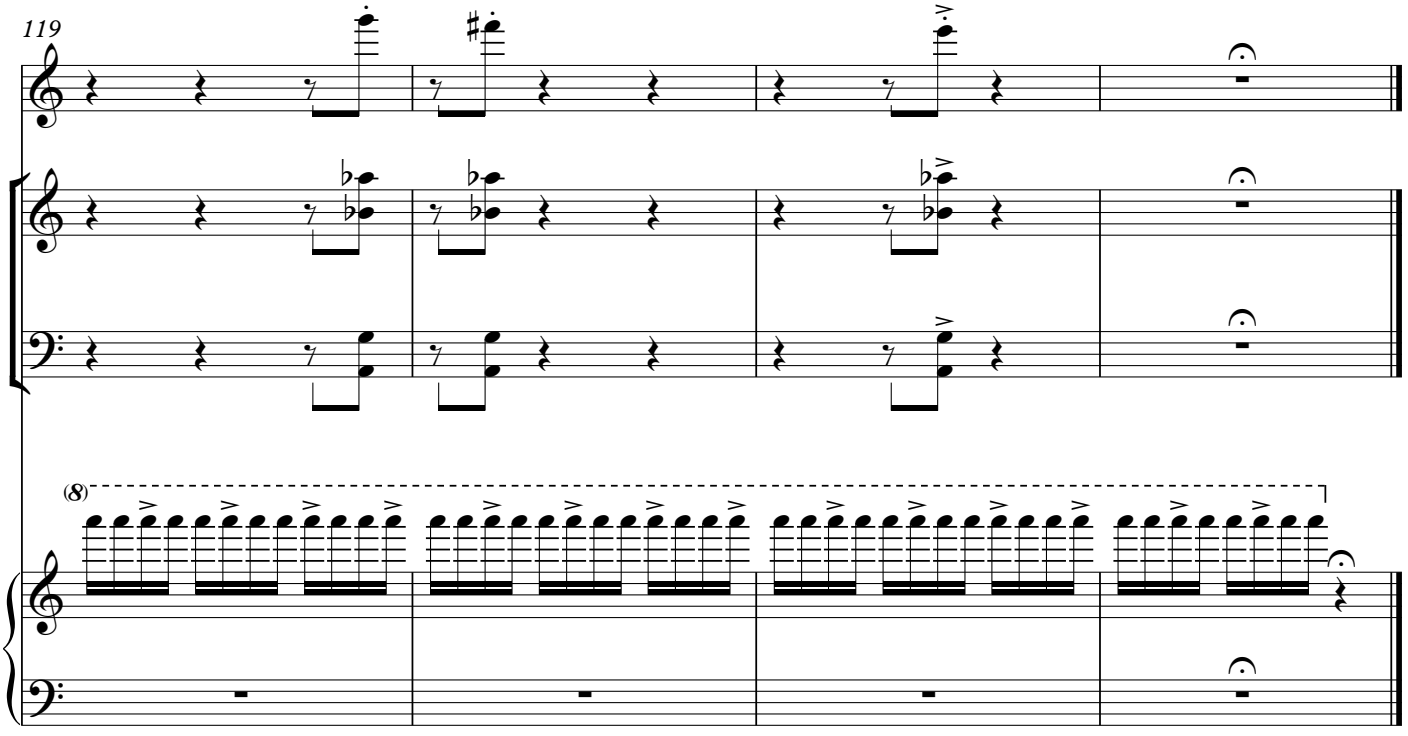

92
94
f
f
f


99
I
♩=75 with rhythmic precision
pizz.
mf
I
♩=75 with rhythmic precision
p
103
(match cello pizz.)
mf
pizz.
mf
mf


107
3
4/4
3/4


111
3
pp

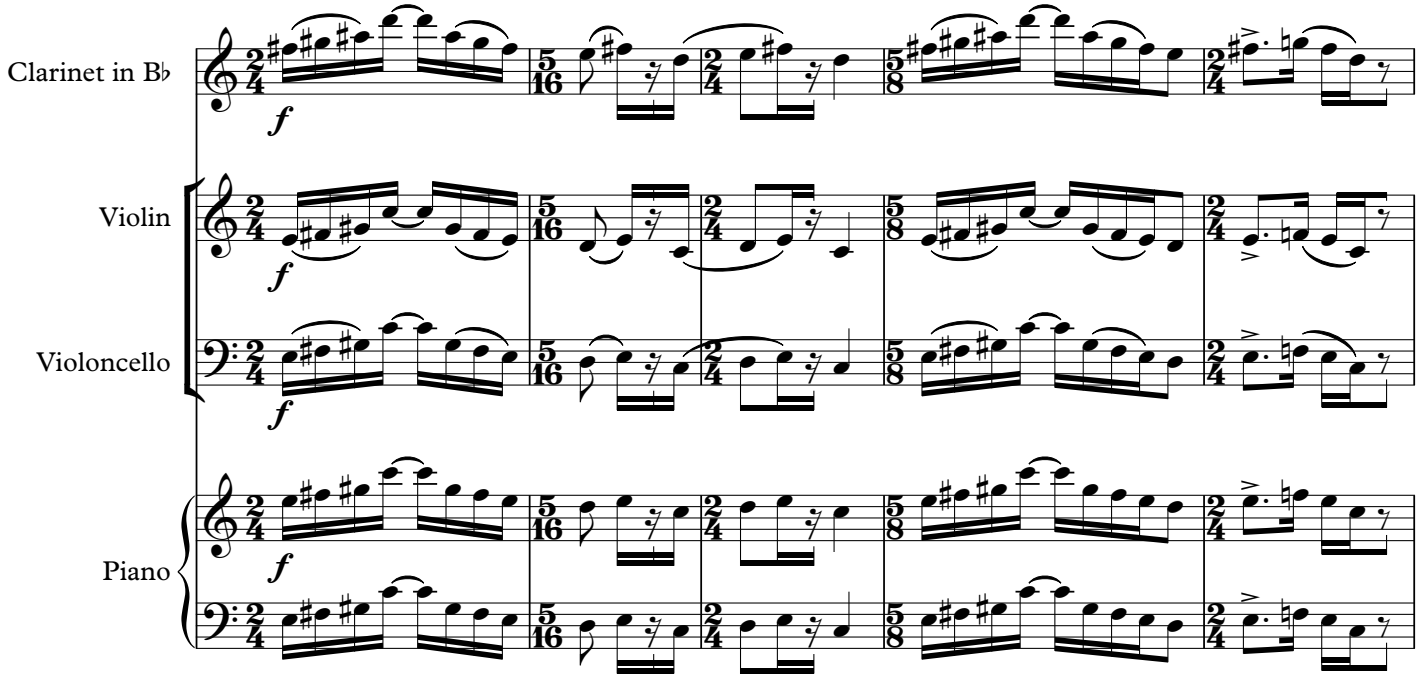

115
8va

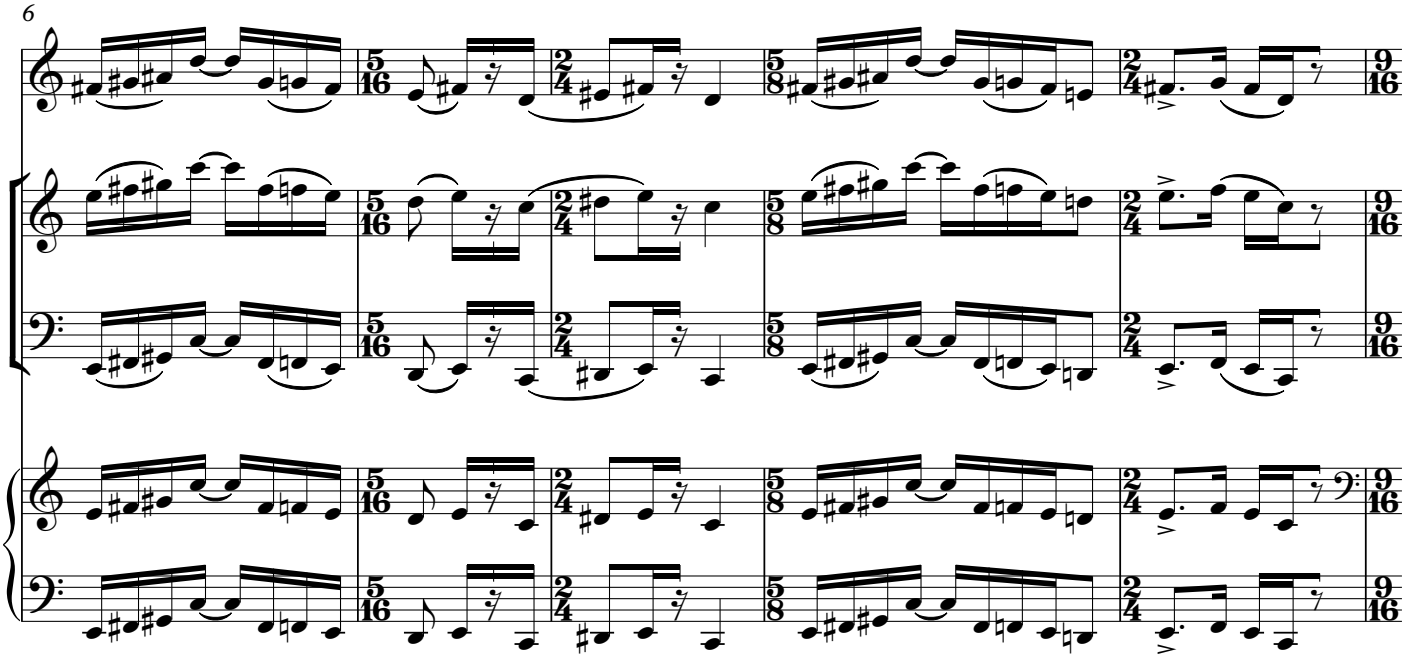

119
(8)

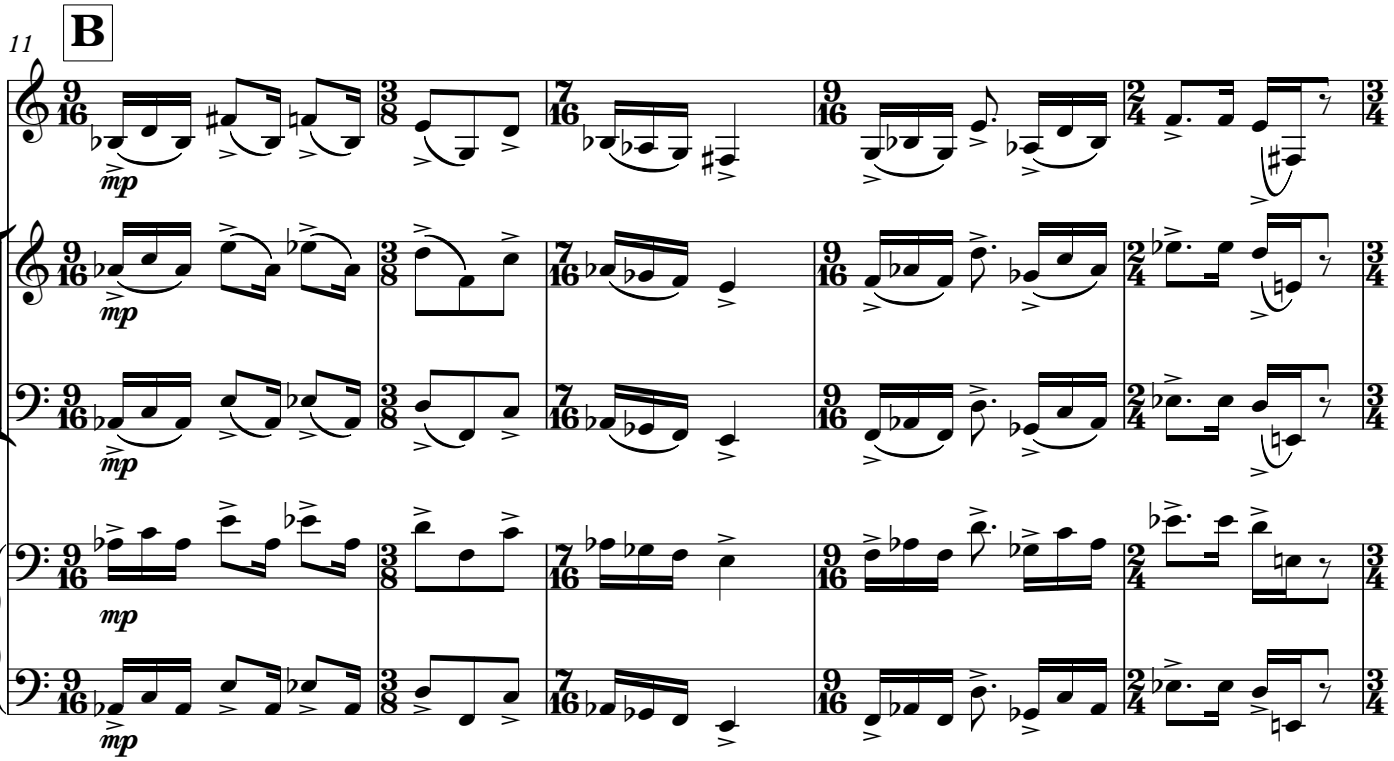
Hexagon II: Falusian

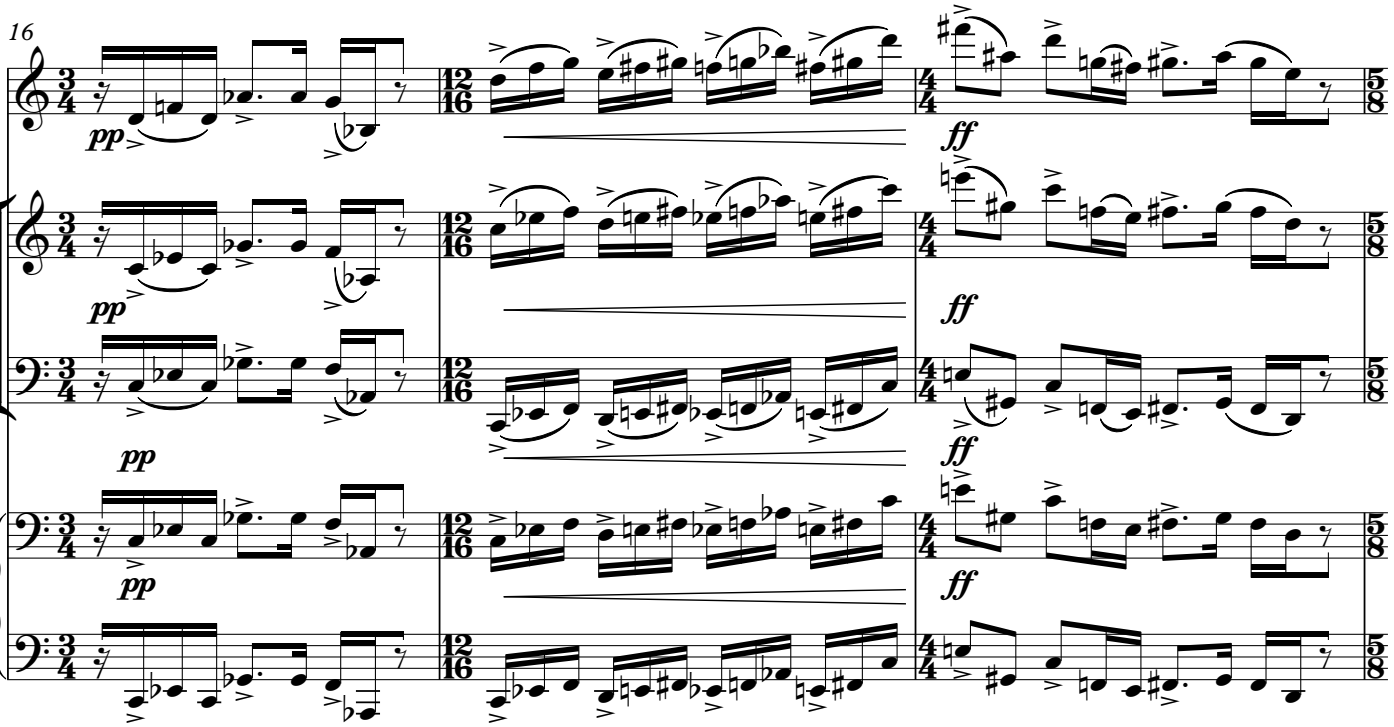
k. Scott Eggert

A ♩.=106 joyous and rhythmically exact; ♩.=♩ throughout



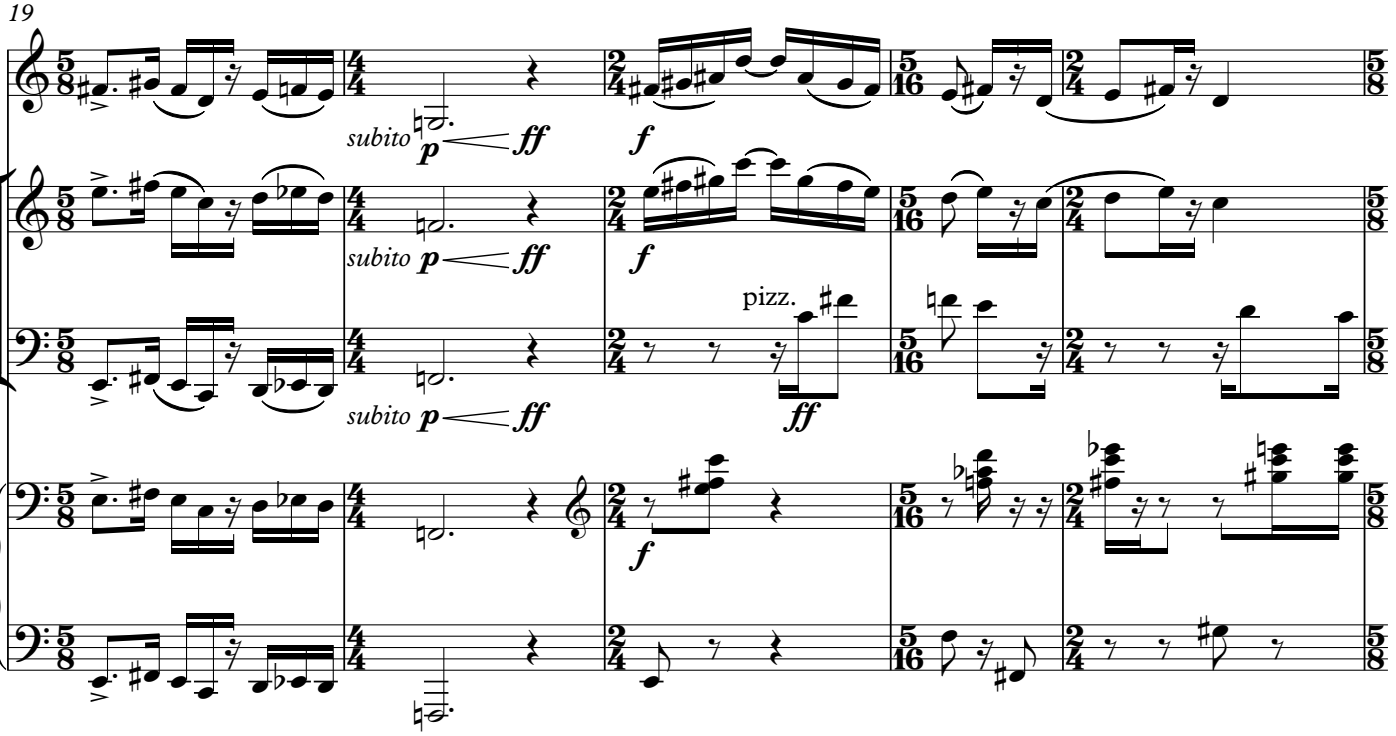



11
B
mp

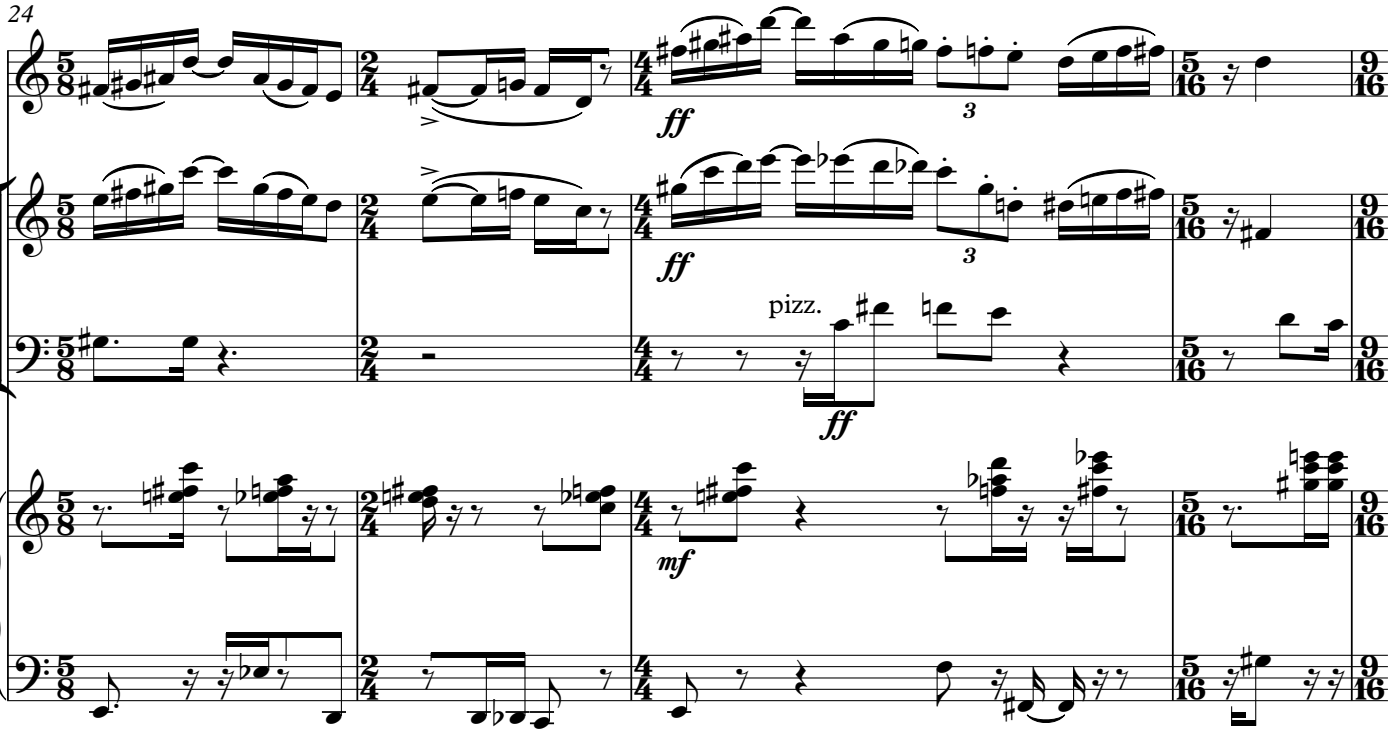

16
pp
ff

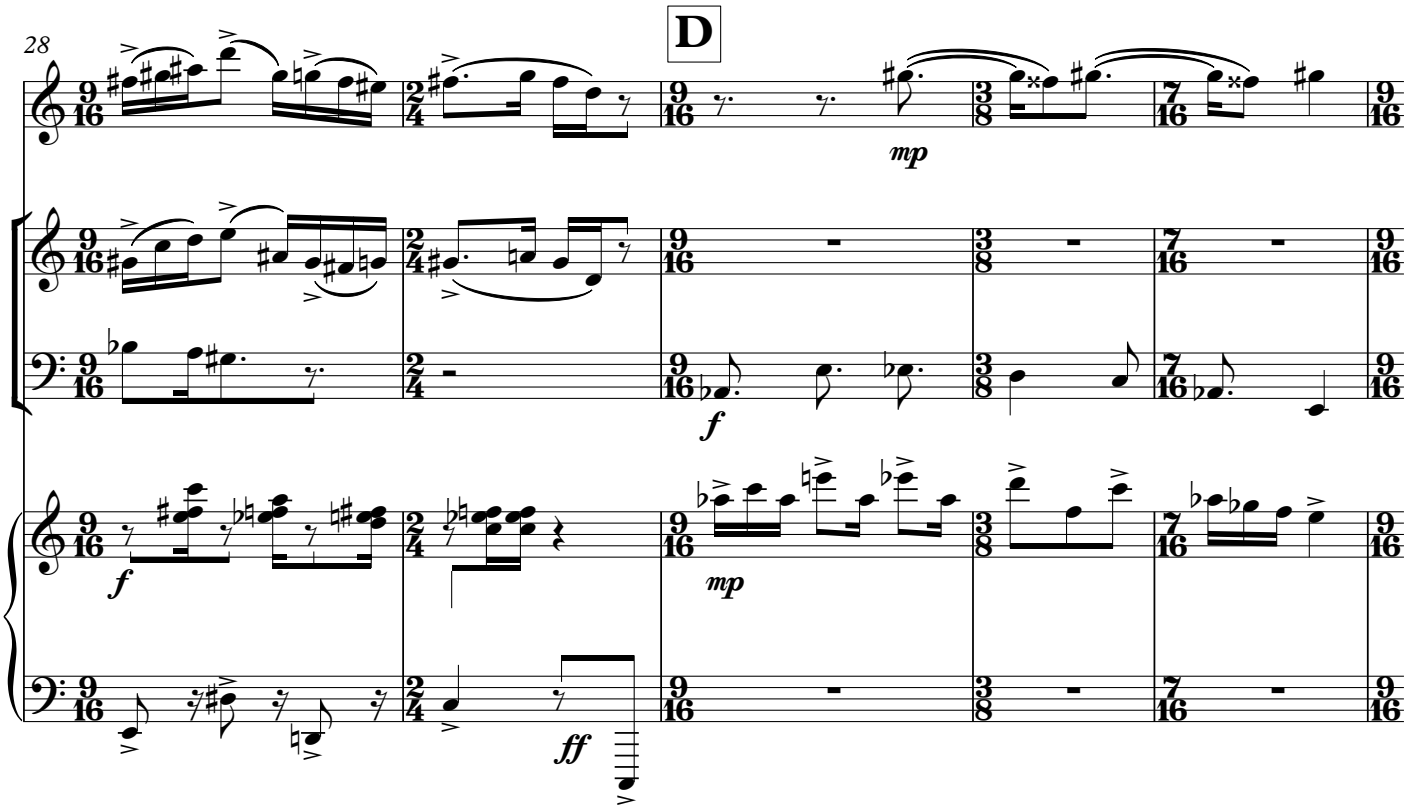
C

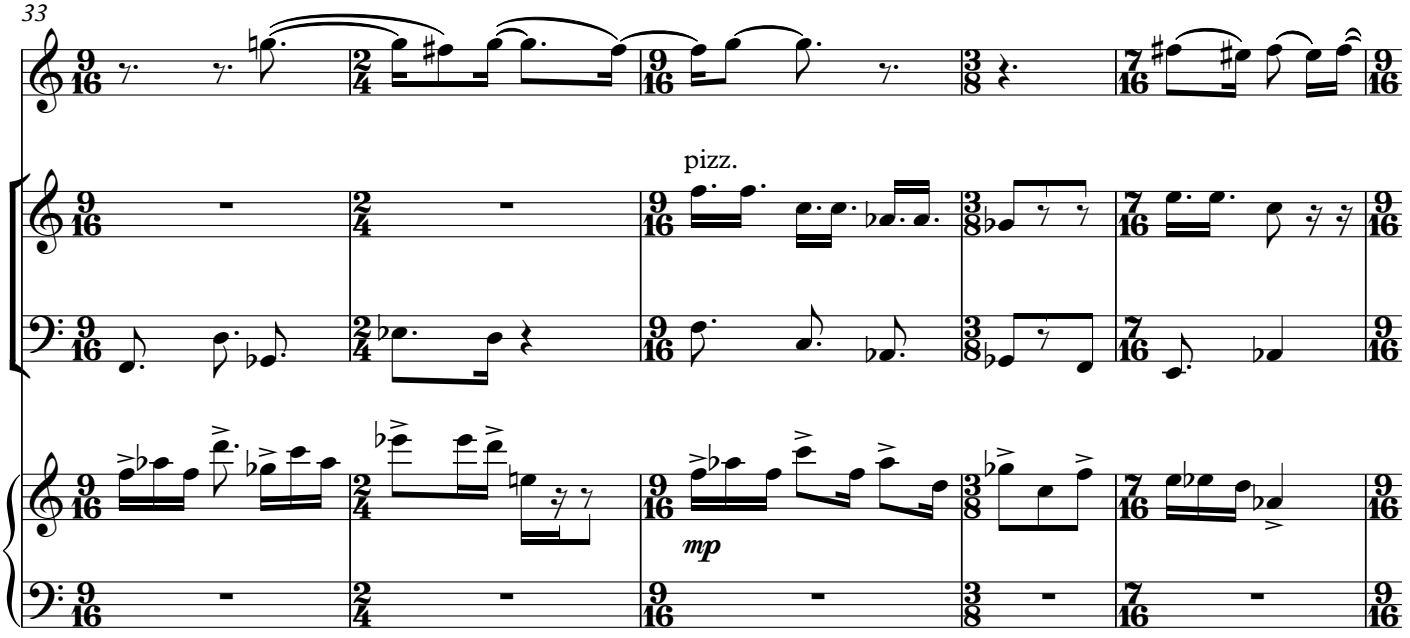
19

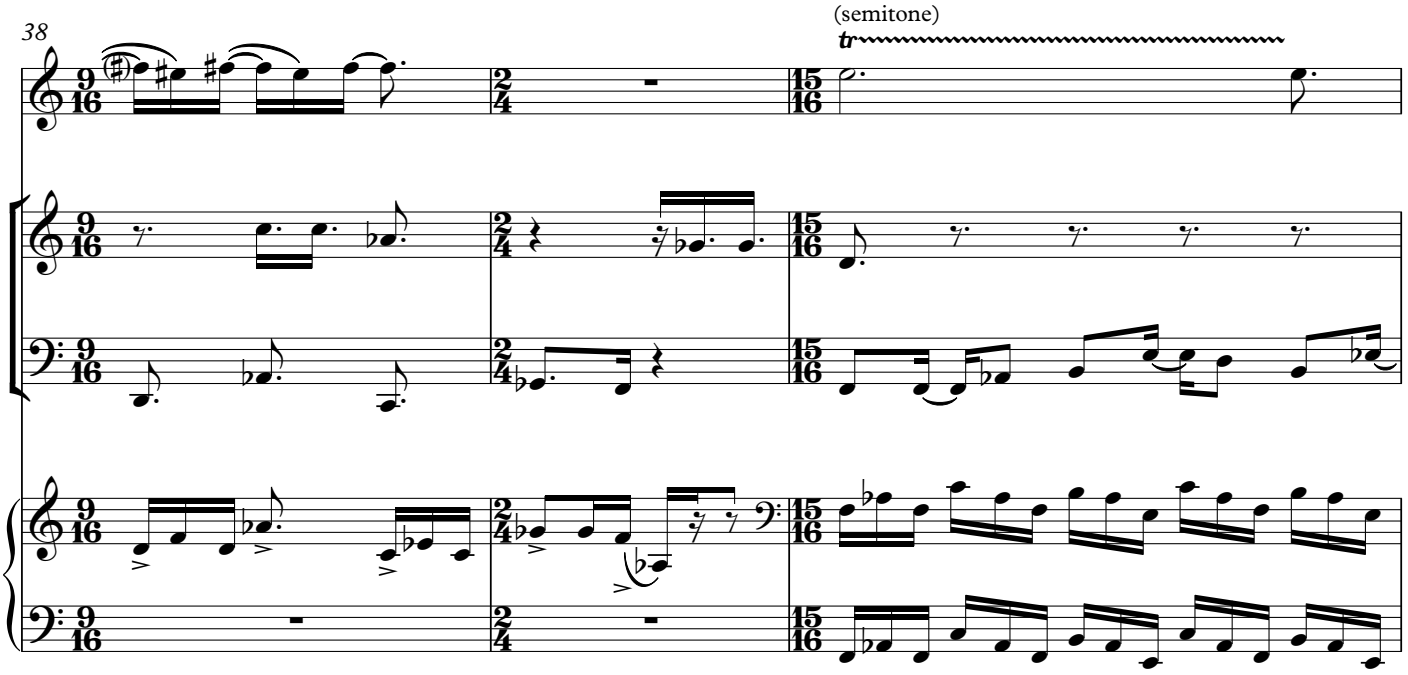


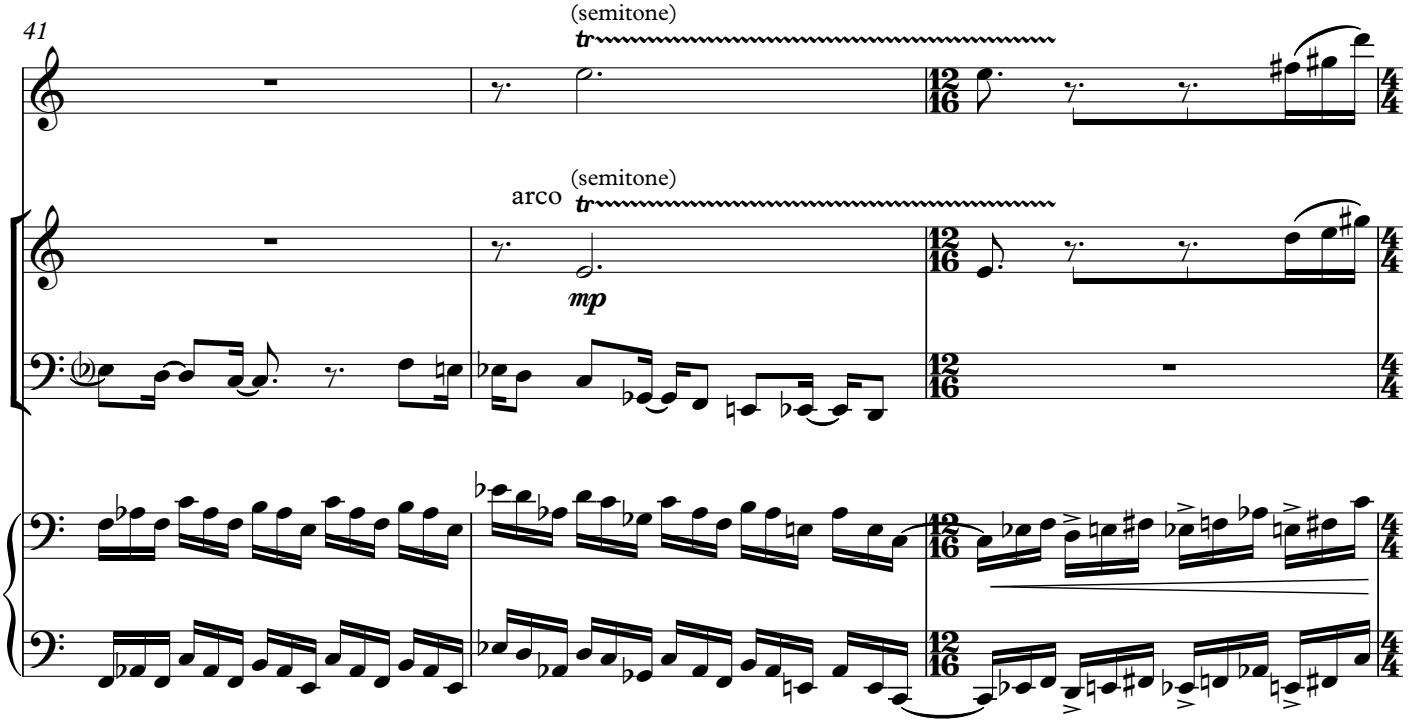
24

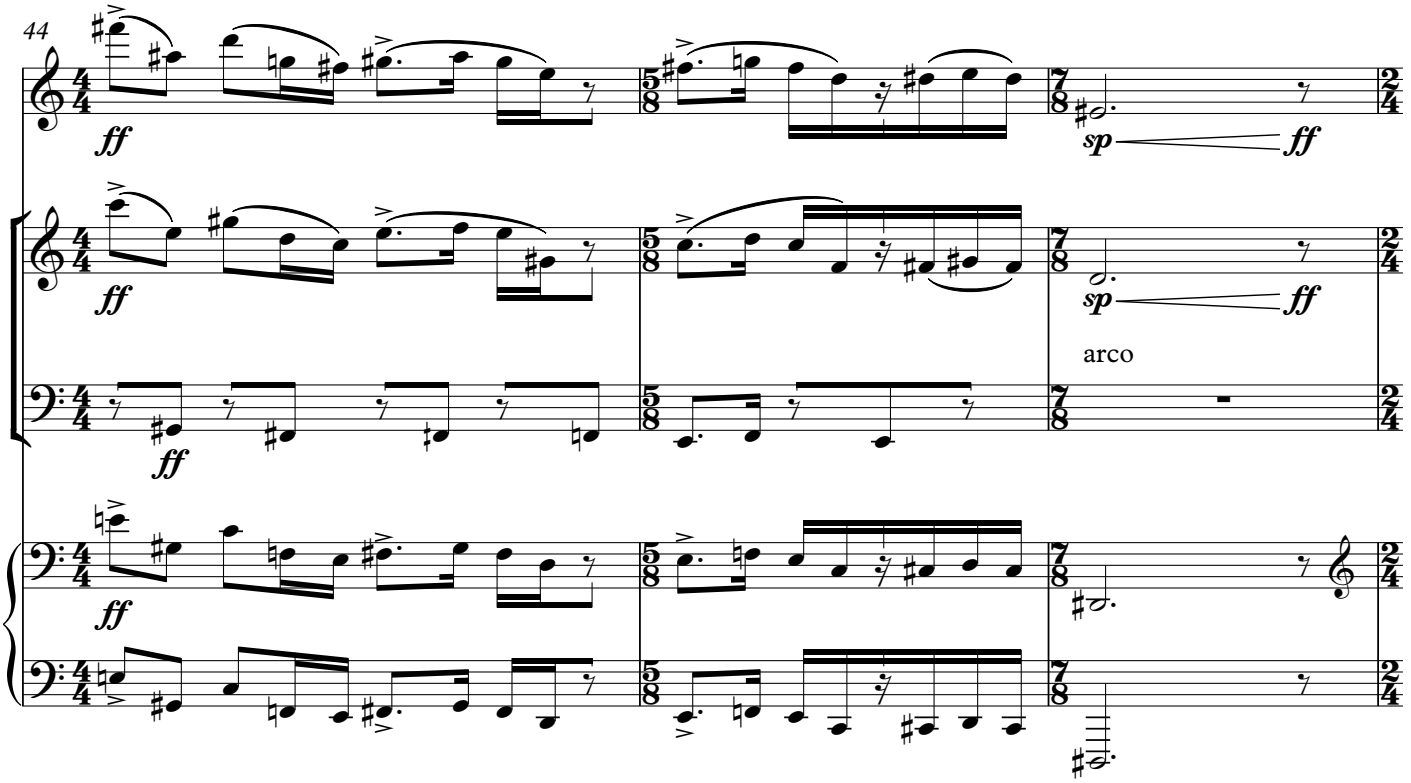


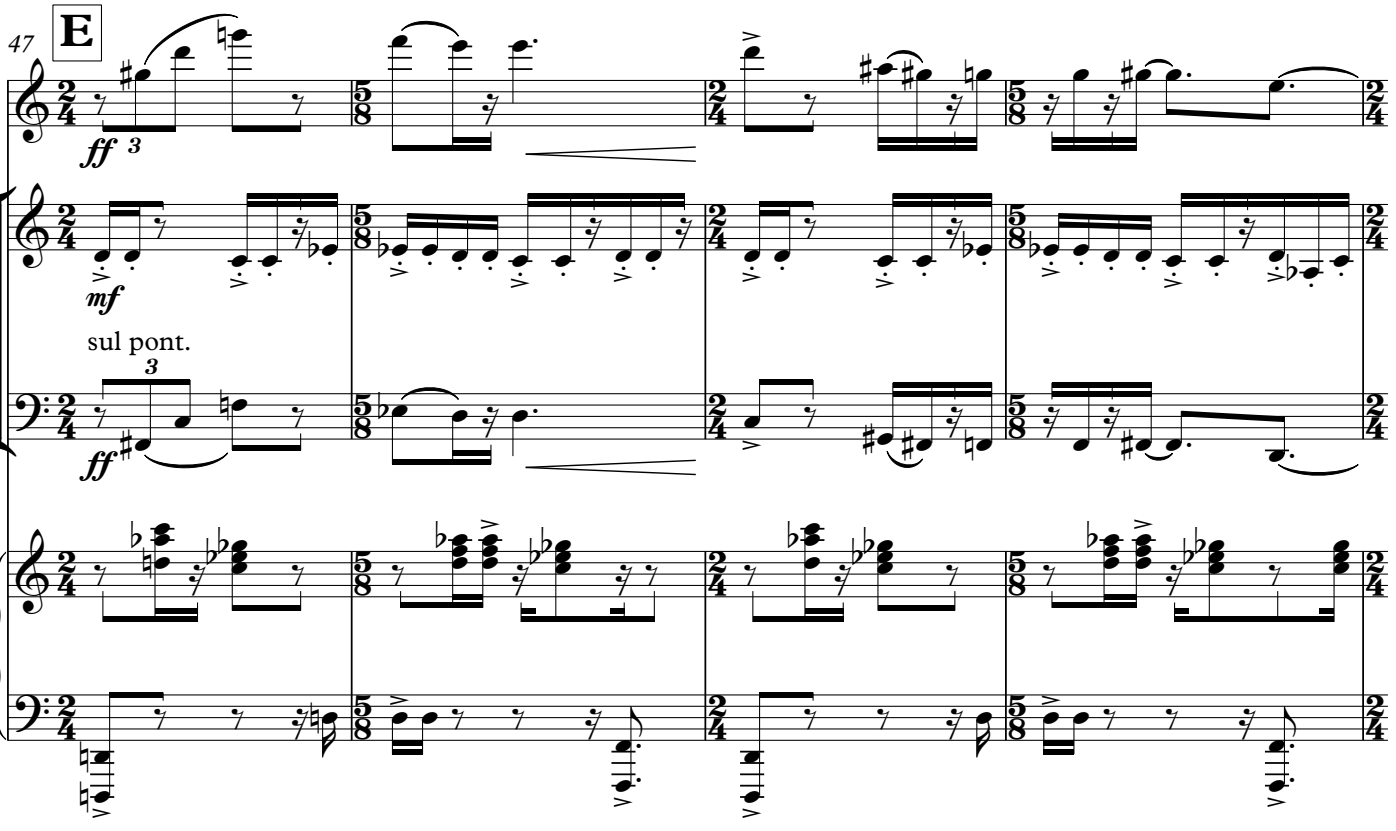

28
D
mp
f
f
mp
ff

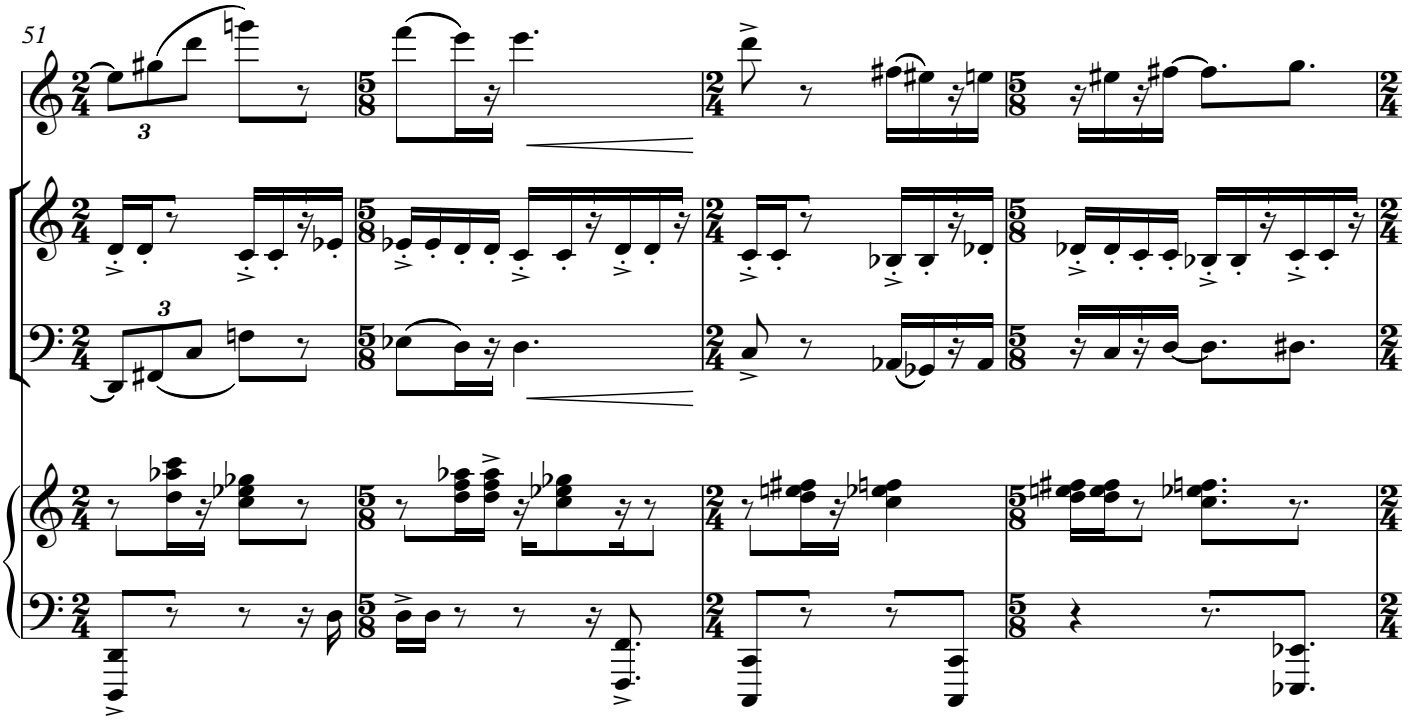

33
pizz.
mp

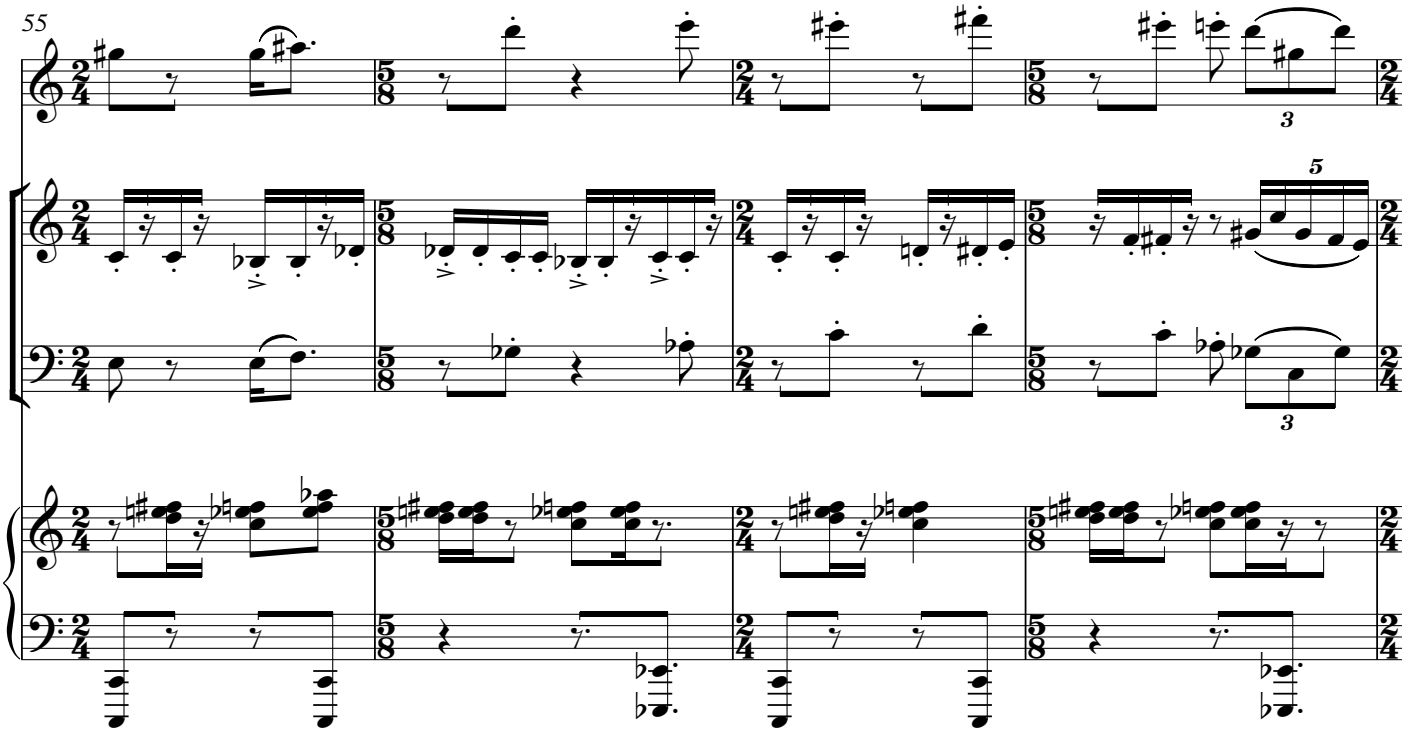

38
(semitone)
tr

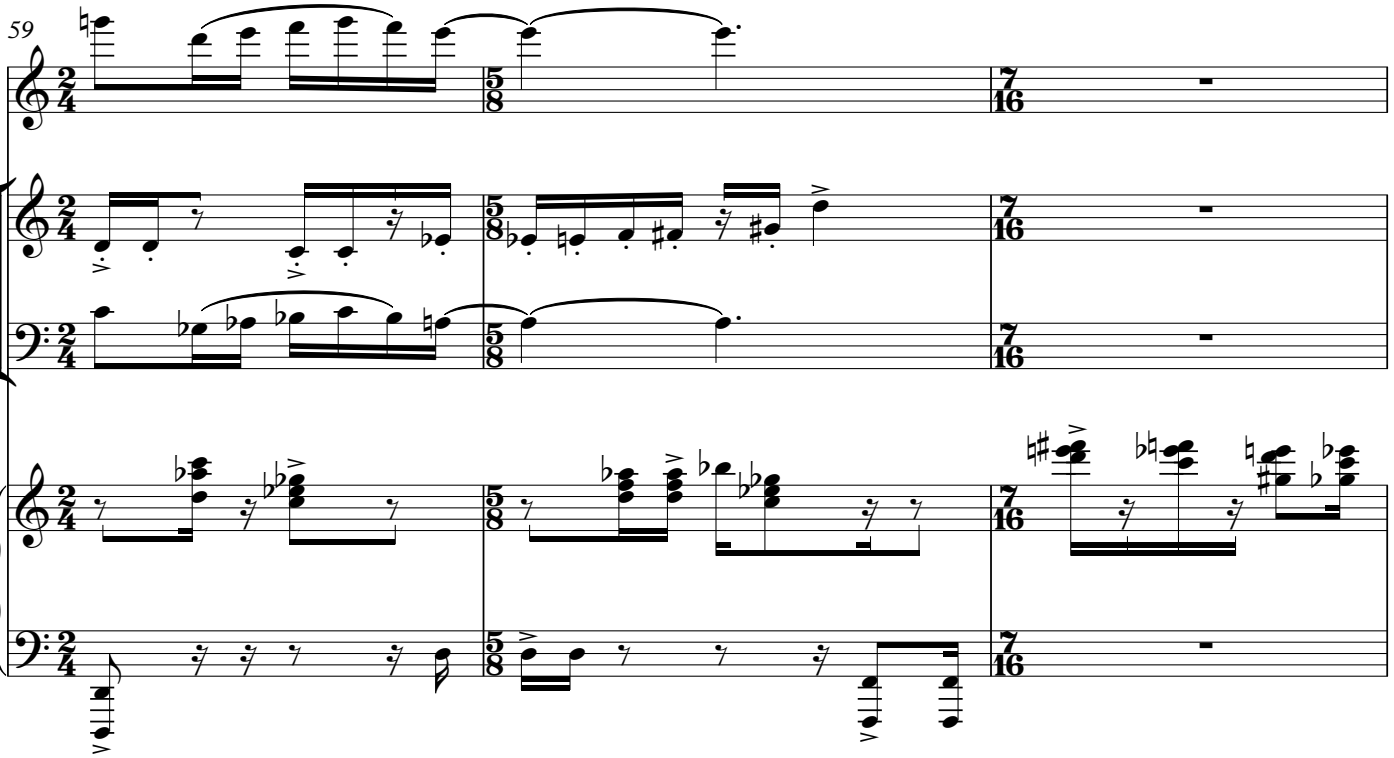

41
(semitone)
tr
arco
(semitone)
tr
mp

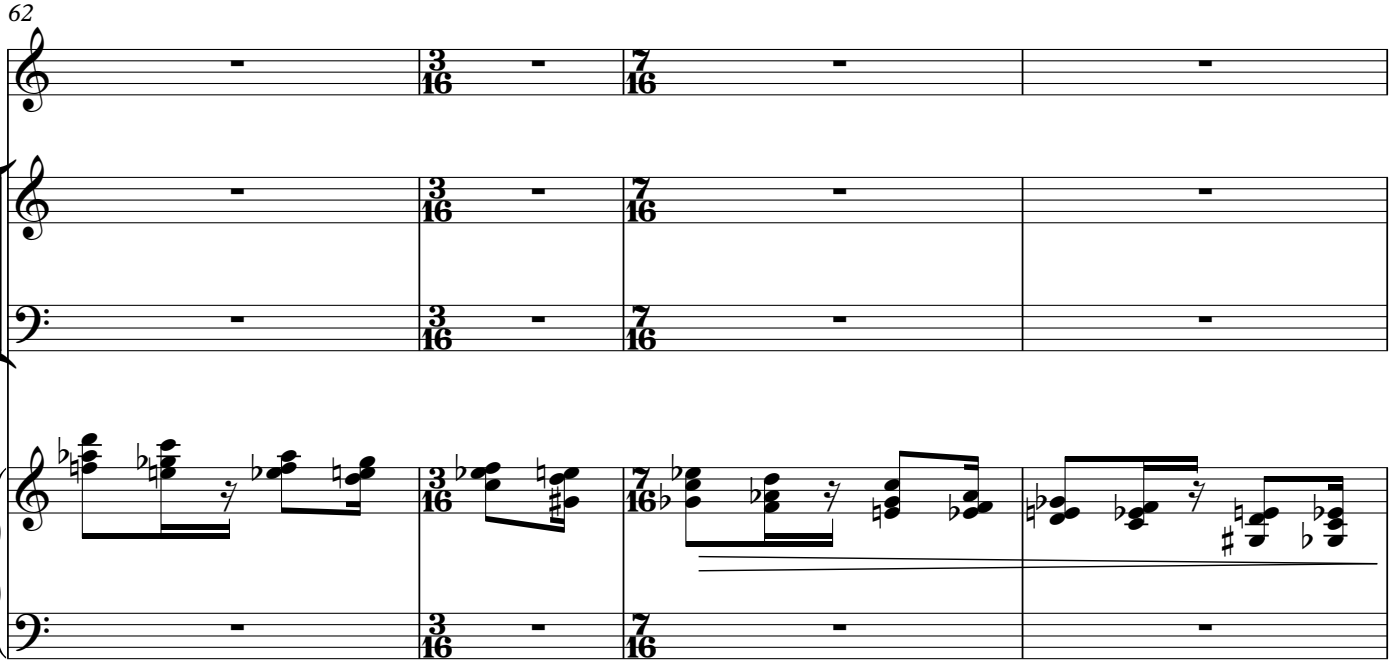

44
ff
sp
ff
arco

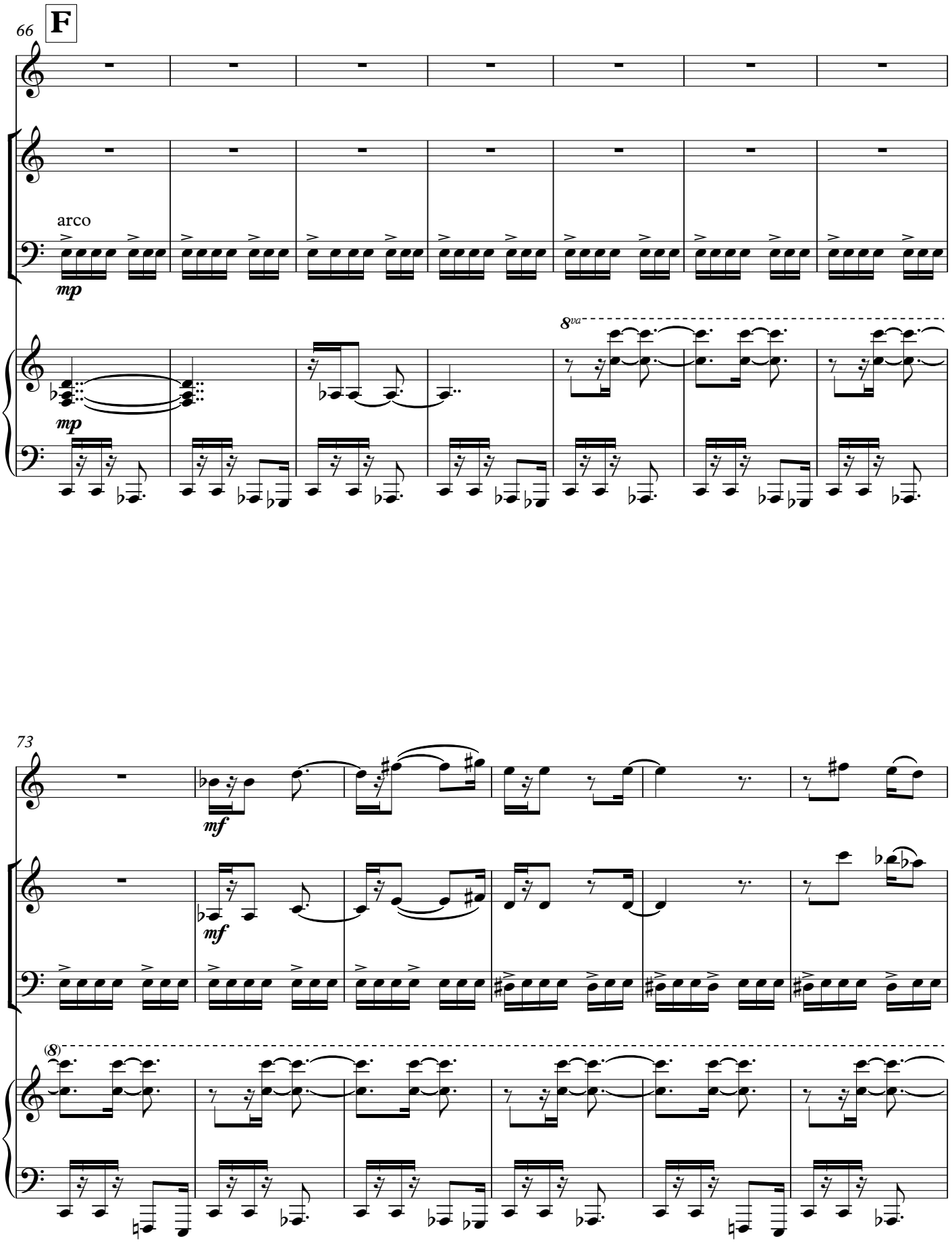

47
E
ff
mf
sul pont.

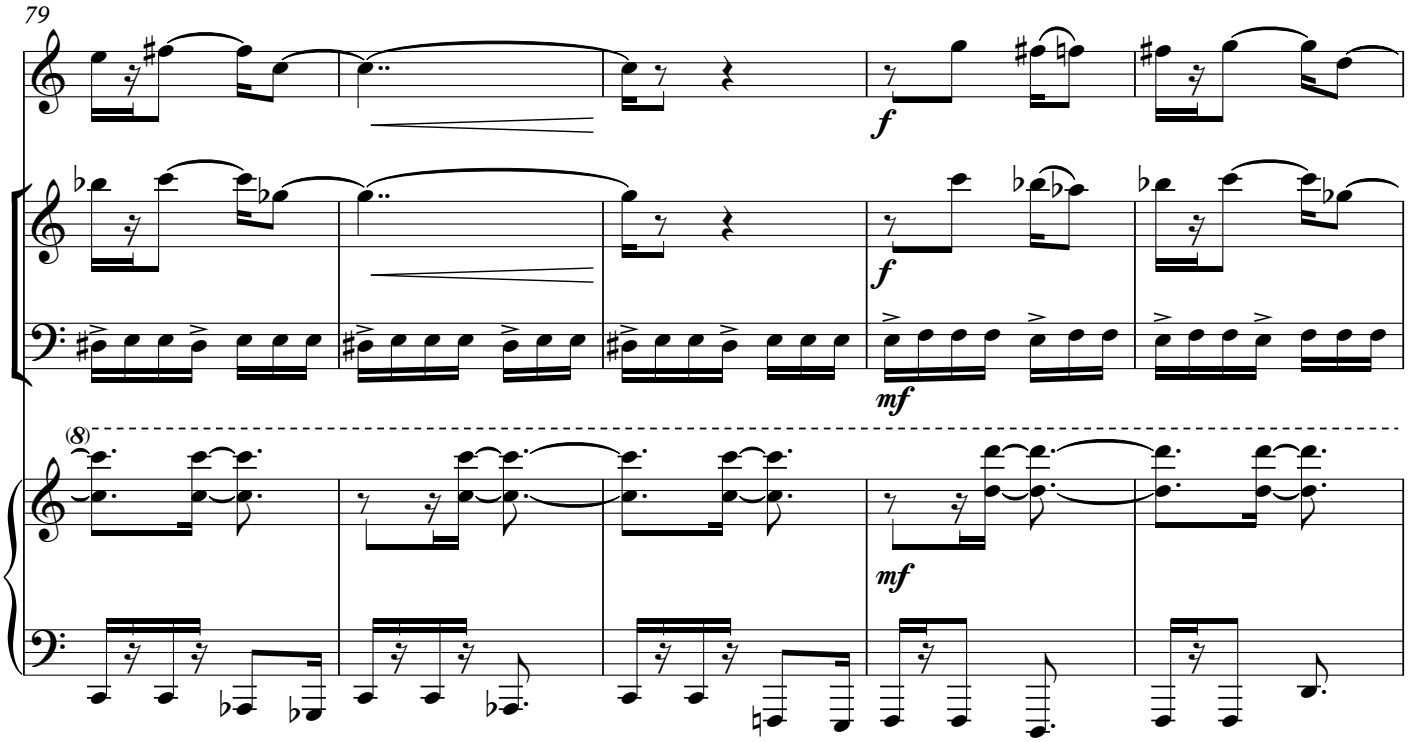

51

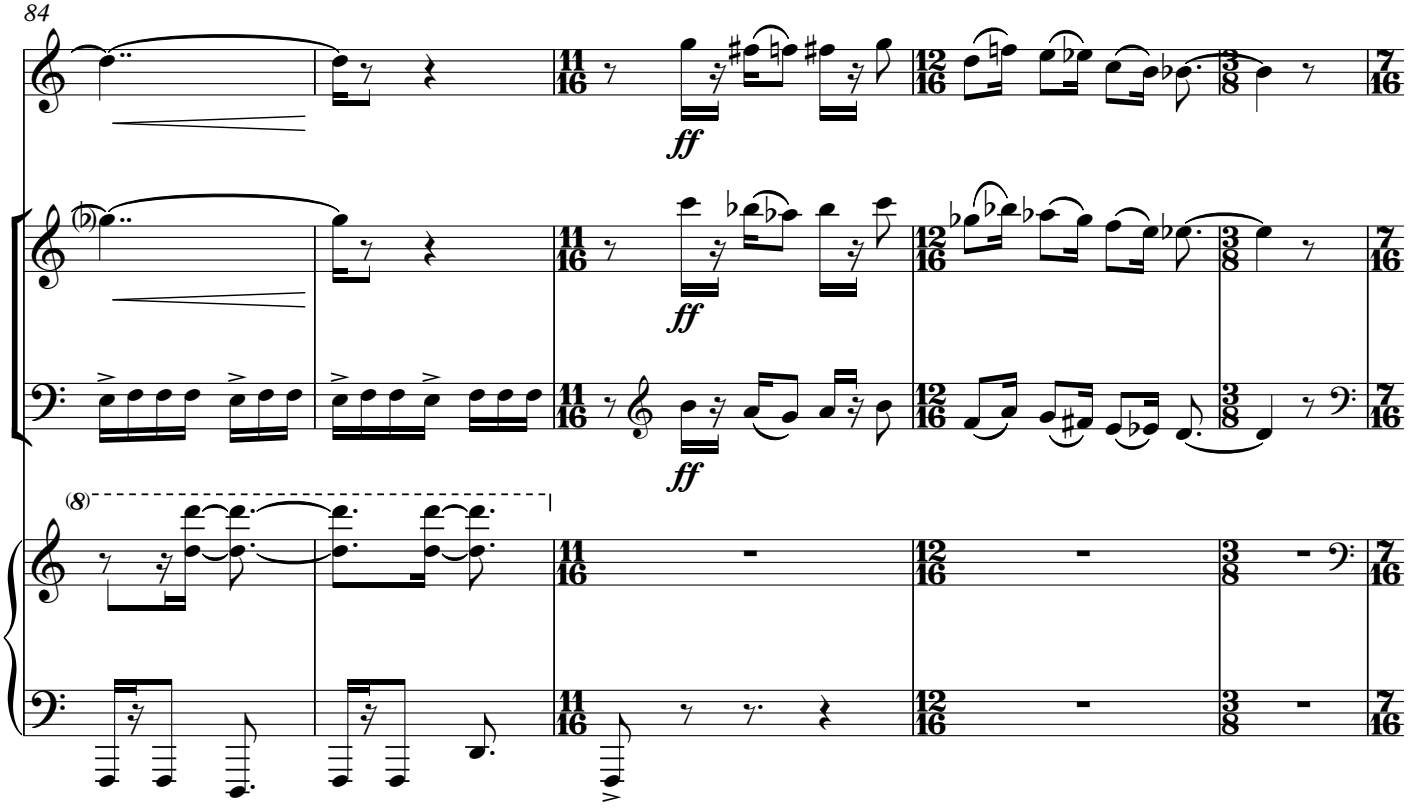

55

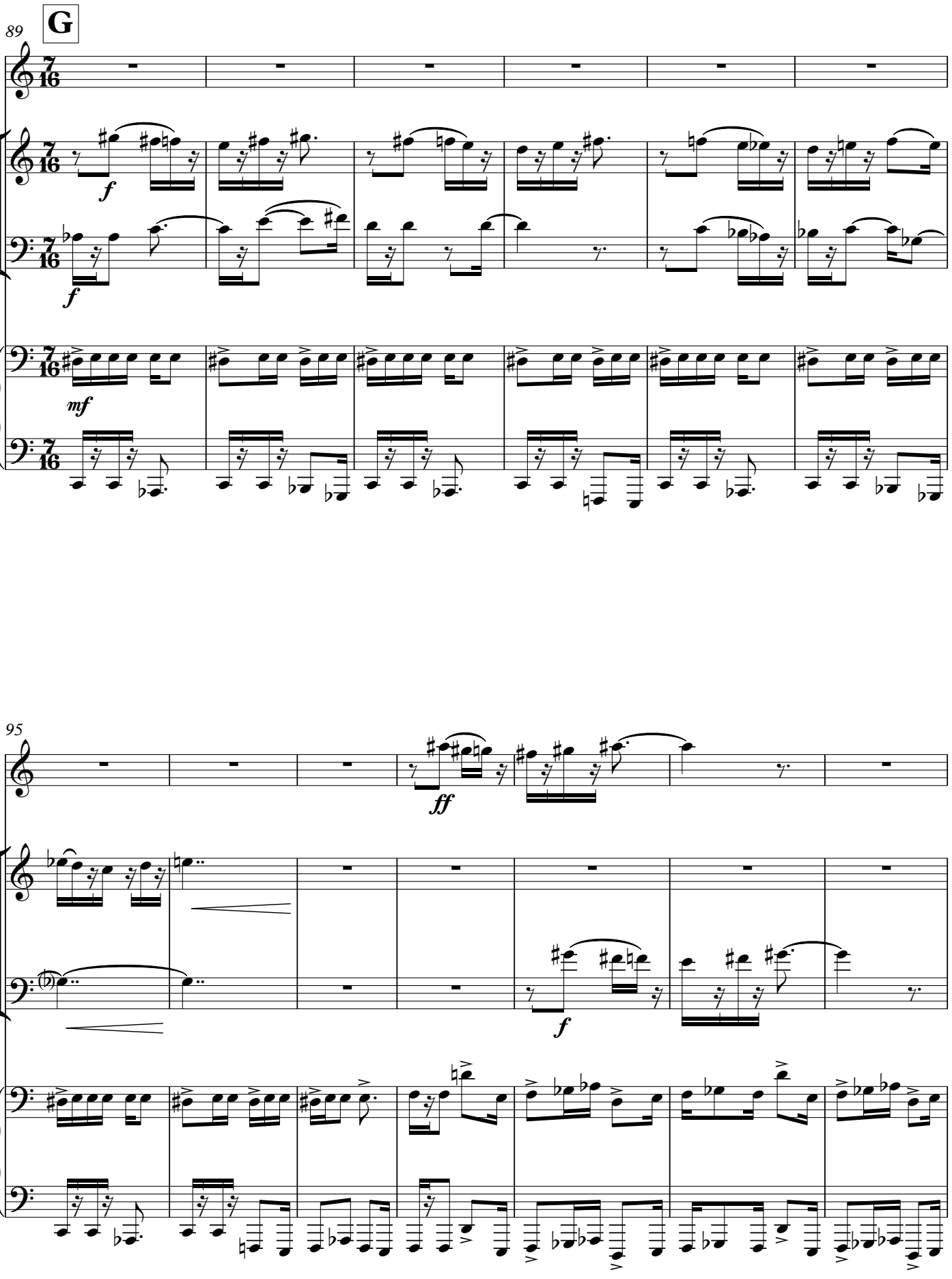

59
2/4
5/8
7/16

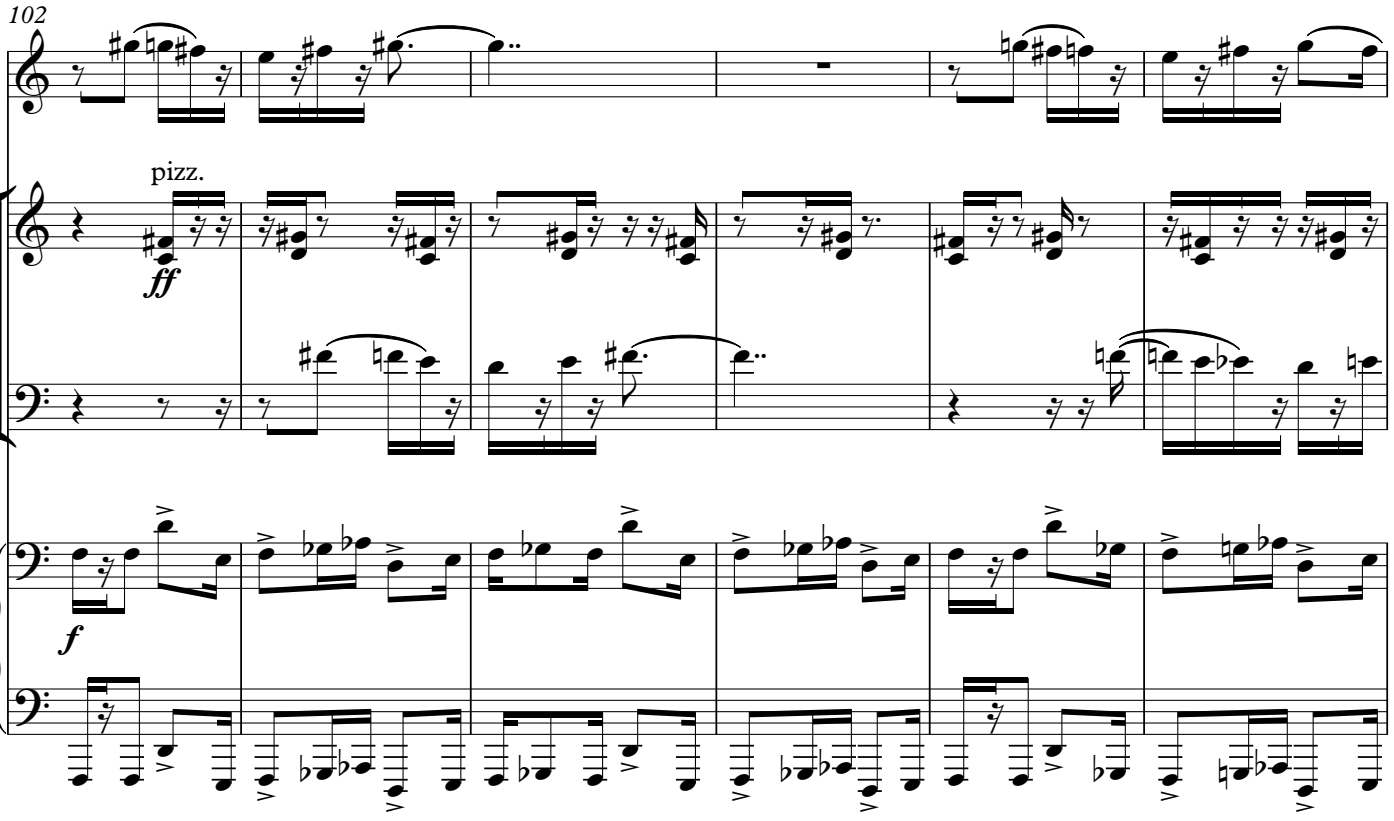

62
3/16
7/16

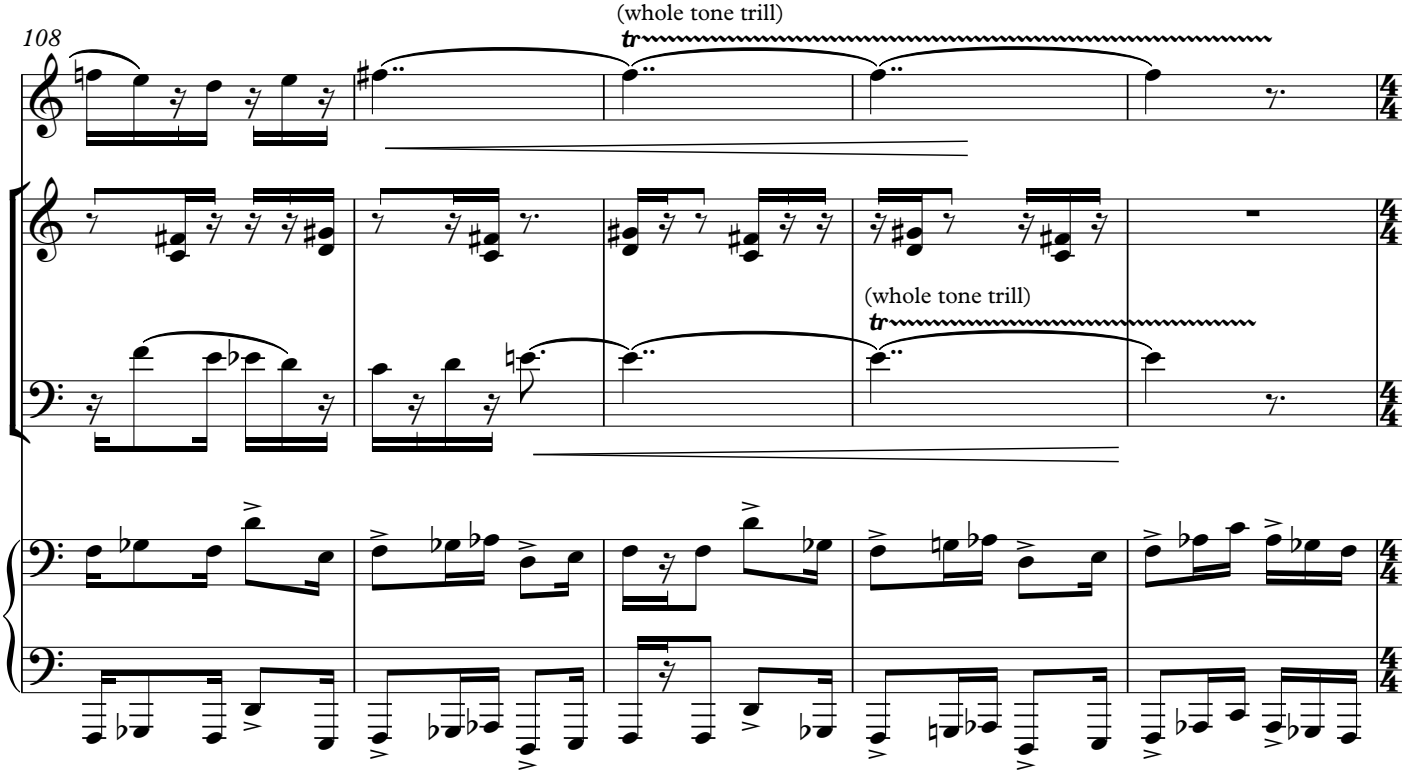

66
F
arco
mp
mp
8va
73
mf
mf
(8)


79
f
f
mf
(8)
mf


84
ff
ff
ff
(8)


89
G
f
f
mf
95
ff
f


102
pizz.
ff
f


108
(whole tone trill)
tr
(whole tone trill)
tr

H

113

ff

arco

ff

ff

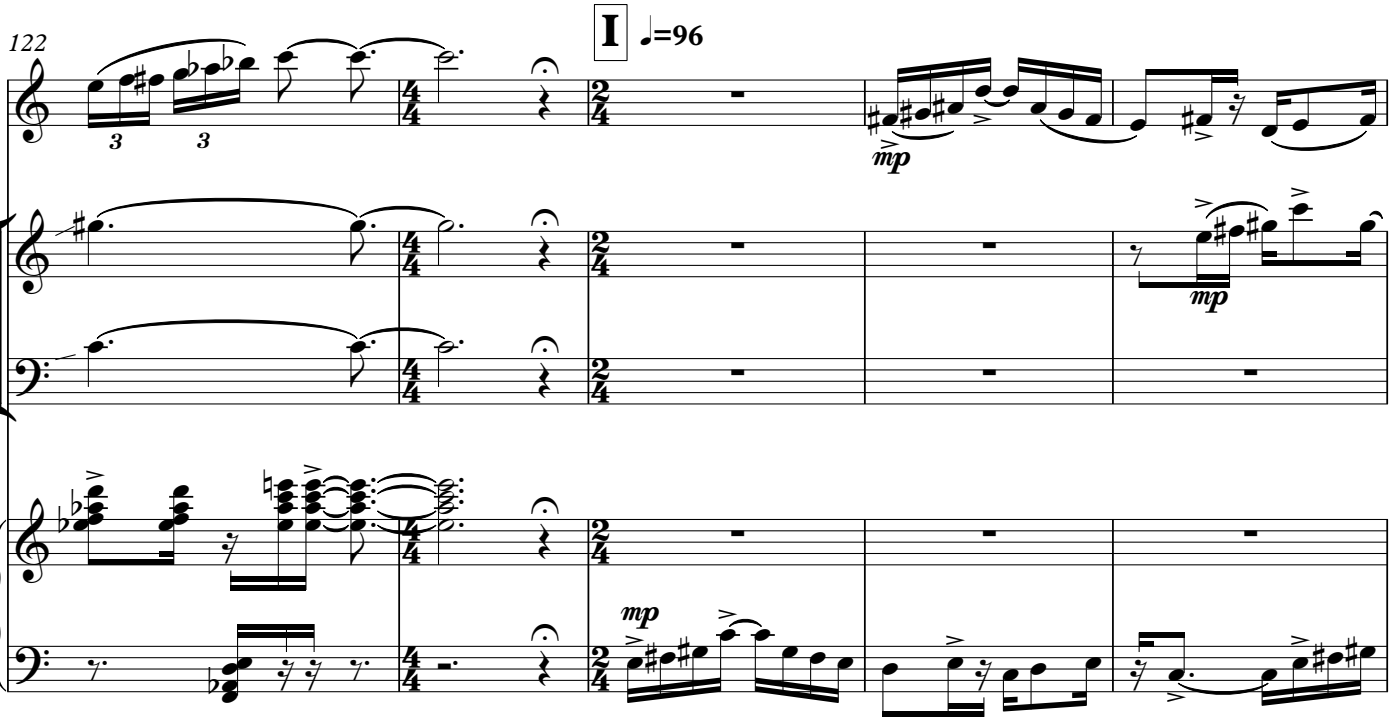
ff

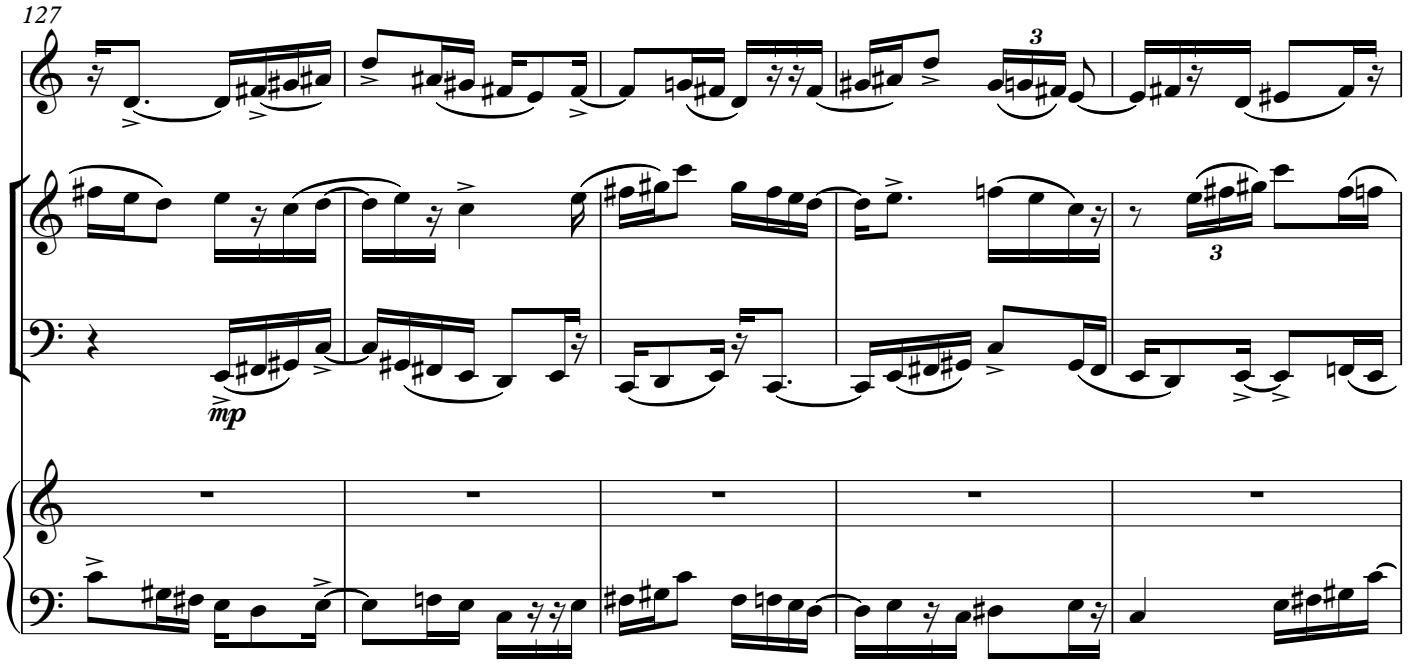
116

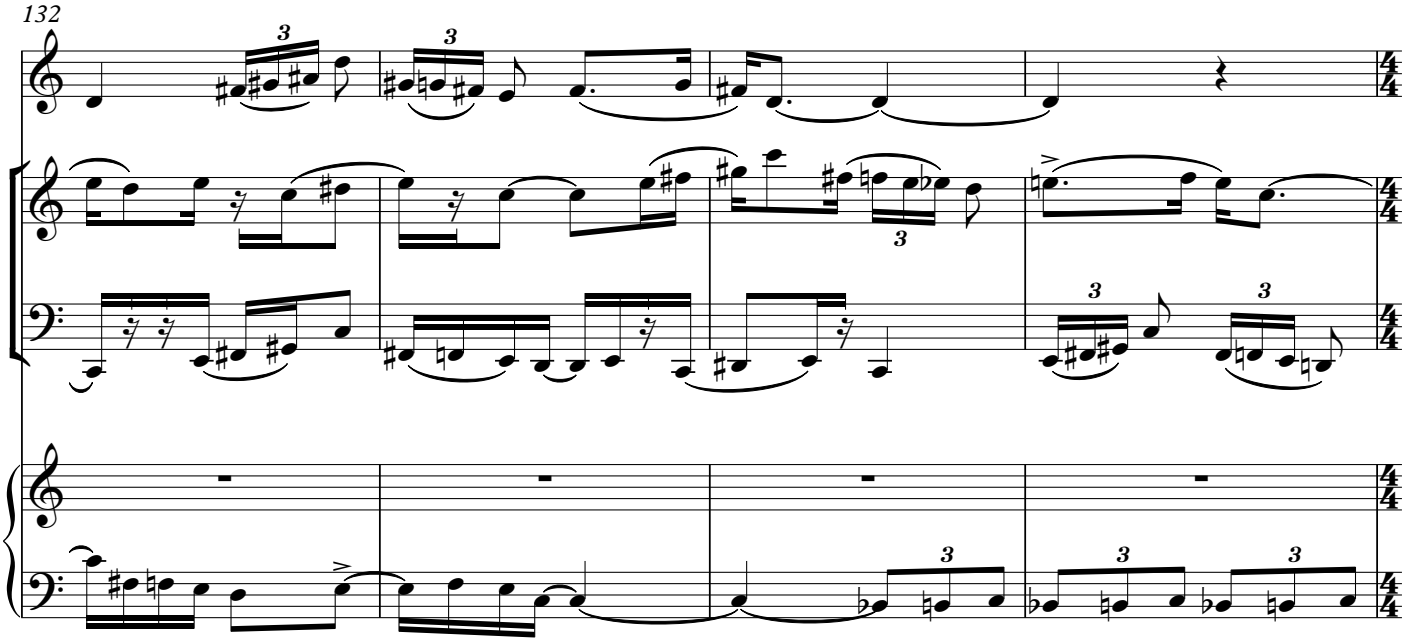
3

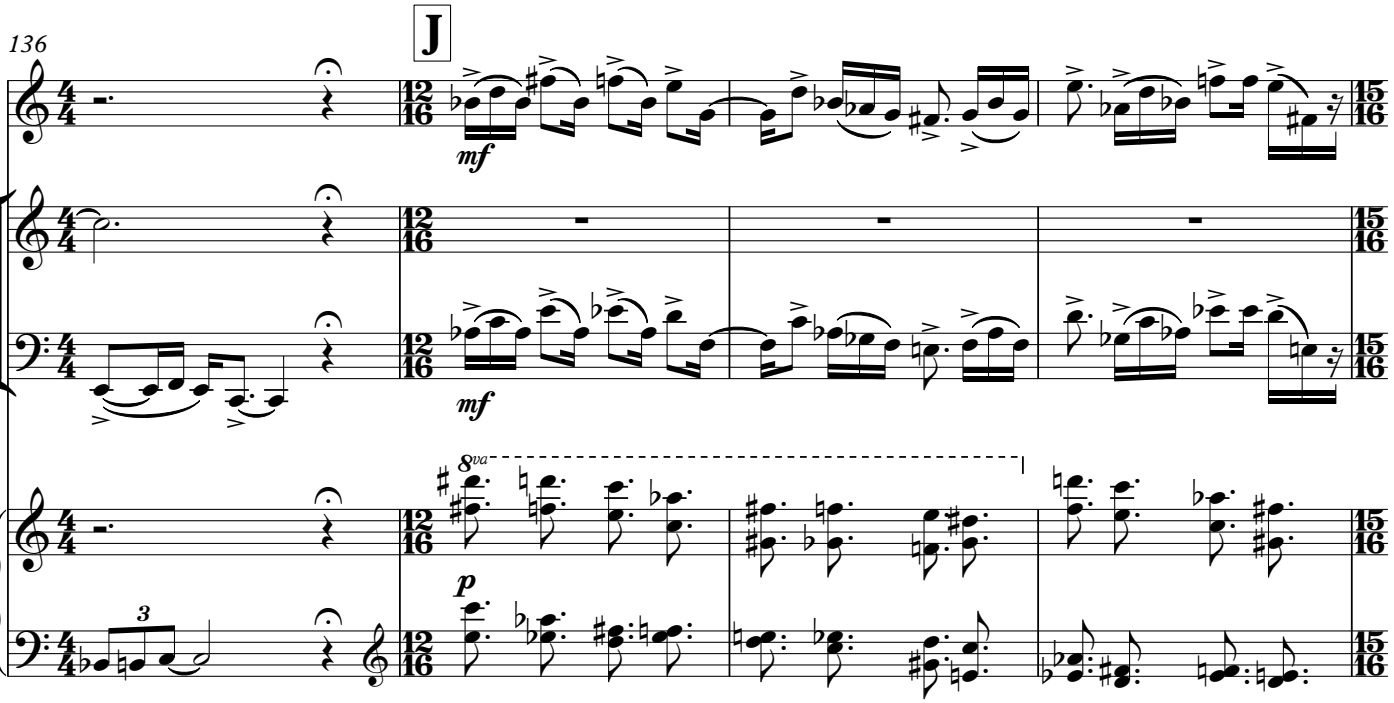
3

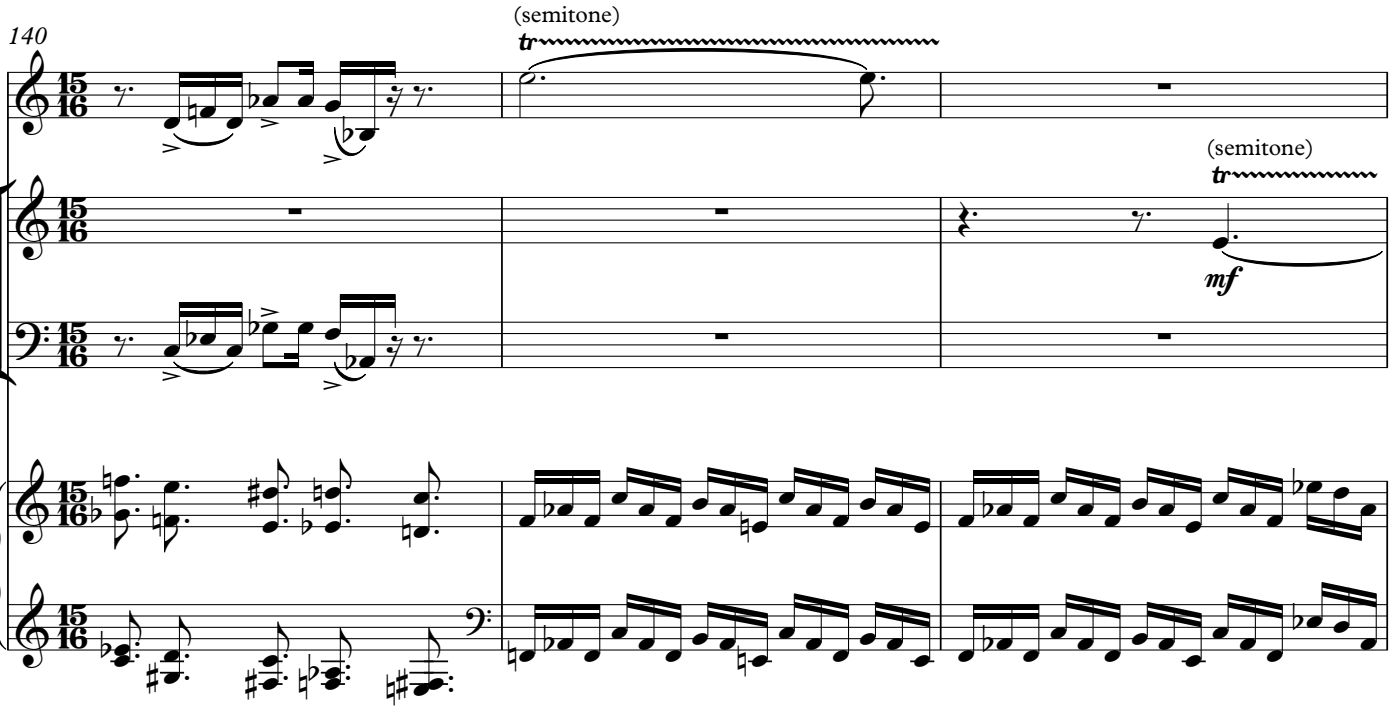
fff

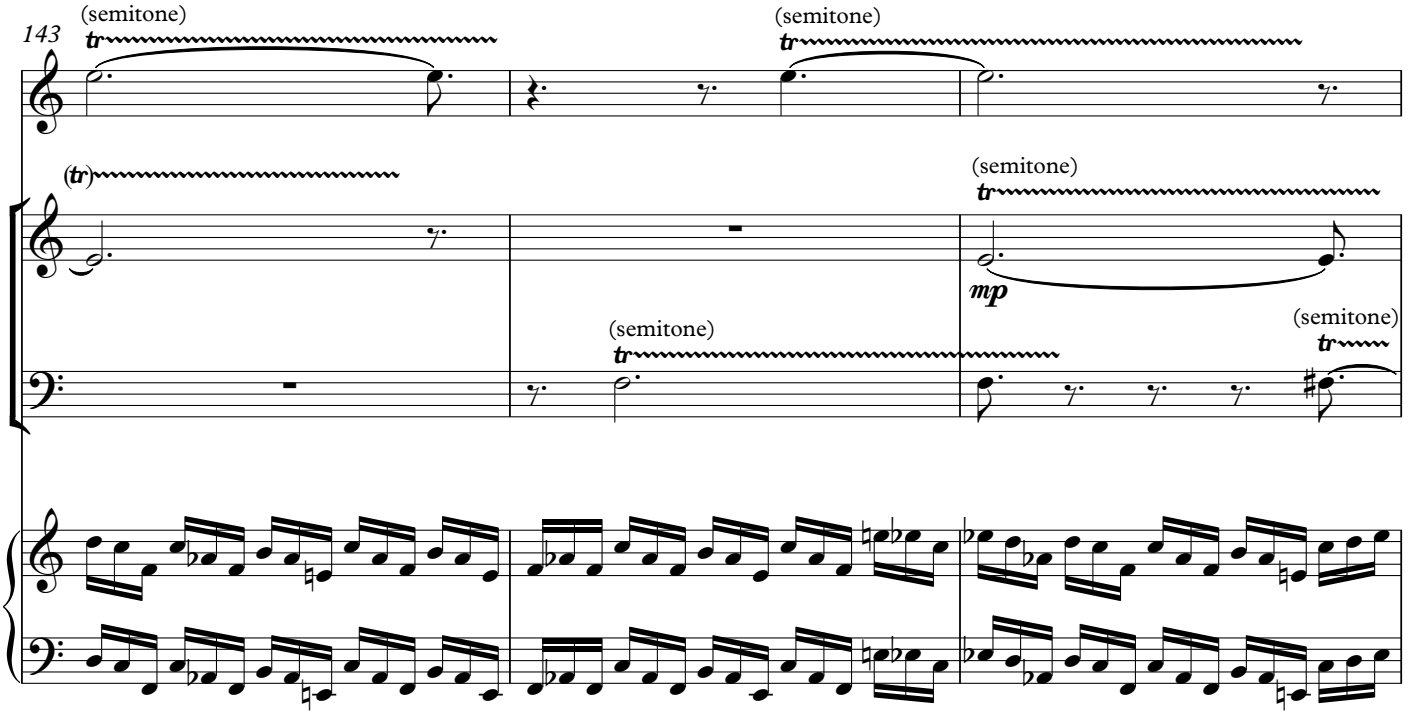

122
I
♩=96
mp
mp
mp

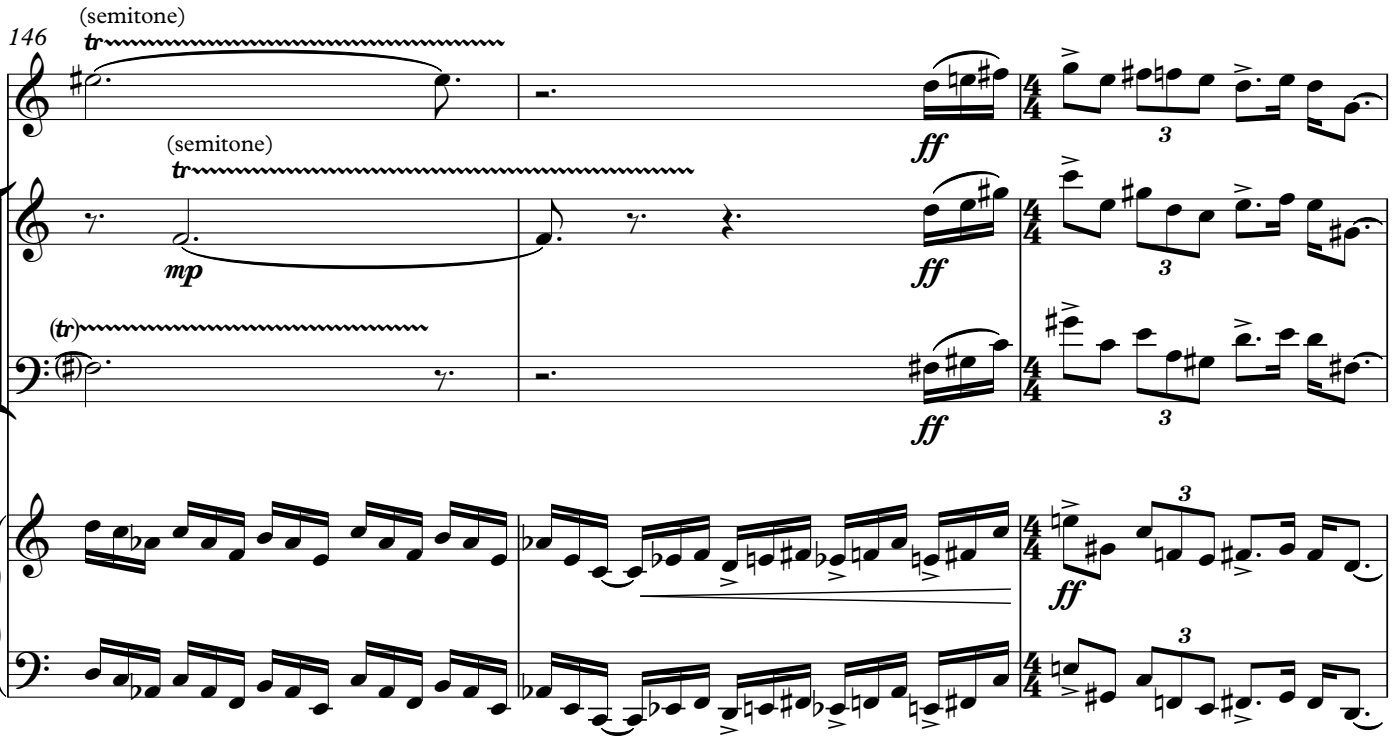

127
mp

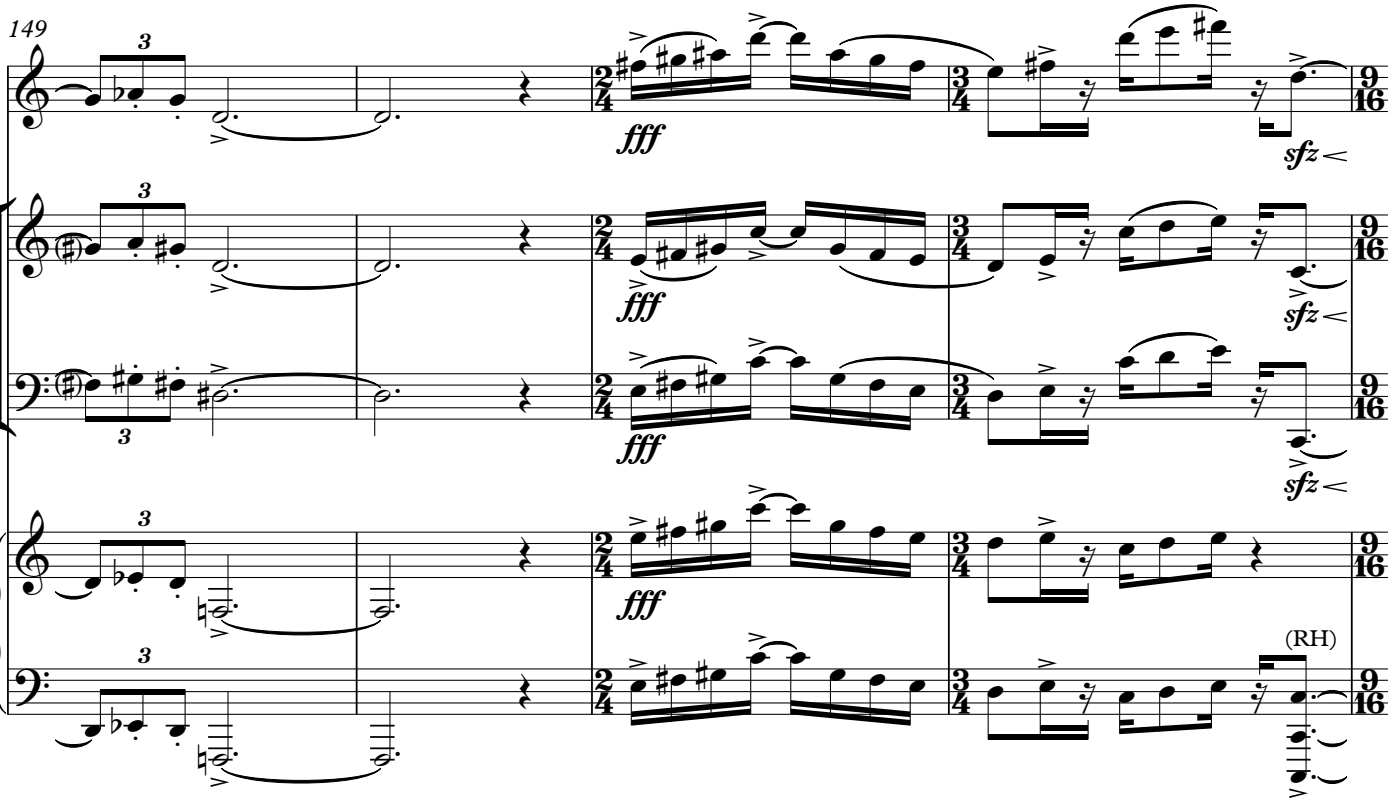

132

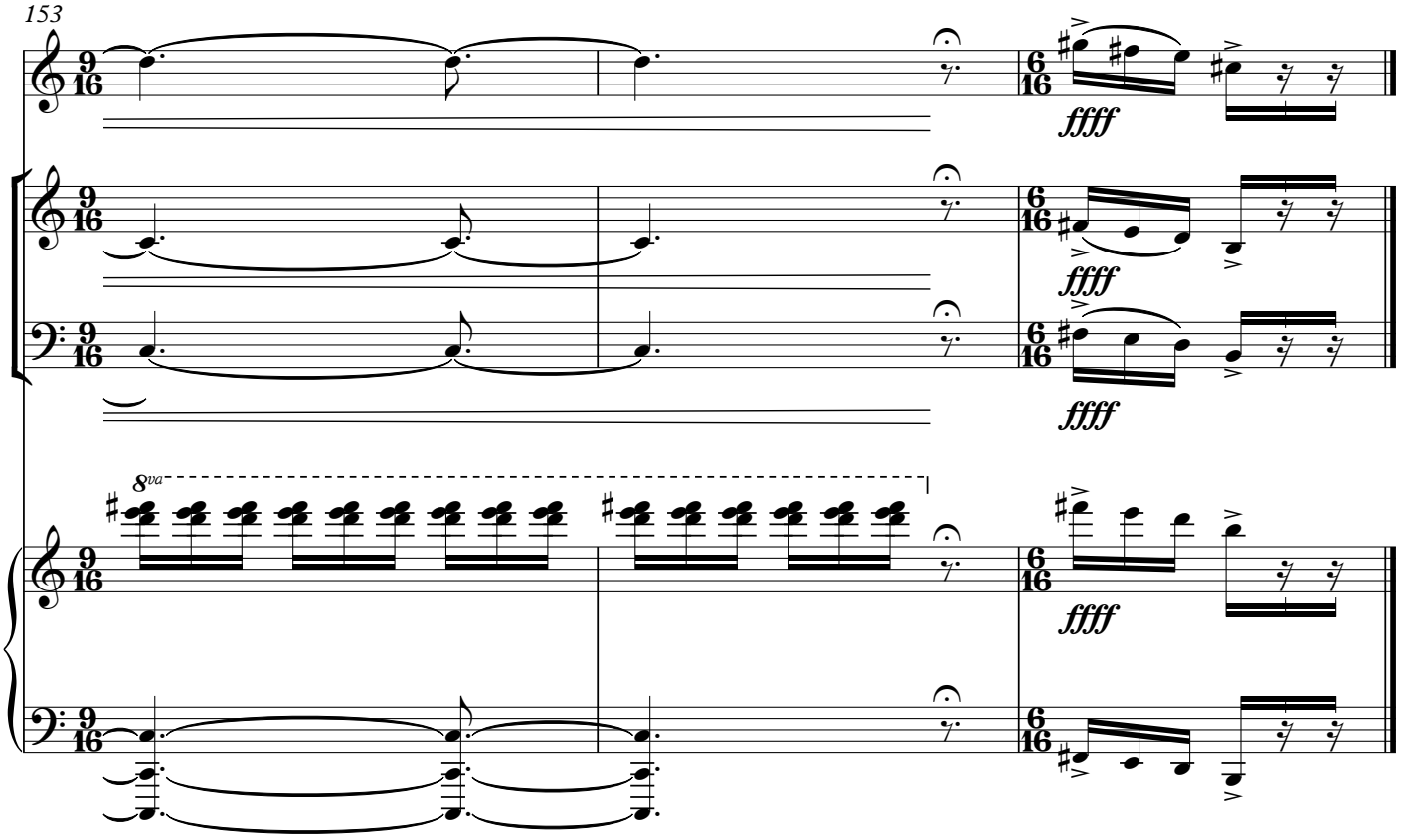

136
J
mf
mf
8va
p


140
(semitone)
tr
(semitone)
tr
mf


143
(semitone)
tr
(semitone)
tr
(tr)
(semitone)
tr
mp
(semitone)
tr
(semitone)
tr


146
(semitone)
tr
(semitone)
tr
mp
(tr)
ff
ff
ff
ff
3
3
3
3


149
3
3
3
3
fff
fff
fff
fff
sfz
sfz
sfz
(RH)
2/4
3/4
9/16


153
ffff
ffff
ffff
8va
ffff

Hexagon I: Janusian

Notes on Percussion Parts:

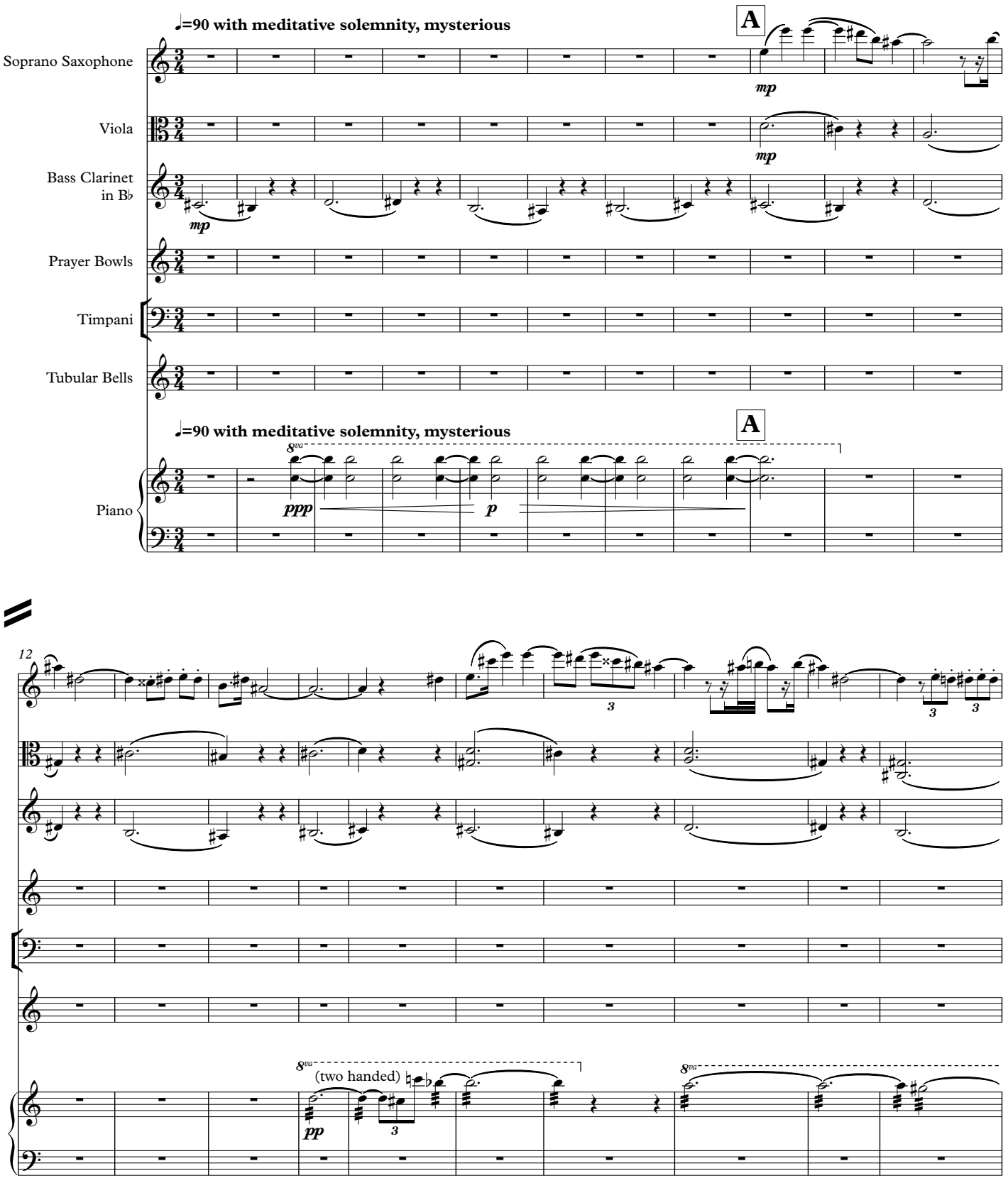
Prayer Bowls Player: This part requires six prayer bowls (Himalayan singing bowls are preferred, but other types of metallic tone-producing bowls will do). If possible, the approximate pitches of the bowls should be C, D flat, D, A flat, A and B flat. Exact octave placement as written in the score does not matter. Place the D, A, and C on the head of a 29" timpani, triangulated, each about 2"-3" from the outer edge. Place the D flat, A flat, and B flat on a 23" timpani in the same fashion. Position so that your feet can work the pedals on both timpani simultaneously. Each time you strike a bowl, allow the pitch to ring until the sound fades naturally, while also pumping the pedal up and down. It should take from 3-5 beats for the foot to move the pedal in one direction, to fully up or fully down. Choose mallets that will bring the tones out without excessive inharmonic noise upon upon the strike. Take care that the pedals on the timpani do not create extra noise.

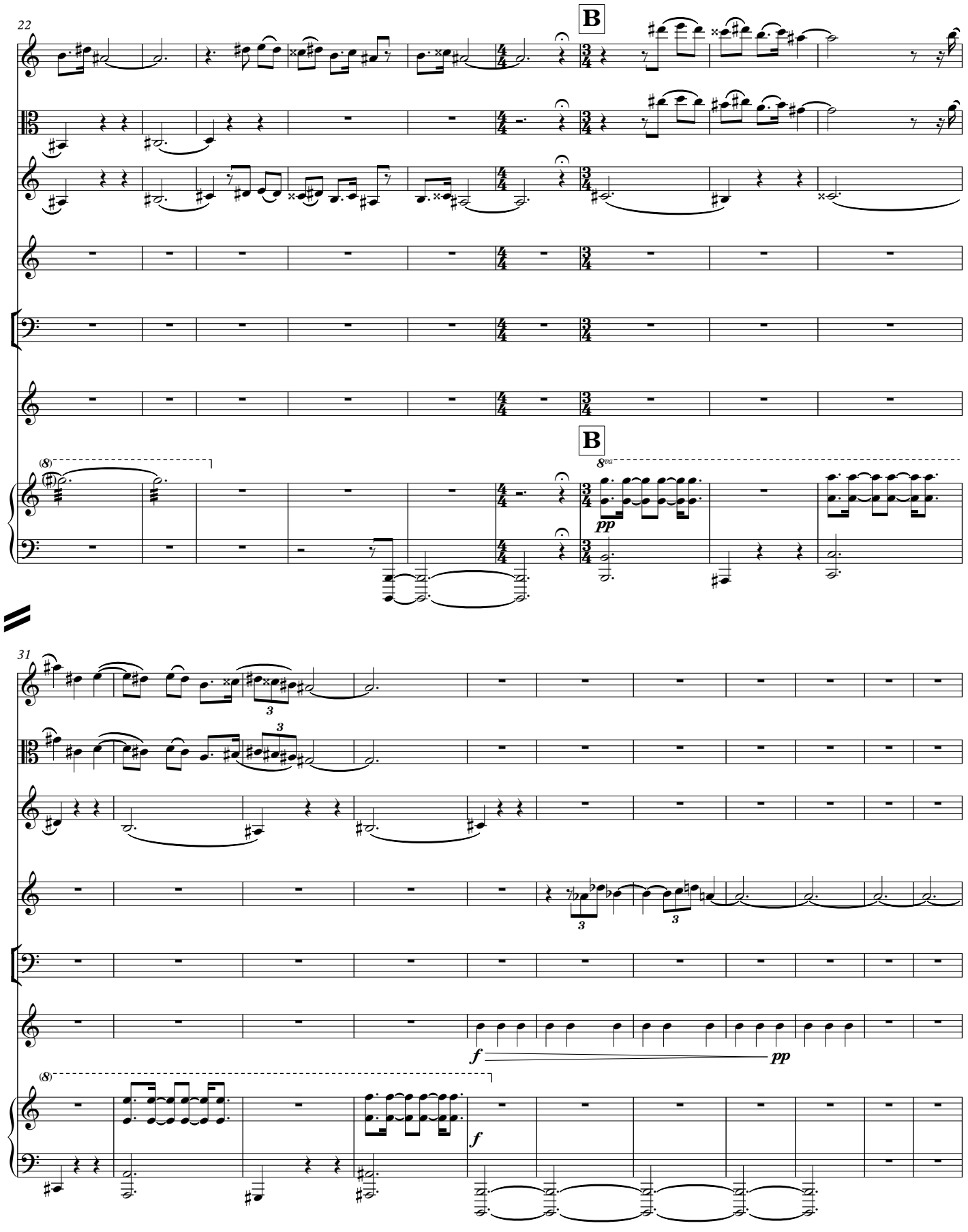
Timpani Player: Use one standard timpani mallet. Tune the 26" timpani to B. Always mute slightly with the other hand while playing, to simulate something like a Native American powwow drum. Tone should not ring for more than one beat--preferably less.

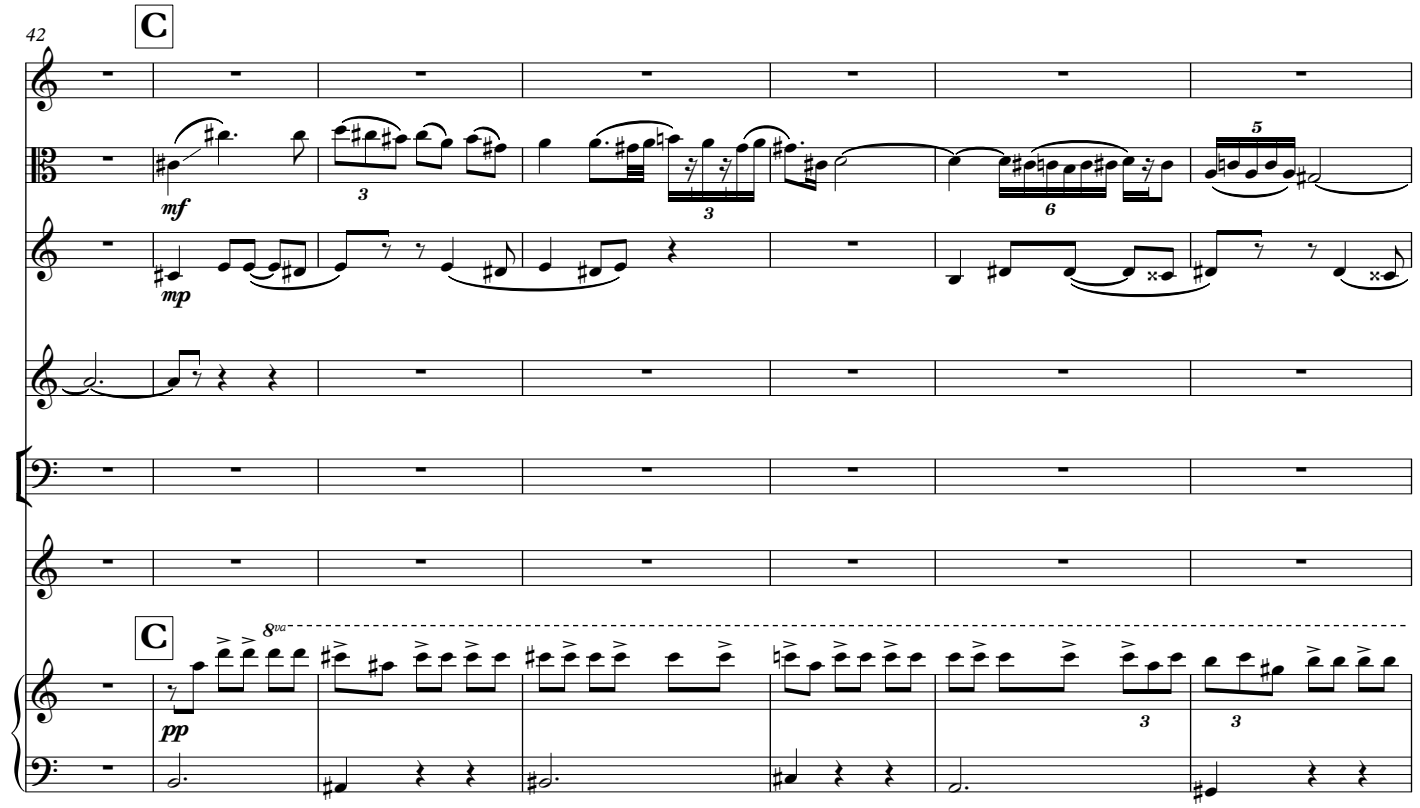
Chimes Player: Use standard hammers. Be careful to keep tight control on the volume. Do not let the sound swell to overwhelm the other instruments.

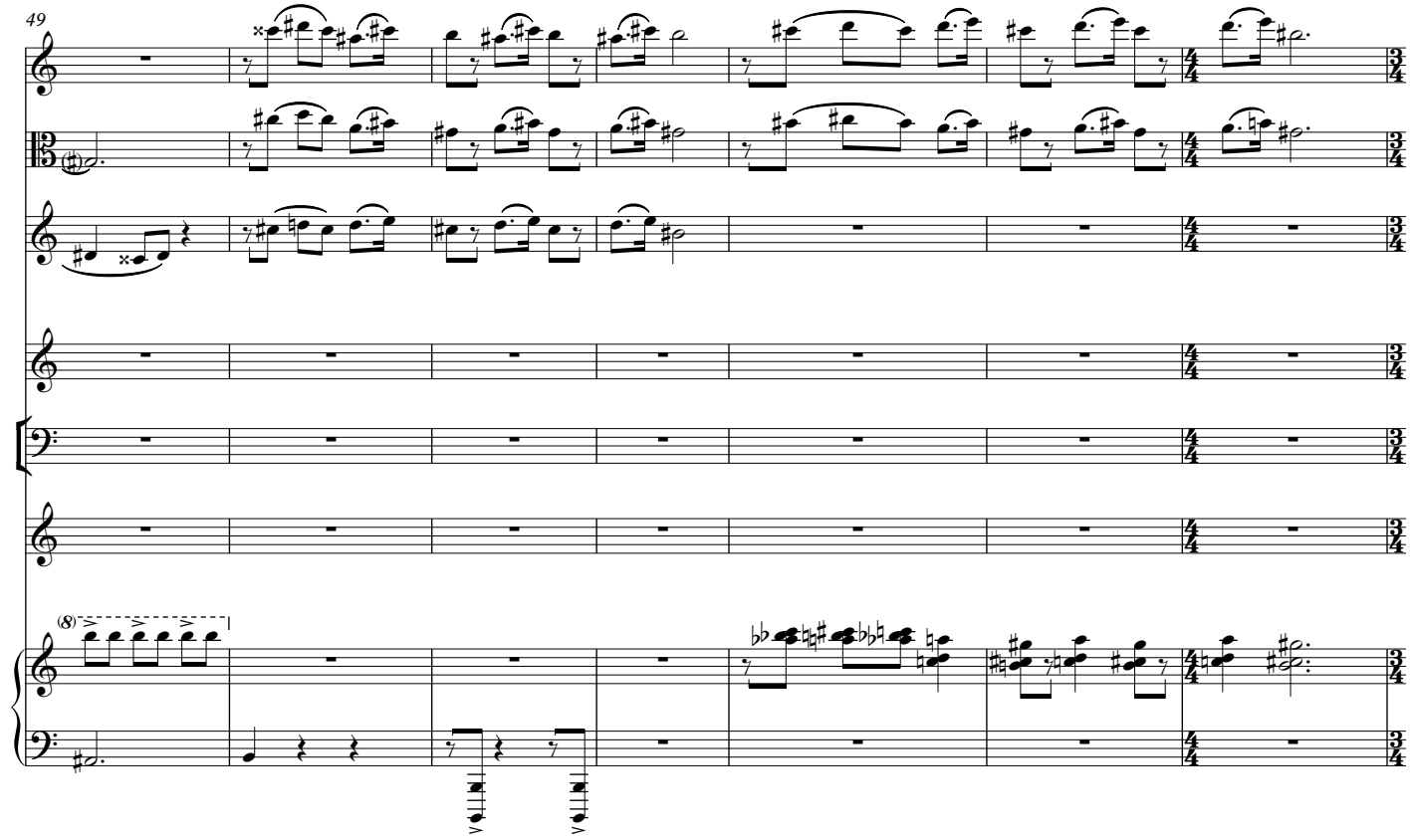
Hexagon I: Janusian

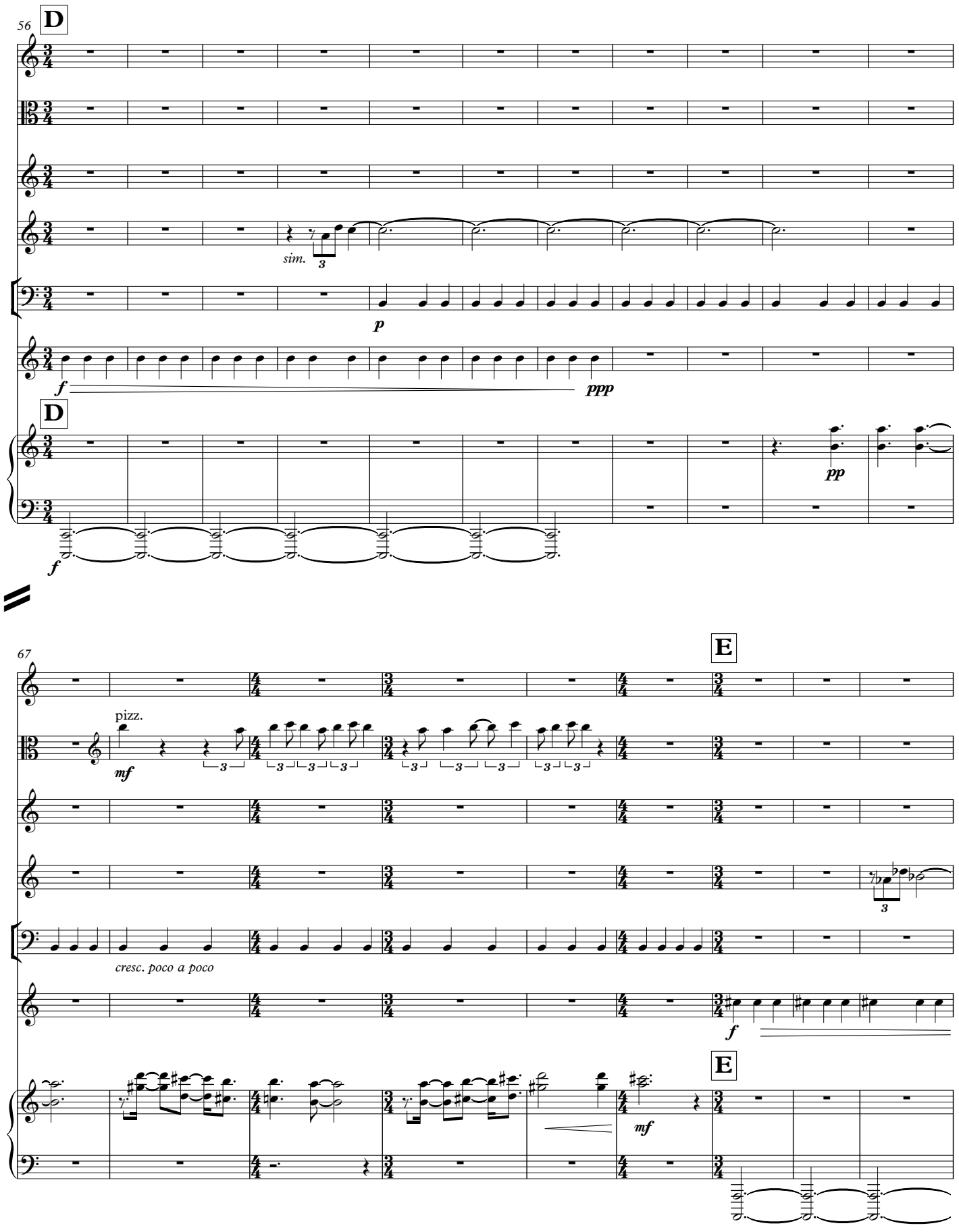
k. Scott Eggert

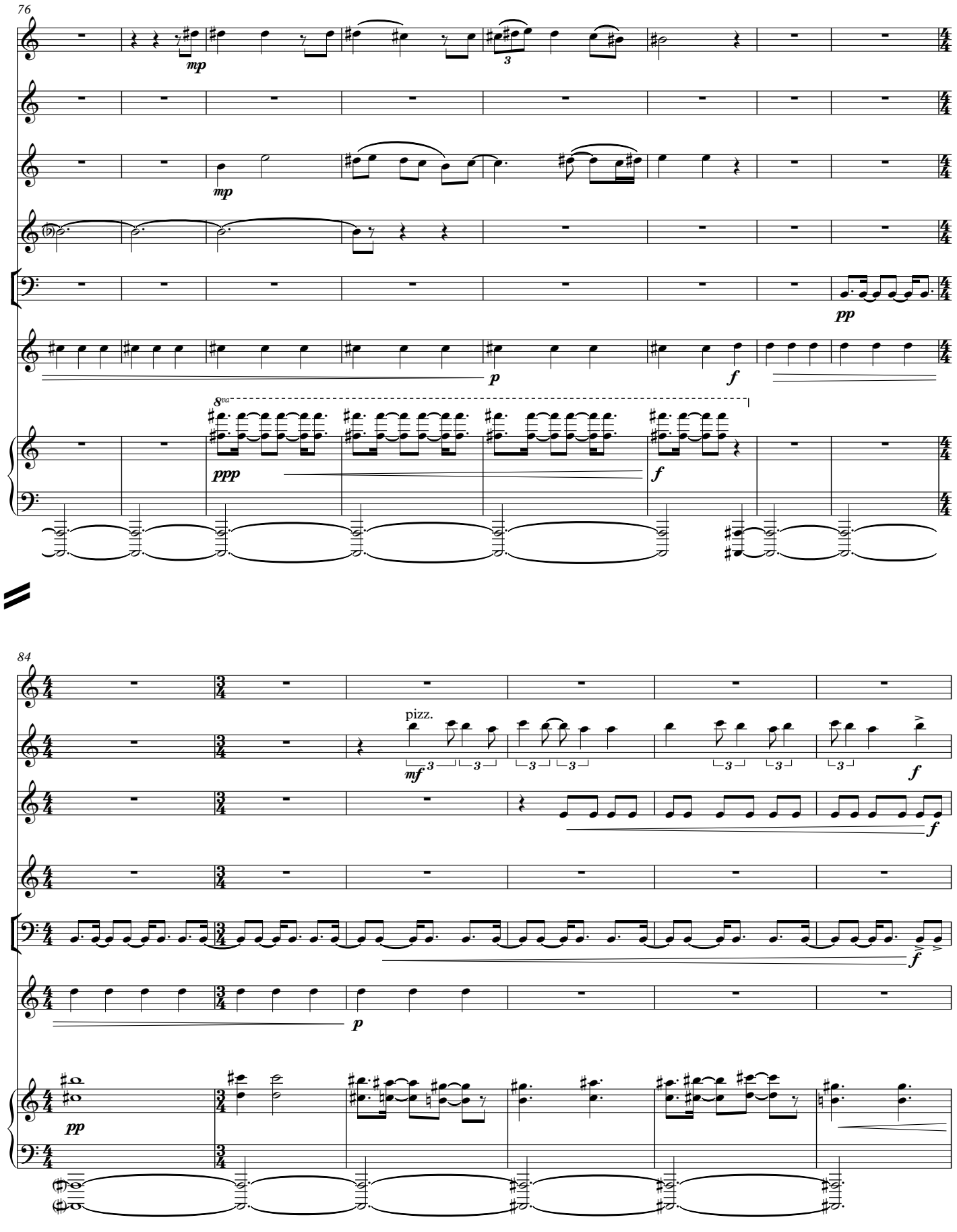


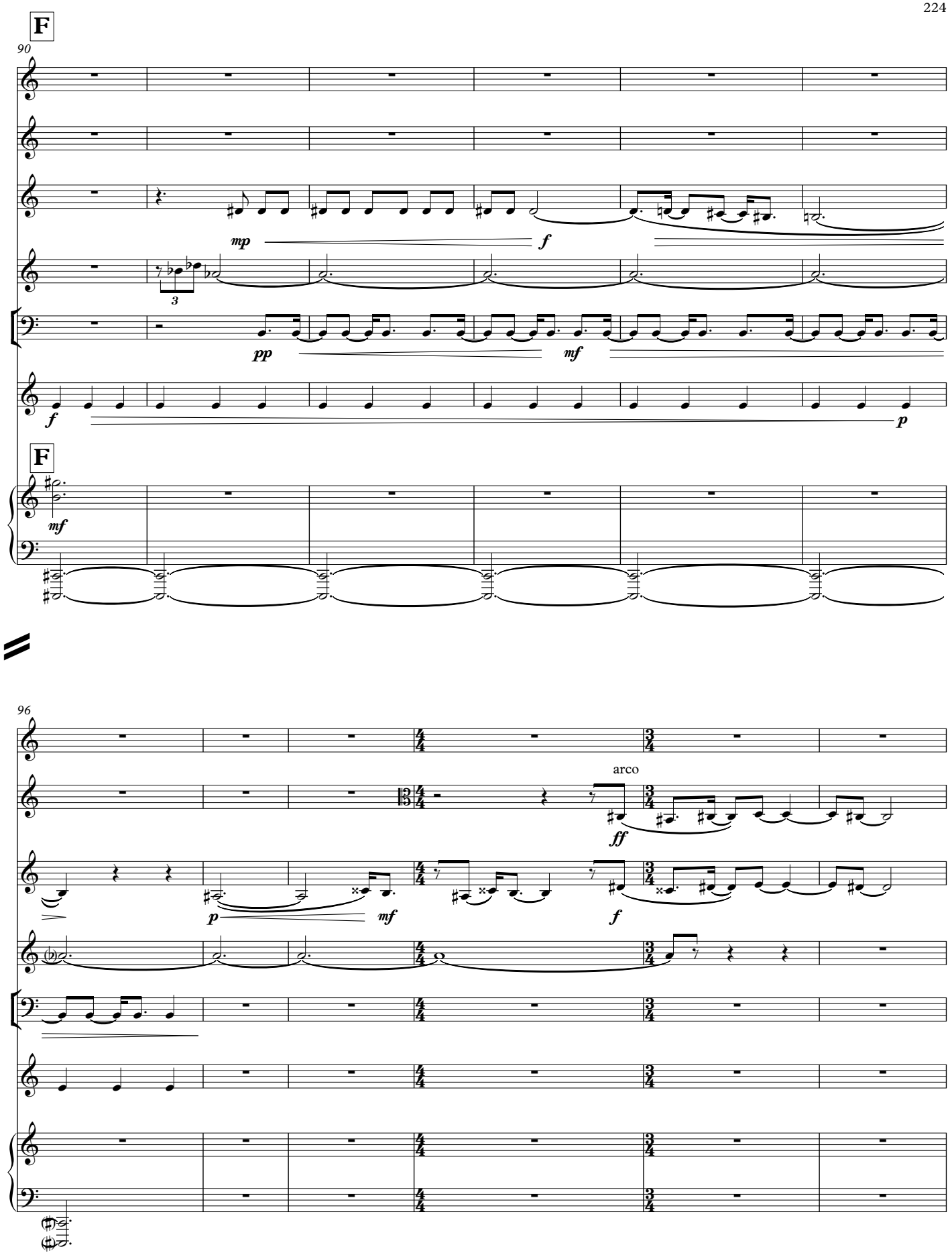

22
B
B
8va
pp
31
3
3
3
f
pp
f

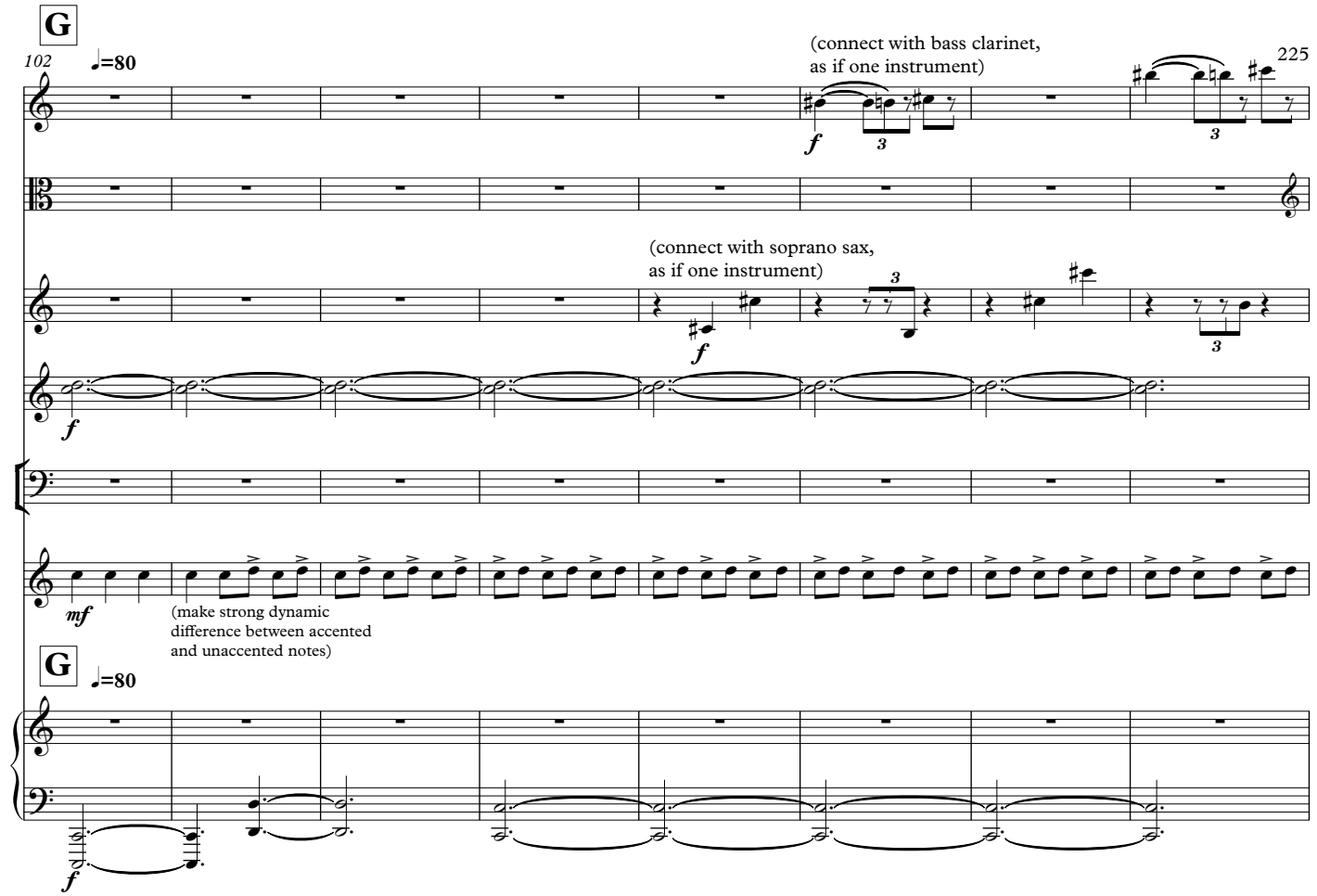

42
C
mf
mp
C
8va
pp

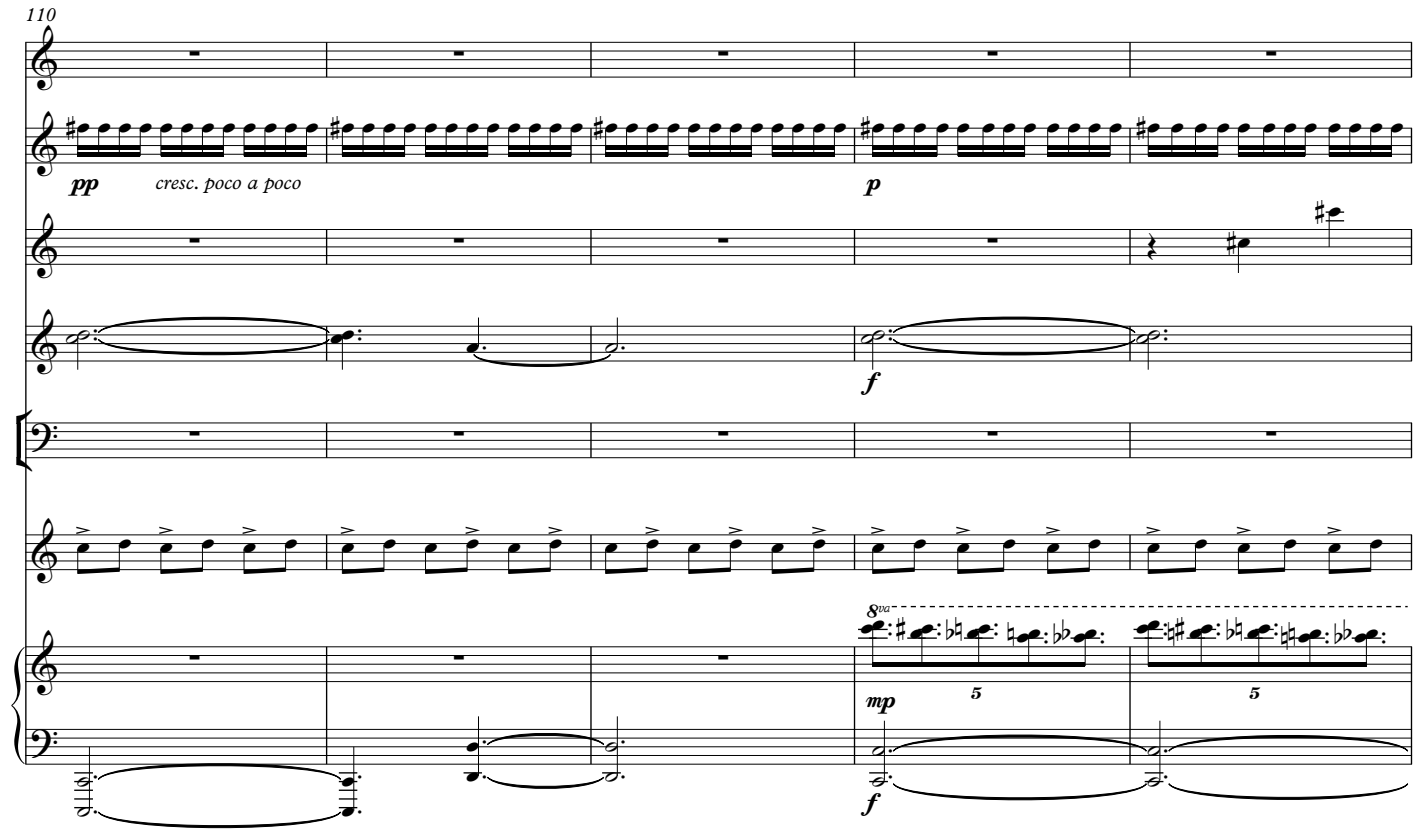

49
(8)

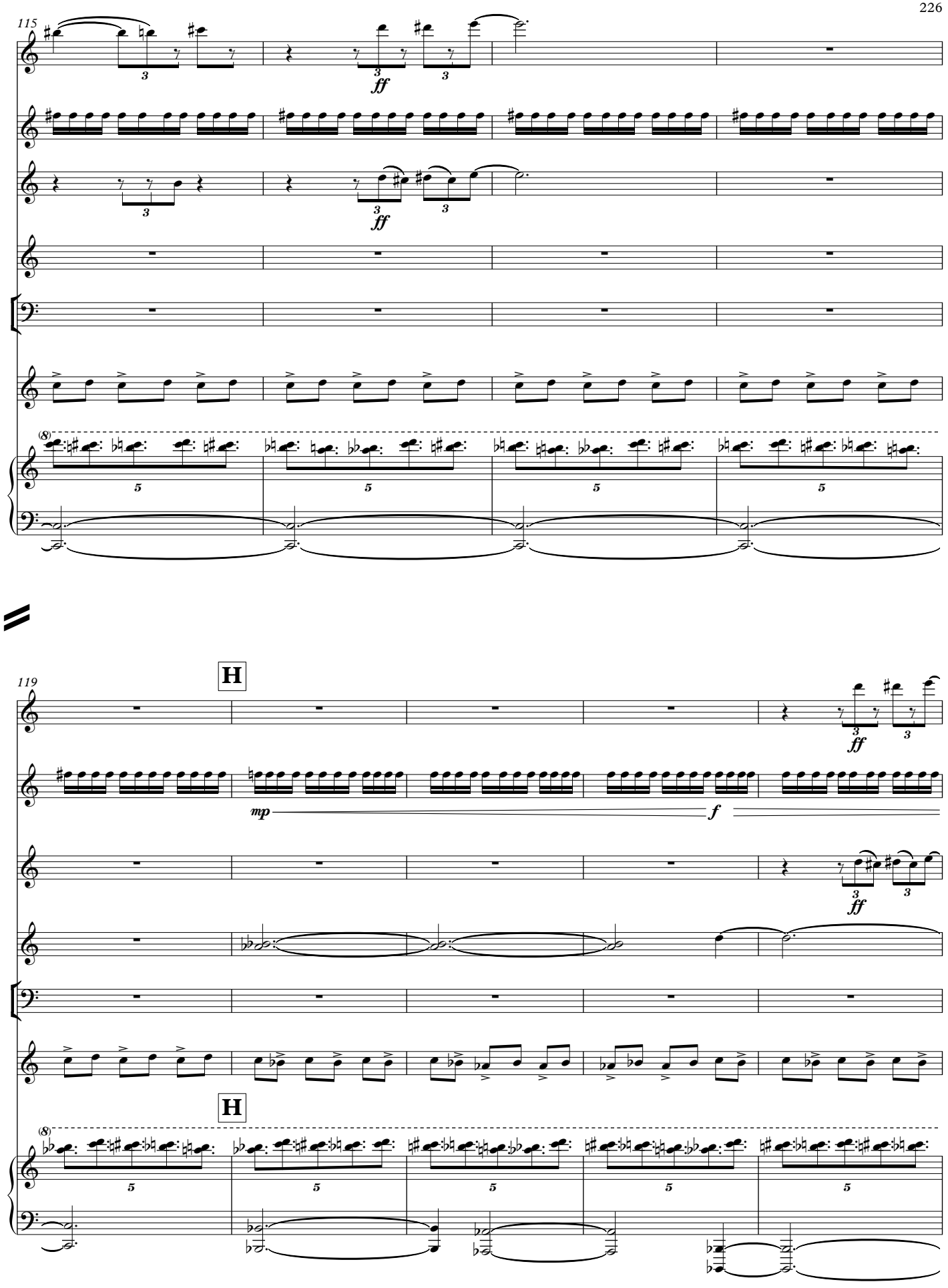

56
D
sim.
p
f
ppp
D
pp
f
67
E
pizz.
mf
cresc. poco a poco
f
E
mf

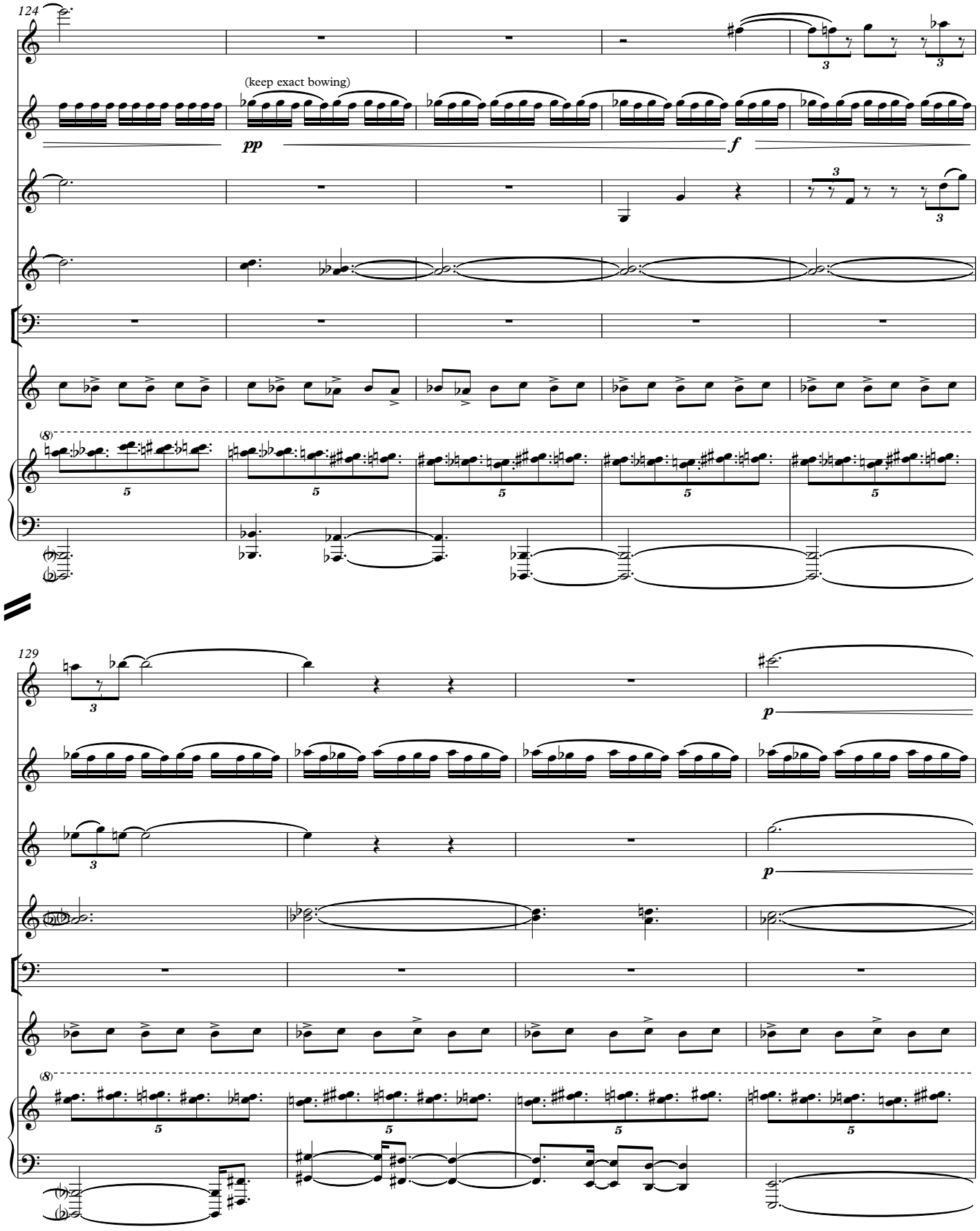

76
mp
mp
pp
p
f
8va
ppp
f
84
pizz.
mf
f
f
f
p
pp

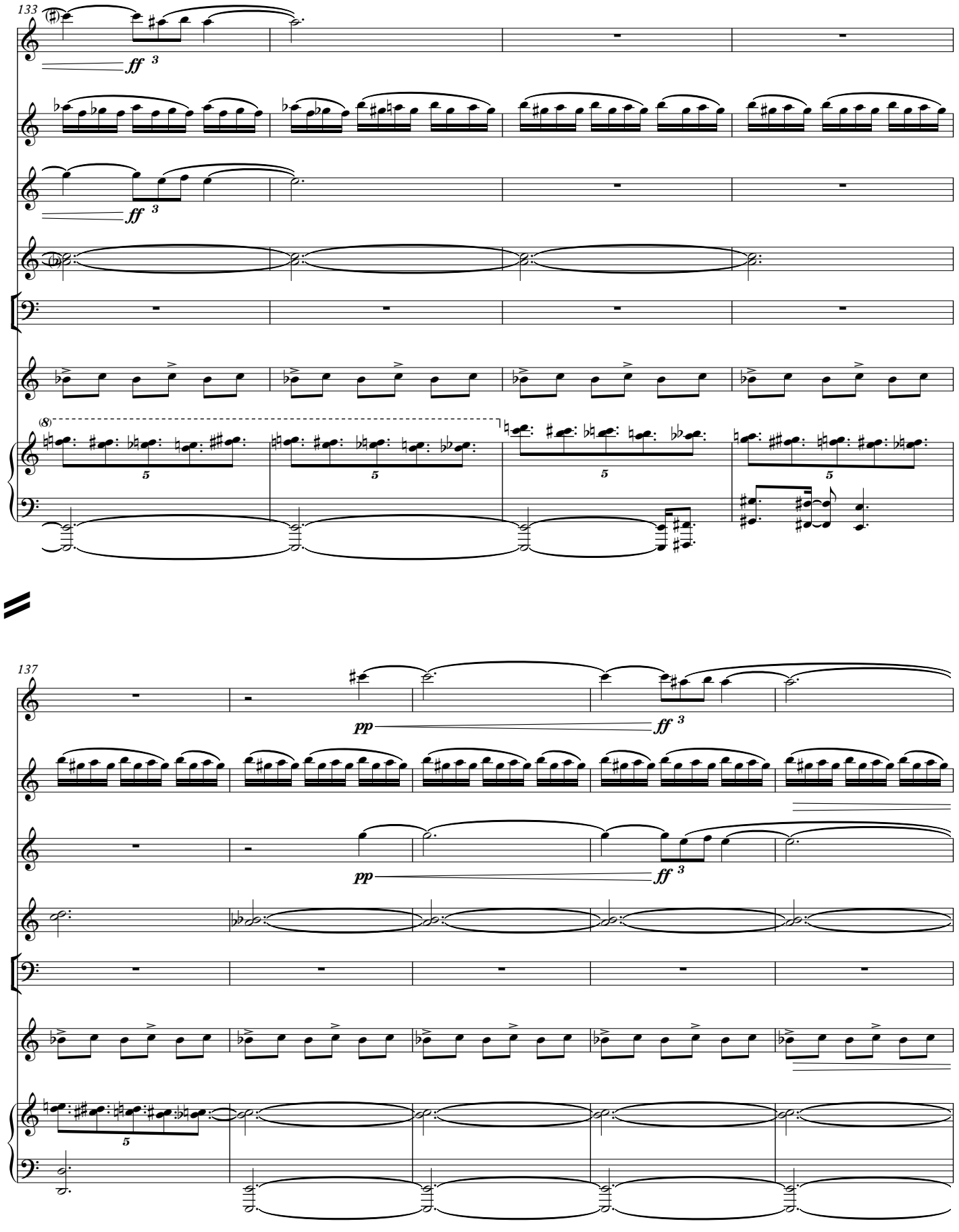

F
90
mp
f
pp
mf
f
p
F
mf
96
arco
ff
p
mf
f

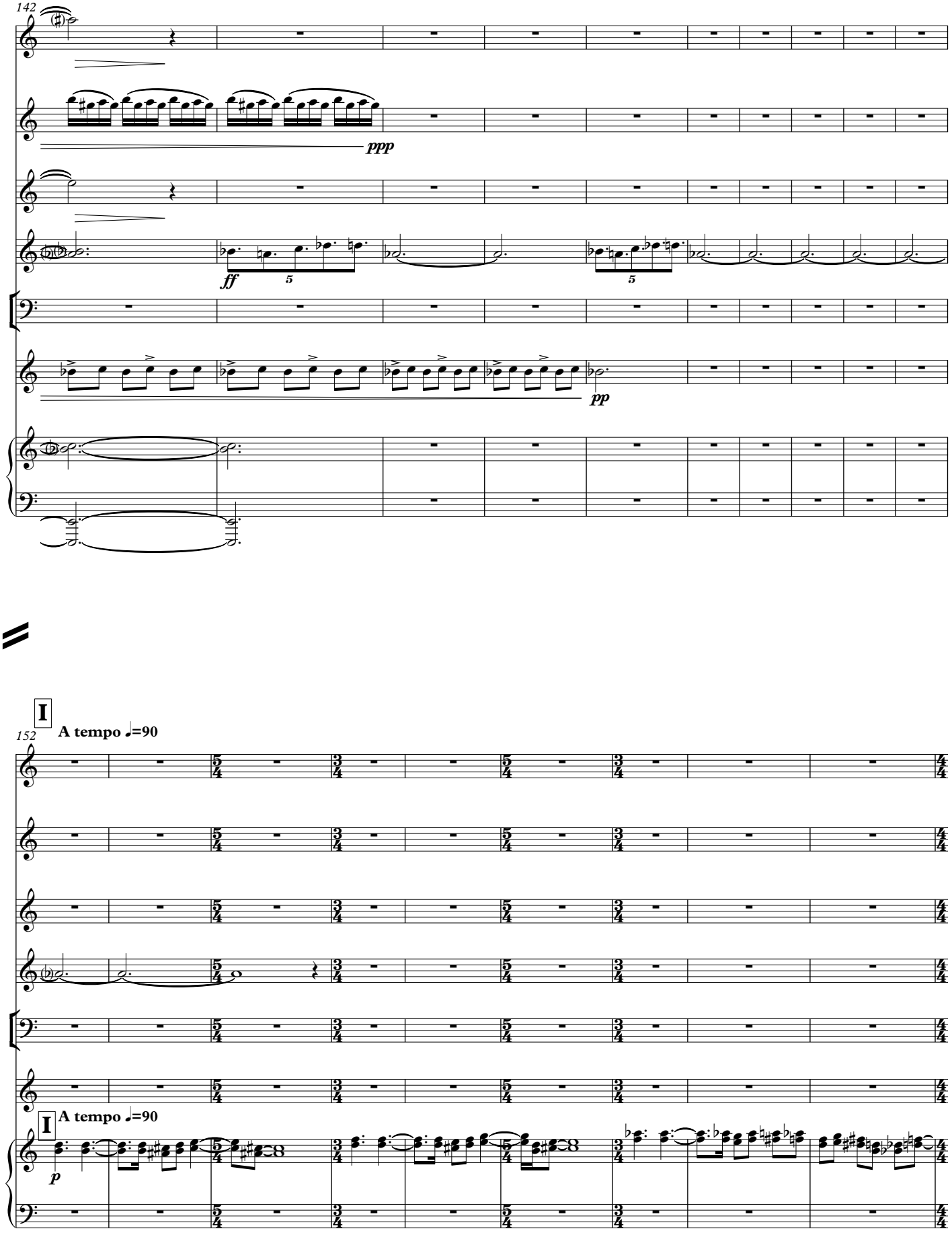

G
102
♩=80
(connect with bass clarinet,
as if one instrument)
f
3
3
(connect with soprano sax,
as if one instrument)
f
3
3
f
mf
(make strong dynamic
difference between accented
and unaccented notes)
G
♩=80
f

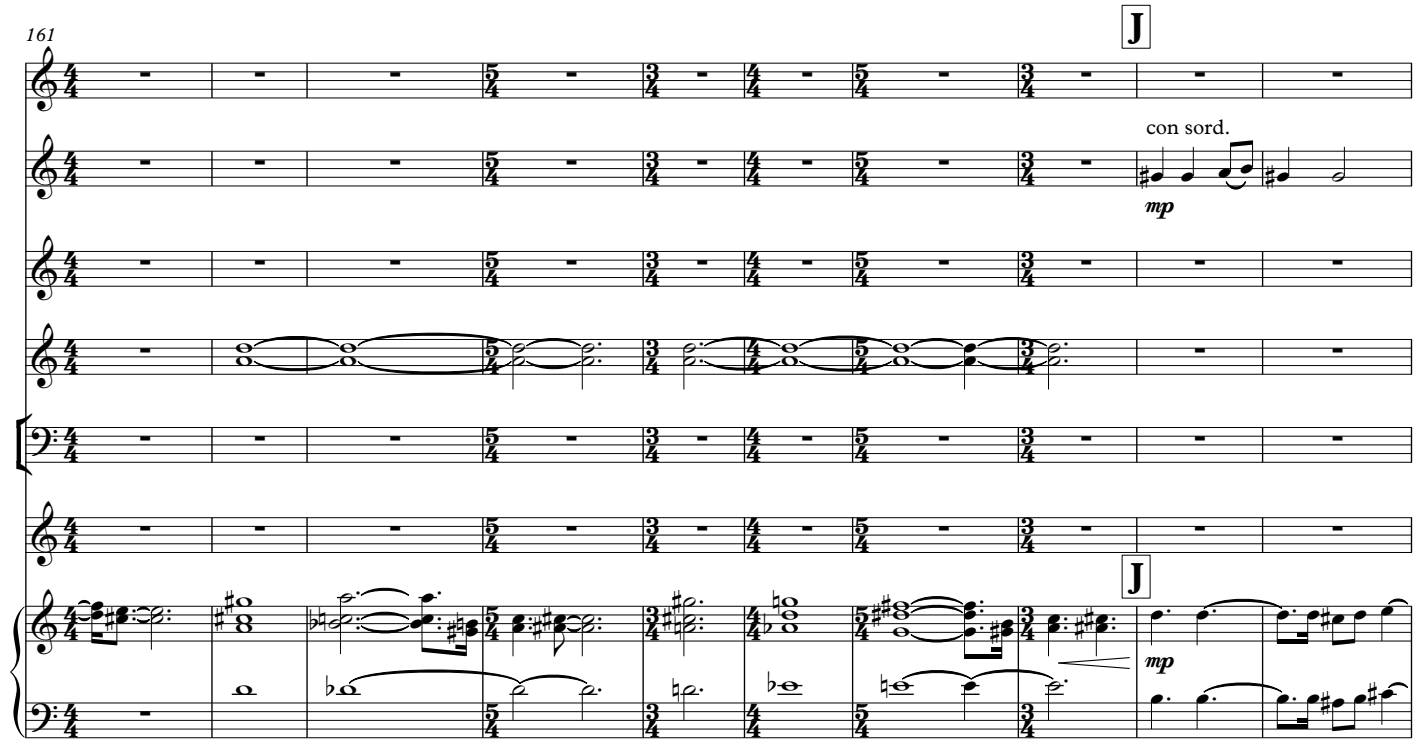

110
pp
cresc. poco a poco
p
f
8va
mp
5
5
f

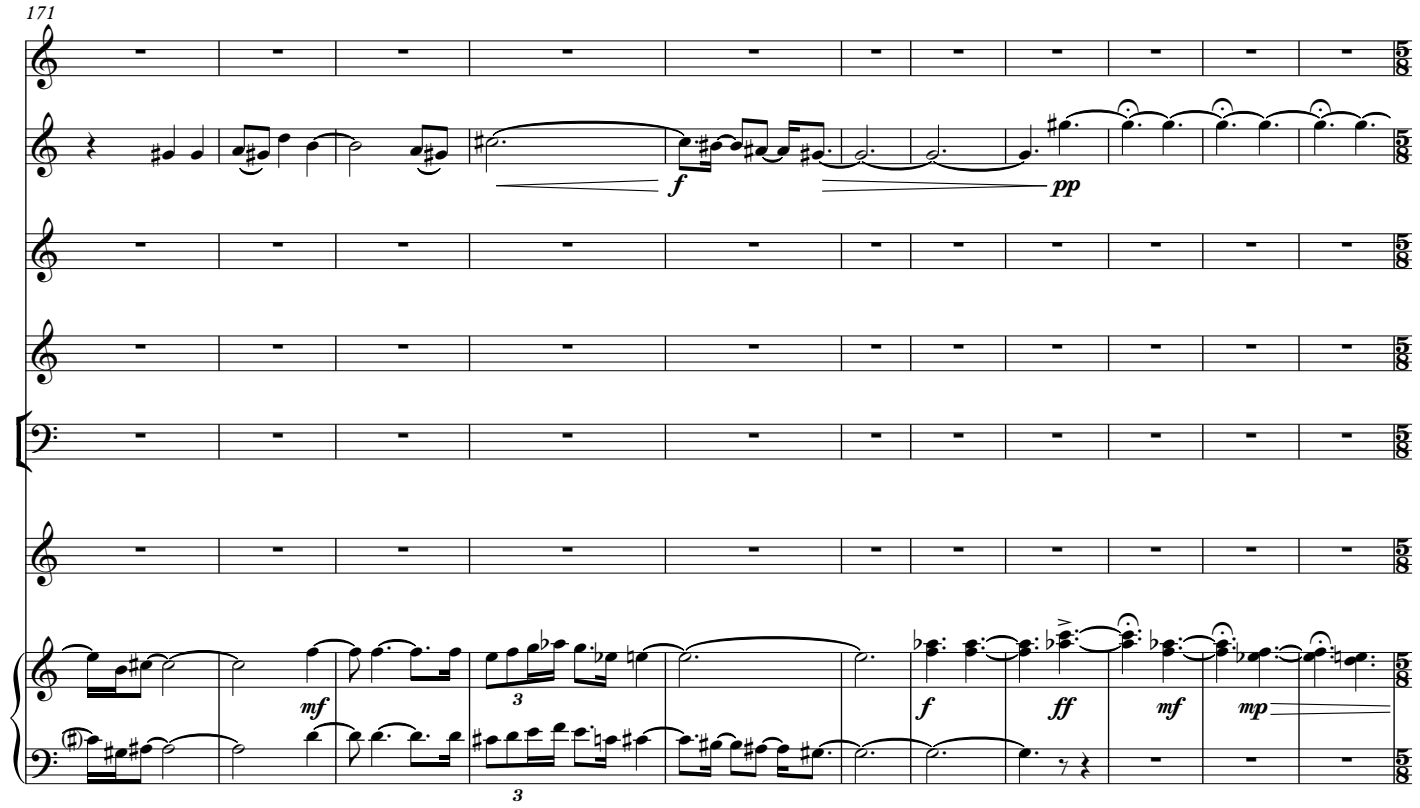

115
ff
119
H
mp
f
ff
H

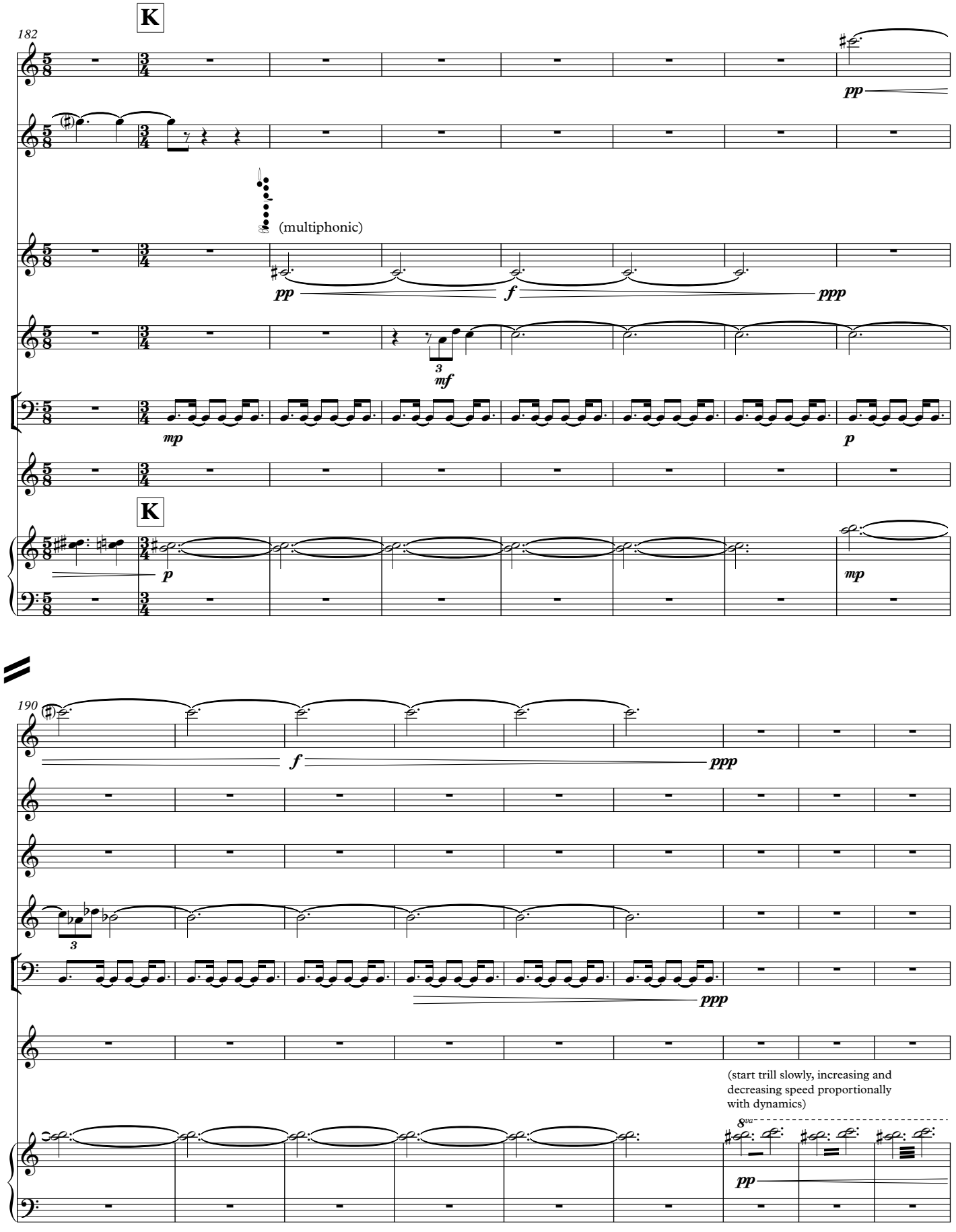

124
(keep exact bowing)
pp
f
(8)
129
p
p
(8)

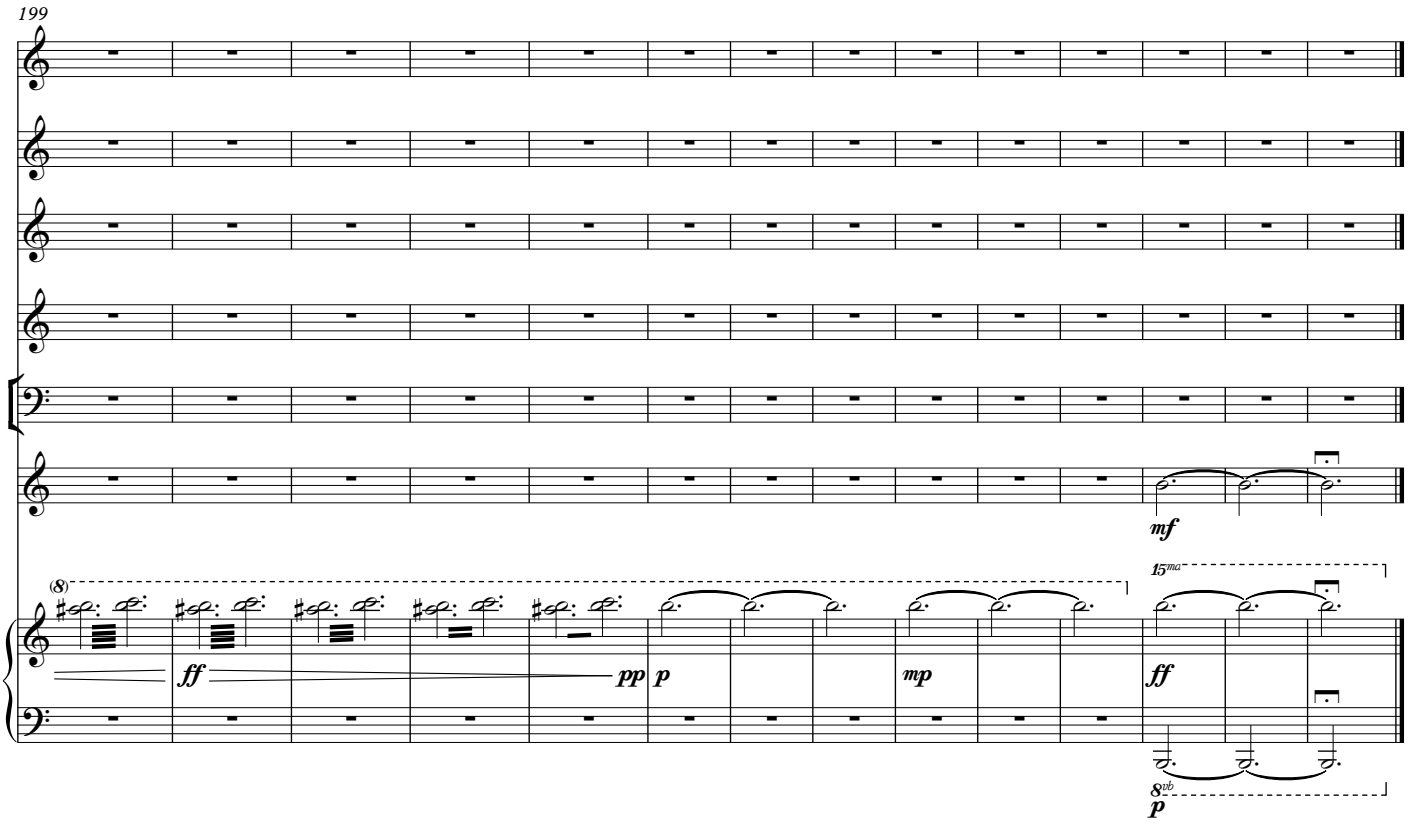

133
ff
3
(8)
5
137
pp
ff
3


142
ppp
ff
5
5
pp
I
A tempo ♩=90
152
I
A tempo ♩=90
p


161
J
con sord.
mp
J
mp


171
f
pp
mf
3
3
f
ff
mf
mp


K
182
pp
(multiphonic)
pp
f
ppp
3
mf
mp
p
K
p
mp
190
f
ppp
3
ppp
(start trill slowly, increasing and decreasing speed proportionally with dynamics)
8va
pp



November 2009-December 2016