MARQUEZ, JOSHUA T., M.M. Incorporation of Humpback Whale Song in an Electroacoustic Concert Piece. (2013)
Directed by Dr. Alejandro Rutty. 94pp.

Inclusion and usage of humpback whale song within the context of an electroacoustic or acoustic ensemble has been used in recent twentieth and twenty-first century literature such as George Crumb's *Vox Balaenae*. New humpback whale song research techniques enable composers to create more representative ways, than previously used, to effectively capture the sound environments of the wild by using instrumental and vocal imitation or through the inclusion. I have composed a piece, *Song of the Sirens*, with a researched use of the aforementioned techniques and an understanding of the pitch material, contour, and development of humpback whale song. In *Song of the Sirens*, I present the songs of the humpback whale to be that of the mythological creature, the Siren.

This thesis investigates the deeper connection between humpback whale song and composition by including the compositional techniques informed by new research of humpback whale song and the process in which the techniques may be adapted for human composition.

I provide original research led by Dr. Patricia Gray, Senior Research Scientist, at the Music Research Institute of the University of North Carolina at Greensboro (Appendix A/Appendix B), a score of the work (Appendix C), and the Max/MSP patches used to perform the electronic component of the composition (Appendix D).

INCORPORATION OF HUMPBACK WHALE SONG IN AN ELECTROACOUSTIC CONCERT PIECE

by

Joshua T. Marquez

A Thesis Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Master of Music

Greensboro
2013

Approved by

_____
Committee Chair

APPROVAL PAGE

This thesis has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair _____
Dr. Alejandro Rutty

Committee Members _____
Dr. Mark Engebretson

_____
Dr. Patricia Gray

_____
Date of Acceptance by Committee

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CHAPTER I

INTRODUCTION

Humpback whales (M*egaptera novaeangliae*) have been known for centuries to have elaborate vocalizations. Roger Payne and Scott McVay first demonstrated that humpback whale vocalizations are "song" in 1967. Payne and McVay define whale song to be a pattern of repeated, coherent sounds that are intentionally organized in an aesthetically pleasing manner, intended for communication.[1] There are, however, recordings of humpback whale song collected by Frank Watlington that date back to 1958. These patterns in humpback whale song were determined by Payne and McVay to have significance to the whale in that the males agree upon and communicate the same song every year[2] with slight variations.[3] It is believed that the songs are used by males during the mating season from November through December. Singing, however, does occur in other seasons, waning in the spring and escalating in the autumn.[4]

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[1] Roger Payne, *Among whales* (New York: Scribner, 1995), 141-167

[2] Ibid, 152

[3] Milius, Susan. "Humpback Alters Song If Another One Sings Along," *Science News*, November 7, 2009, 5.

[4] Clark, Christopher A., Shonda Gaylord, Leila T. Hatch, Sofie M. Van Parijs, Denise Risch, Michael A. Thompson, Elizabeth T. Vu, David N. Wiley. "Humpback whale song occurs extensively on feeding grounds in the western North Atlantic Ocean."*Aquatic Biology* Vol. 14: 175–183, 2012. doi: 10.3354/ab00390…", 181

A single whale will sing up to 23 hours per day during the mating season. A song lasts between 10-30 minutes and may be broken down into smaller 5-8 minute sections called themes. The themes are also made up of smaller units called "phrases", which last 1-10 seconds (See Appendix A).[5]

With *Song of the Sirens*, I attempt to methodically explore the effectiveness of humpback whale song inclusion. *Song of the Sirens* demonstrates the effectiveness of including live manipulation of humpback whale field recordings via laptop performer with WiiMote, instrumental and vocal imitations of whale song, atmospheric textures that allude to the aural experience of being "underwater" or "in the world of the whale", and the informed borrowings and inclusion of directly transcribed or imitated humpback whale song. The pitch material, contour, ornamentation, variation of material, and song structure of humpback whale song is used throughout *Song of the Sirens* to present humpback whale song through the perspective of sea-faring people of ancient times, who understood the sounds to be that of the mythological creature, the Siren.

Chapter II outlines the pitch material and structure found in humpback whale song and contextual information pertinent to *Song of the Sirens*. Chapter III provides examples of how the techniques discussed in Chapter II have been used by composers in previous acoustic and electroacoustic pieces. Chapters IV and V describe instrumental and vocal techniques found in *Song of the Sirens* and how the techniques used in *Song of*

[5] Payne, *Among whales*, 144

the Sirens correlate to the techniques outlined in Chapter II. Chapter VI describes the electronic component of *Song of the Sirens*. Chapter VII demonstrates the possible effectiveness of live manipulation of field recordings by describing the blurred line between ensemble and recording. Chapter VIII briefly relates the literary references to "Sirens" to the modern day understanding of humpback whale song and the correlation between the two.

CHAPTER II

COMPOSITIONAL FEATURES FOUND IN HUMPBACK WHALE SONG

Several structural elements found in humpback whale song have been utilized in human-composed music. One of the most striking features of humpback whale song is the glissandi that connect the target pitches, the pitches that begin and end the glissandi, of a phrase. This technique of humpback whale glissandi is arguably the most well-known and most exploited technique found in the repertoire.

Glissandi Found in Humpback Whale Song

The glissandi found in humpback whale song define the range of two or more target pitches that range from a semitone to several octaves in either direction. In the data I have analyzed, the target pitches always adhere to the set-class (0123) or any subset contained within. The glissandi may occur in either an upward or downward motion and may span over 5 octaves. There are two distinct categories of glissandi present in humpback whale song: smooth glissandi and defined glissandi. The smooth glissandi occur in a very glossy manner with no defined pitches articulated within the glissandi. The pitches articulated at the beginning and end are labeled as “target pitches”. The defined glissandi contain articulated pitches within the movement between target pitches.

Structure and Substructure of Humpback Whale Song

Humpback whale songs are organized into phrases and themes. Payne and McVay discovered that a song lasts 10-30 minutes and is made up of smaller sections. On the micro-level of song structure, phrases last from 1-10 seconds in length. Phrases make up the themes which last 5-8 minutes.[6] My research with Dr. Patricia Gray suggests that each theme typically falls into one of two categories: static or dynamic. A static theme contains minimal or no change of pitch level. In a static theme, the phrases remain dormant on the same pitch level or within a restricted register. Static themes usually occupy a very high or very low register.

A dynamic theme contains a more rapid change of events in pitch level. In a dynamic theme, the phrases frequently change pitch level several times within the theme. The two themes, static and dynamic, alternate and contrast one another on the macro-level. Appendix A contains my analysis of Roger Payne's field recording from April 13, 1970. This chart outlines the static and dynamic themes along with the change in pitch level of the phrases within the themes. Appendix B contains my analysis of Peter Tyack's field recording from April 16, 1978. This recording is of a different whale, in a different location, and different time. This chart also outlines the static and dynamic themes along with the change in pitch level of the phrases within the themes. My charts, based on the field recordings of Payne and Tyack, outline the recordings with my labels of "static" and "dynamic" themes, based on the pitch level of each theme. In both

[6] Payne, *Among whales*, 144

examples, and even though these are distinctively different contexts, the pitch level of the static and dynamic themes is very similar.

Pitch Content in Humpback Whale Song

The pitch content of humpback whale song analyzed for this thesis, contains target pitches which always adhere to the set-class (0123), Forte number 4-1, and the subsets found within. A set-class is defined as "a single closely related family of sets".[7] The building block of a set-class is a "set", which is "an unordered collection of pitch classes".[8] A "pitch class" is simply "a group of pitches with the same name".[9] This means that all "C's" belong to the same pitch class, regardless of the octave in which they are placed. It is important to note that the "target pitches" of humpback whale song are the pitches that either begin or end a glissandi or any sustained pitch. The "target pitches" do not account for the microtonal pitches that appear within the motion of the glissandi. Every phrase of the analyzed humpback whale song adheres to the set-class (0123) which can take place on different pitch levels. The pitch level may change within a dynamic theme upon completion of a phrase. Exact transpositions may take place such as: [2345] to [3456]. These two pitch-class sets are contained within the same pitch-class (0123), but occur on different pitch levels. If the pitch level does change and the

[7] Joseph Nathan Straus, *Introduction to post-tonal theory* (Englewood Cliffs, N.J.: Prentice Hall), 1990, 53

[8] Ibid, 33

[9] Ibid, 2

set-class is transposed within a theme (found in dynamic themes), the completion of the phrase is indicated by a break in the vocalization pattern that lasts between 1-5 seconds.

Development of Themes in Humpback Whale Song

Just as humans develop and add variation to music, so do whales. Seasonal songs contain changes to the durational values, rhythm, length and definition of glissandi (smooth glissandi or defined glissandi). The changes within the seasonal songs occur over a considerably long period of time: minutes, hours, days, or weeks.[10] Within an individual song of 10-30 minutes, however, the changes are very minute and do not drastically change. An appropriate word to define these variations would be "ornamentation".

[10] Ibid, 149

CHAPTER III

PRECEDENTS IN ACOUSTIC AND ELECTROACOUSTIC MUSIC

Many different composers have used humpback whale song in their compositions or have been inspired by the recordings of humpback whale song made by Dr. Roger Payne. Two pieces have used the Roger Payne field recordings of humpback whale song, directly in the composition: Alan Hovhaness' *And God Created Great Whales* (1970)[11] and the Paul Winter, Paul Halley, and Roger Payne collaboration, *Whales Alive* (1987)[12]. Both of these pieces incorporate Dr. Payne's recordings within the music via pre-recorded, pre-manipulated tape. Other compositions such as George Crumb's *Vox Balaenae* (1971)[13] and John Tavener's *The Whale* (1966)[14] do not use, but were inspired by the recordings of humpback whale song made by Dr. Roger Payne.

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[11] Alan Hovhaness, *And God created great whales: orchestra and tape* (New York: C.F. Peters, 1970), 3

[12] Paul Halley and Paul Winter, *Whales Alive* (Living Music ASIN: B0000000UC, 1987), compact disc

[13] George Crumb, *Vox balaenae: for three masked players : electric flute, electric cello, and electric piano* (New York: C.F. Peters Corp, 1973), 11

[14] John Tavener, *The whale; a Biblical fantasy* (London: J. & W. Chester 1969), 2

Uses of Humpback Whale Glissandi in Previous Literature

Glissandi are the most often exploited technique used in musical compositions. When done in a similar manner to humpback whale song, it evokes images and sounds of the animal in the wild. Crumb uses the glissandi in both the piano, via piano chisel[15], and violoncello in his piece *Vox Balaenae*.[16] John Tavener also makes use of the glissandi in his piece, *The Whale*, presenting downward glissandi in the horns.[17] A final example is found in Alan Hovhaness' piece, *And God Created Great Whales*. Hovhaness uses both downward and upward glissandi in the trombones[18] and strings[19], respectively. In all of the previous examples, however, the pitch material found in humpback whale song is not used. Most commonly, the interval of I5 (P4) or I7 (P5) is used in both upward and downward motions. These intervals are not found in humpback whale song. As discussed in Chapter II, the pitch material found in my analysis of humpback whale song adheres to the set-class (0123) which has an interval vector of <321000> and contains neither an I5 nor I7. Based on my whale song analyses, it is presumed that Hovhaness adapted the original whale song's pitch material to better suit his compositional aesthetic, thereby creating a more unified and cohesive sound.

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[15] Crumb, *Vox Balaenae*, 4

[16] Ibid, 3

[17] Tavener, *The Whale*, 46

[18] Hovhaness, *And God Created Great Whales*, 13

[19] Ibid, 15

These gestures, however, are not exact transcriptions or direct imitation of humpback whale song. In my piece, *Song of the Sirens* (2013), I use exact quotations along with my own variations of whale song and original material to create an interactive sound environment in which humpback whale song is able to thrive in a different manner than before; via live manipulation of electronics through the program Max/MSP.

The Use of Field Recordings in Previous Literature

There are two composers who use pre-recorded tape in their compositions: Alan Hovhaness' *And God Created Great Whales*, and the Winter, Halley, and Payne collaboration, *Whales Alive*. The former example juxtaposes recordings provided by Roger Payne against an orchestral backdrop, often having the two "voices" (orchestra and tape) taking turns with one another as the background and foreground textures. Throughout the piece, the orchestra often provides a background texture to accompany the field recordings in an aleatoric manner.[20]

The latter example, however, allows for slightly more interaction within the ensemble consisting of field recordings, soprano saxophone, organ/keyboard, and spoken voice. *Whales Alive* incorporates more intricate textures throughout the recording either through contrapuntal duets between saxophone and field recordings or instrumental accompaniments supporting the field recordings. The manner of setting field recordings in *Whales Alive* gives the "whale" a more individualized voice within the ensemble and

[20] Ibid, 1

composition. The pre-manipulated recordings found in *Whales Alive* allow for the whale to have flowing melodic lines instead of the dense textures created by Hovhaness which gives the "whale" a more "singing" or "soloistic" voice.

The greatest limitation to using pre-recorded tape, such as Hovhaness' *And God Created Great Whales*, is the less interactive delivery of the electronic sounds within the ensemble. When performing the piece, the electronics may only be started and stopped with little or no alteration being done in real time. The textures that Hovhaness provides to accompany the whale recordings work very well and achieve the desired effect. There are, however, limitations to the colors and gestures that can be used in this setting. Live manipulation provides a more unique aural experience that treats the electronics (or the "whale") as an instrument belonging in the ensemble. This gives more coherence between the ensemble and electronics by fusing both into an organic ensemble with the ability to react and inhabit the same sonic space.

The inclusion of pre-recorded field recording whale samples only occurs during the very quiescent moments of *And God Created Great Whales*[21], which does not allow for much interaction.[22] Although the textures do change slightly, the overall sound and sonic palette does not. This could be, however, an allusion to the ever-so-slightly changing variations that occur naturally in humpback whale song.

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[21] Ibid, 9

[22] Ibid, 13

Use of the Set-Class (0123) and the Subsets Found Within

Another humpback whale song technique used throughout *And God Created Great Whales* is the use of the set-class (012). Hovhaness uses this set-class as a stacked triad as opposed to a melodic line.[23] The few examples of this triadic set-class are presented in the trombone and are brief. The usage of this set-class however, provides a much needed change of texture that contrasts the previous, more "tonal" harmonies. This use of the pitch material, even in its abbreviated form, is used to heighten a connection with the humpback whale song.

Creating an Underwater Sound Environment

Payne states that the sound of the ocean is an important factor to be conscious of when listening to humpback whale song. This is because the ocean makes you "aware of the vastness of the mystery that underlies your boat" and because whales "give the ocean its voice".[24] Taking away the environment in which the whale produces these beautiful and haunting sounds, is like taking away the context in which the sound is supposed to be heard.

This effect has been achieved in some compositions either by a continuously flowing motion, changes in orchestral color, or a combination of the two. One very striking example of this is found in Debussy's *Sirens*. Throughout the piece, Debussy creates ocean-like textures with an undulating motion and various techniques to change

[23] Ibid, 18
[24] Payne, *Among Whales*, 145

the orchestral color that suit an underwater setting and achieve the desired aural experience.

CHAPTER IV

INSTRUMENTAL TECHNIQUES USED TO EMULATE WHALE SONG IN *SONG OF THE SIRENS*

Instrumental Glissandi in *Song of the Sirens*

Throughout *Song of the Sirens*, the use of humpback whale-inspired glissandi is used in the instrumental ensemble. Figure 1, below, shows the first instrumental glissandi technique in *Song of the Sirens*. It is first introduced by the violin and violoncello in measure 44. In this example, the instruments overlap upward and downward I2 glissandi in a surging, undulating fashion. With this, the colors also change with the placement of the bow ranging from the normal bow position, sul tasto, and sul ponticello. These glissandi not only give a slight imitation of whale glissandi, but also provide an increased movement and a needed textural change.

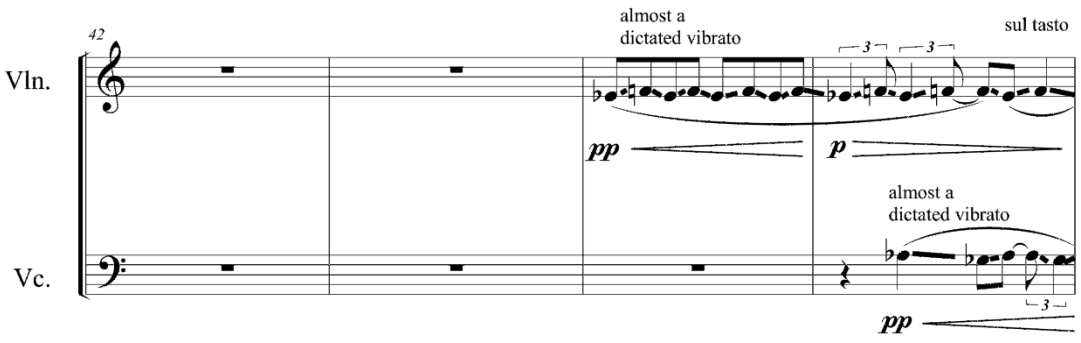

Figure 1. Glissandi used to add movement in *Song of the Sirens*

Shown in Figure 2, the clarinet, violin, and violoncello overlap glissandi of longer durational values and greater intervallic distance. When juxtaposed against the example shown in Figure 1, the longer durational values in Figure 2 embody the "slowing down" and development of phrases in humpback whale song.

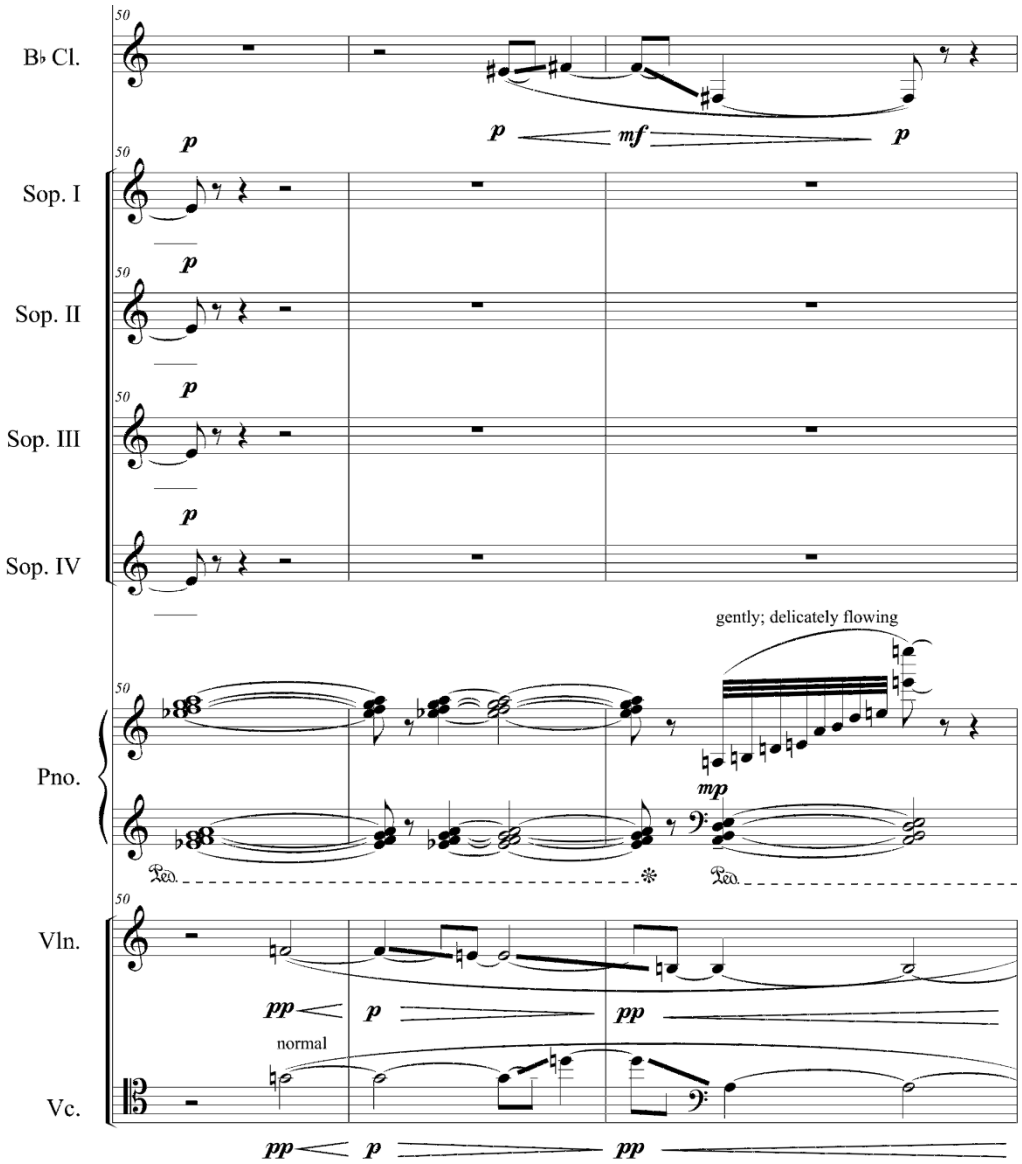

Figure 2. Instrumental ensemble upward and downward glissandi

Instrumental Pitch Material in *Song of the Sirens*

The instrumental pitch material found in *Song of the Sirens* does not always adhere to the set-class (0123). This can also be seen in previous examples such as the Hovhaness and Tavener. The pitch material in *Song of the Sirens* does, however, adhere to the set-class (0123) when a phrase of humpback whale song is directly transcribed. As seen in Figure 2, the intervallic distance traveled within the glissandi does not adhere to the pitch content found in humpback whale song. The gestures found in Figure 2, however, are not exact whale imitation. As seen in the Hovhaness and Tavener, the gesture alludes to humpback whale glissandi, rather than imitating it directly. This is due to the multiple functions of the instrumental ensemble for *Song of the Sirens*. The instrumental ensemble imitates humpback whale song, fills the harmonic void, creates ocean-like textures, and provides a change in timbre and color needed to add variation. This contributes to the concept of understanding humpback whale song as the singing of "Sirens". Because of this, the sonorities present in the instrumental ensemble throughout *Song of the Sirens* do not adhere strictly to the set-class (0123) unless a direct transcription or quotation of humpback whale song is presented by the instrumental ensemble.

Creating Ocean Textures with the Instrumental Ensemble in *Song of the Sirens*

As discussed in Chapter III, to create ocean textures with an instrumental ensemble, I employ a continuously flowing current with textural changes to aid in the

aural experience of being underwater. This is achieved in *Song of the Sirens* with dissimilar glissandi, overlapping rhythms and harmonies, and timbral change. Figure 1 demonstrates the use of all of these techniques. The glissandi change durational values frequently, never lining up exactly the same between the instruments. This creates the uneven texture by means of the overlapping rhythms and harmonies whereas the timbral changes occur by means of bow position. The change of bow position from normal to sul tasto acts as a low-pass filter, taking away some of the higher frequencies present in the sonority whereas the change of the bow to sul ponticello acts as a high-pass filter. This "filtering" is consistent with the real-time filtering of field recordings, discussed in Chapter VI.

CHAPTER V

VOCAL TECNHIQUES USED TO EMULATE WHALE SONG IN *SONG OF THE SIRENS*

Vocal Glissandi in *Song of the Sirens*

As with the previous examples of instrumental glissandi, the glissandi presented in the vocal choir of the ensemble also effectively communicate the imitation of the humpback whale glissandi. Shown in Figure 3, the vocal glissandi in this example strictly adheres to the pitch-class (0123) and provide a substantial imitation of whale song in a layered fashion.

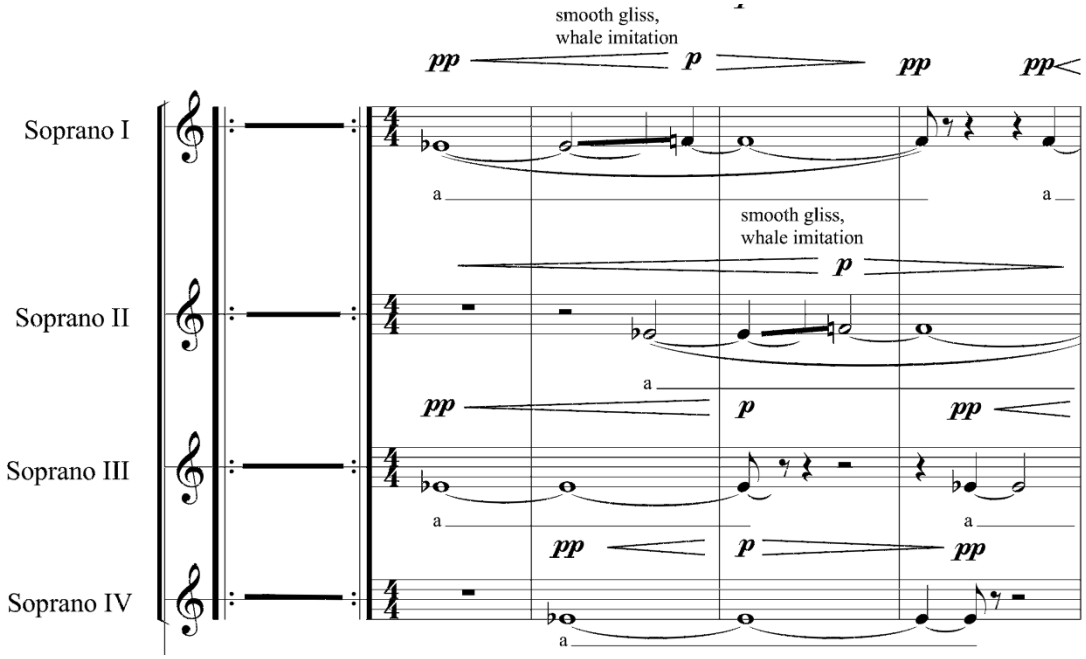

Figure 3. Vocal glissandi

Figure 4 shows a varied transcription of a common phrase found throughout whale song. Again, the pitch material adheres strictly to the pitch-class (0123), but with larger intervallic distance travelled within the glissandi. The gesture present in Soprano II has a contour of <120>. The use of both upward and downward motions throughout the vocal choir provides contrast.

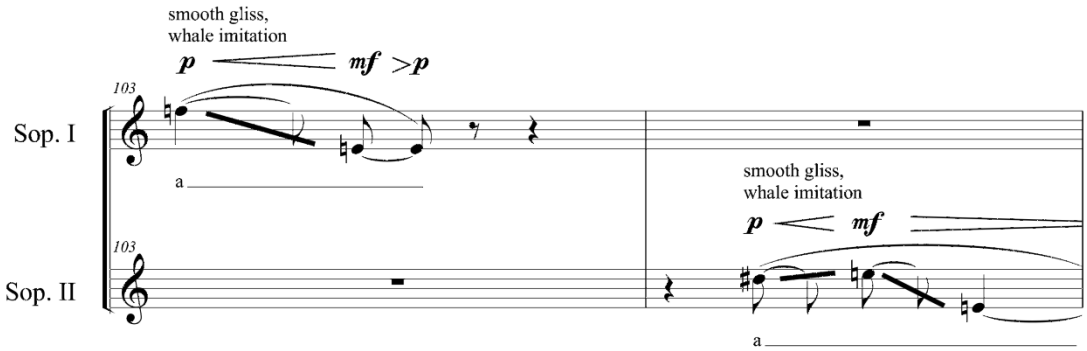

Figure 4. Whale glissandi vocal imitation 1

Shown in Figure 5, the glissandi occur both in an upward and downward fashion, "slowing down" by means of longer durational values throughout. The pitch material, however, does not adhere to what is naturally found in humpback whale song. In this example, there are three pitch levels represented. Separately, each individual part adheres to the (0123) set-class, but when together as a choir do not adhere to the pitch material, as a whole.

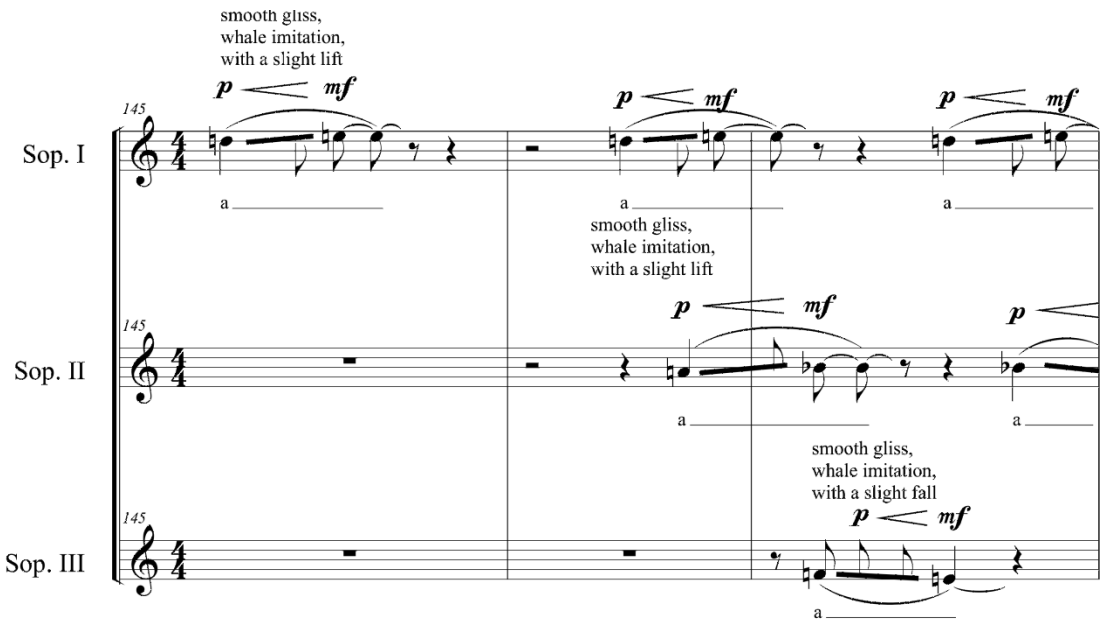

Figure 5. Whale glissandi vocal imitation 2

Figure 6 contains a variation of George Crumb's "seagull effect" which appears in the violoncello of *Vox Balaenae*[25] as well as in the violoncello of *Song of the Sirens*. This technique imitates a very high upward humpback whale glissando and is immediately followed by a downward glissando in the lowest voice. When juxtaposed, the combination presents a very slow upward and downward glissandi gesture, similar to the one found in Figure 5, with the exception of the transference of gesture from violoncello to voice.

[25] Crumb, *Vox Balaenae*, 3

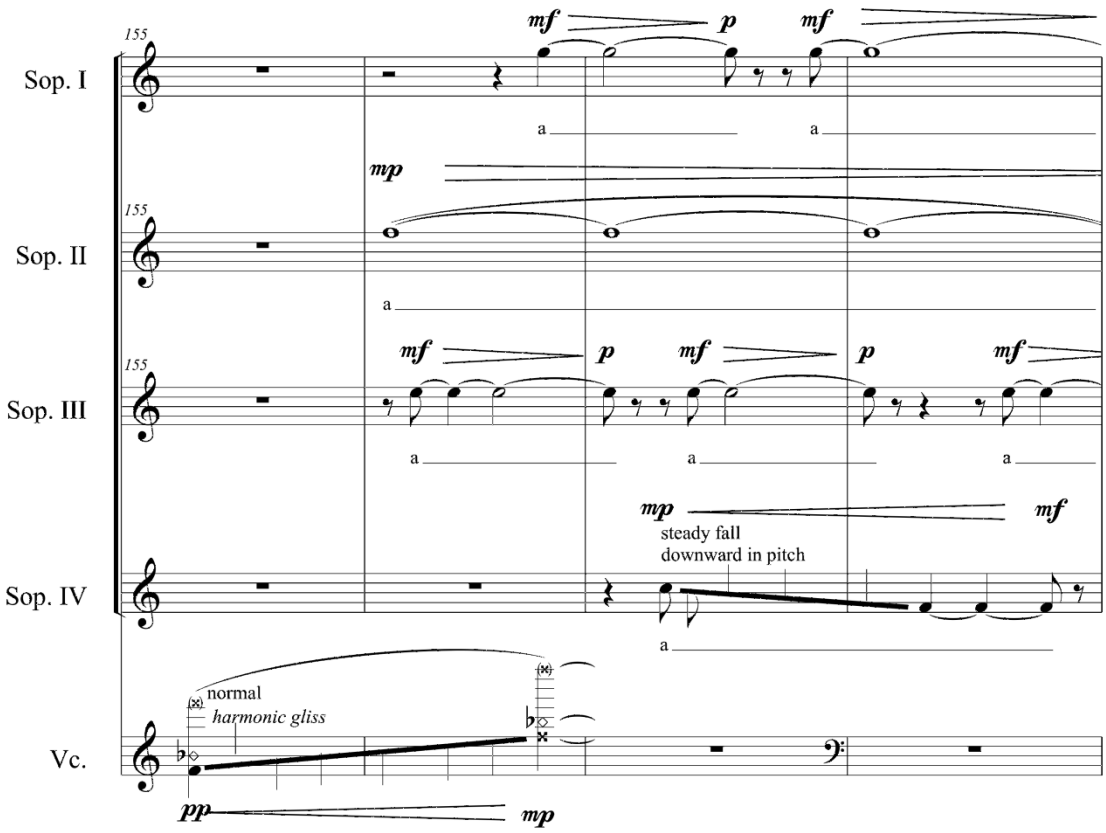

Figure 6. Upward harmonic glissandi and downward vocal glissandi

Vocal Pitch Material in *Song of the Sirens*

As described in Chapter II, the pitch material found in humpback whale song adheres strictly to the pitch-class (0123). The pitch material found in the vocal parts, however, does not always adhere strictly to the set-class found in humpback whale song. If creating ocean-like textures or providing harmonic accompaniment, the pitch material is not restricted to the pitch-class (0123). This is due to the same, multiple roles that the voice and instrumental ensemble must fulfill.

Creating Ocean Textures with the Voice in *Song of the Sirens*

As mentioned previously, to create ocean textures, I employed a continuous flow, incongruent rhythms and harmonies, and timbral change. To change the timbre, the voices alter between three neutral vowels: a ("aah"), i ("ee"), and u ("oo"). This change in vowel shape emulates the high-pass/low-pass filter used in the electronics patch and the bow position of the instrumental ensemble. The "a" vowel acts as the most neutral shape – the "normal" bow position – whereas the "i" vowel shape acts as a high-pass filter and the "u" vowel shape counteracts as the low-pass filter. These timbral changes connect the three "voices" of the ensemble (instrumental ensemble, vocal choir, and electronics/the "whale") by adding coherence in the form of another similar technique.

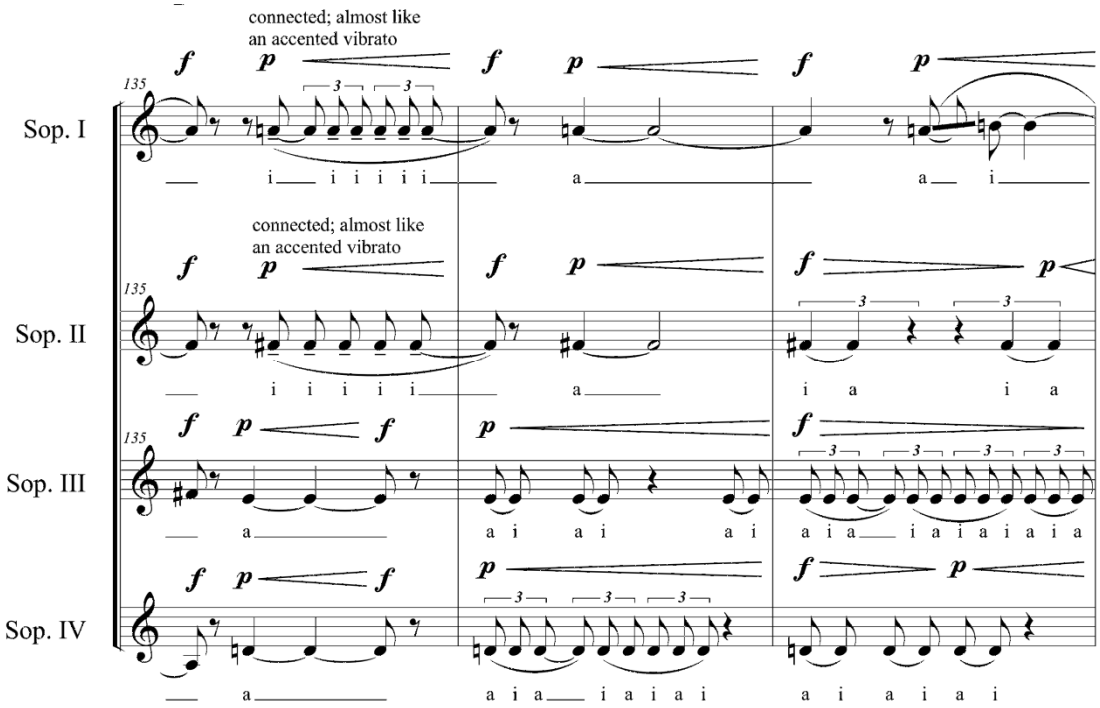

Figure 7. Vocal vowel change

Figure 8 shows the combination of vocal vowel change and instrumental glissandi. In Figure 8, the glissandi presented in each instrument of the instrumental ensemble adhere strictly to the set-class (0123). The instruments, however, are all on different pitch levels. However, each individual gesture remains consistent with the pitch material of humpback whale song. The addition of vocal vowel change creates a denser texture and provides the ocean-like sound to accompany the whale imitation present in the instrumental ensemble. This combination of techniques not only creates a new texture that has yet to be present in the piece, but also creates coherence.

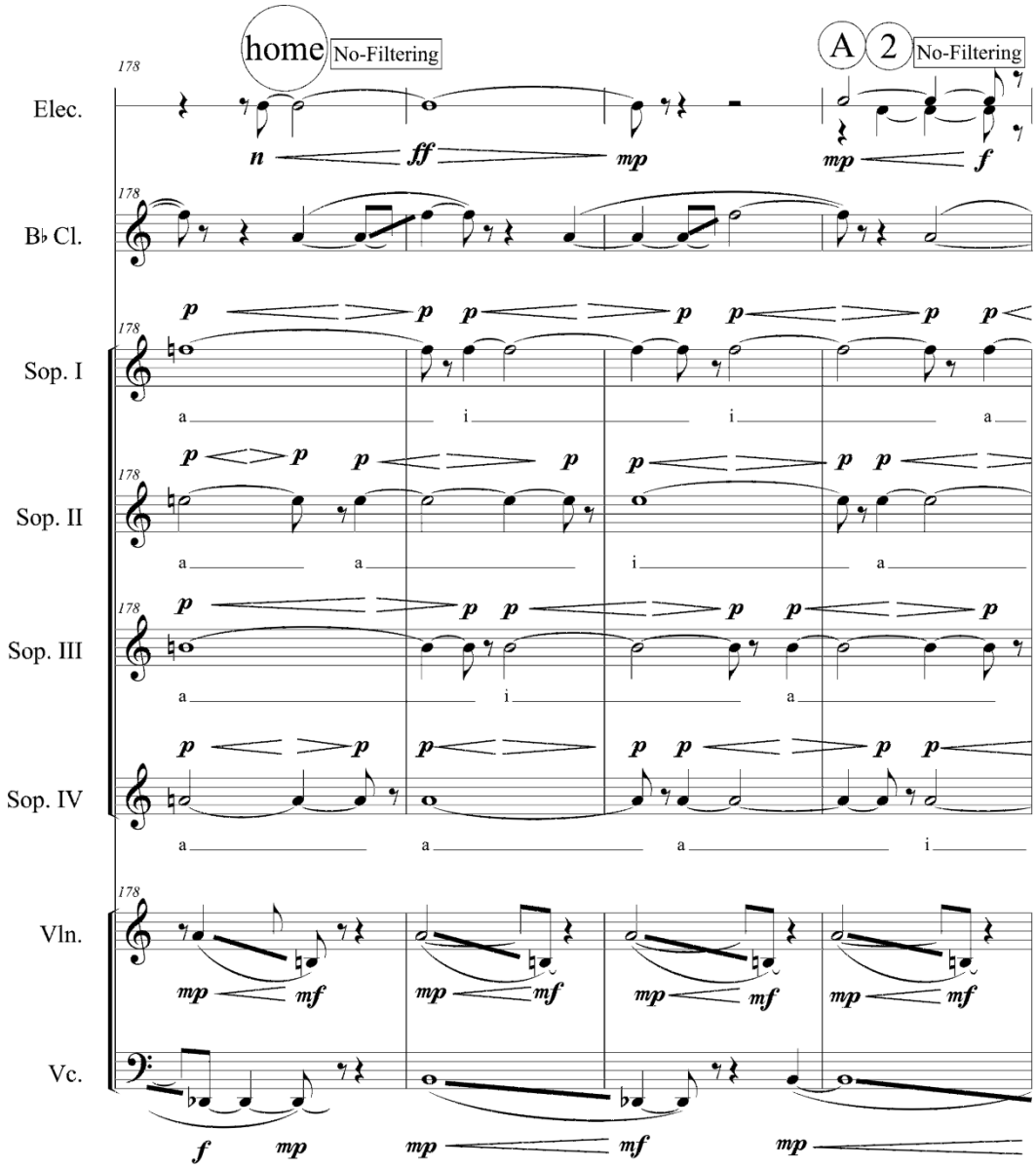

Figure 8. Instrumental glissandi and vocal vowel change

Giving the "Sirens" a Voice

Just as the "whale" has a voice in the ensemble, so do the "Sirens". The sopranos act as the "Sirens" by both imitating and embellishing humpback whale song. This reinforces the concept of an earlier perception of humpback whale song. The manipulation of humpback whale song and use of humpback whale song techniques by the vocal choir in *Song of the Sirens* support the overall concept of the piece. The relationship between "Sirens" and "whales" is discussed in greater detail in Chapter VIII.

CHAPTER VI

LIVE MANIPULATION OF FIELD RECORDINGS IN *SONG OF THE SIRENS*

Selecting Samples from the *Roger Payne Sound Archive*

For *Song of the Sirens*, I chose excerpts from the Roger Payne Marine Archive based on pitch material, contour, pitch level, and duration. The excerpts are referred to as "samples" due to the relation to "sampling" in electronic music. The samples chosen last between 2 – 8 seconds and may be used in conjunction with one another, although combination is used sparingly. The goal of the samples is to provide a somewhat linear melodic contour comprised of small samples that weave in and out of the ensemble texture, creating a dialogue between the entire ensemble.

Real-Time Triggering of Samples

The real-time triggering of samples is achieved through the program Max/MSP. In the program, each button of the WiiMote is assigned a certain sample of whale song from the Roger Payne Marine Archive. The button must be held for the durational values indicated throughout the score and the vertical pitch of the WiiMote must be adjusted to facilitate the indicated dynamic levels, crescendos, and decrescendos. A third parameter is set with the filtering of high- and low-pass filter. Figure 9 shows the motion that must be utilized in order to achieve the parameters set throughout the score.

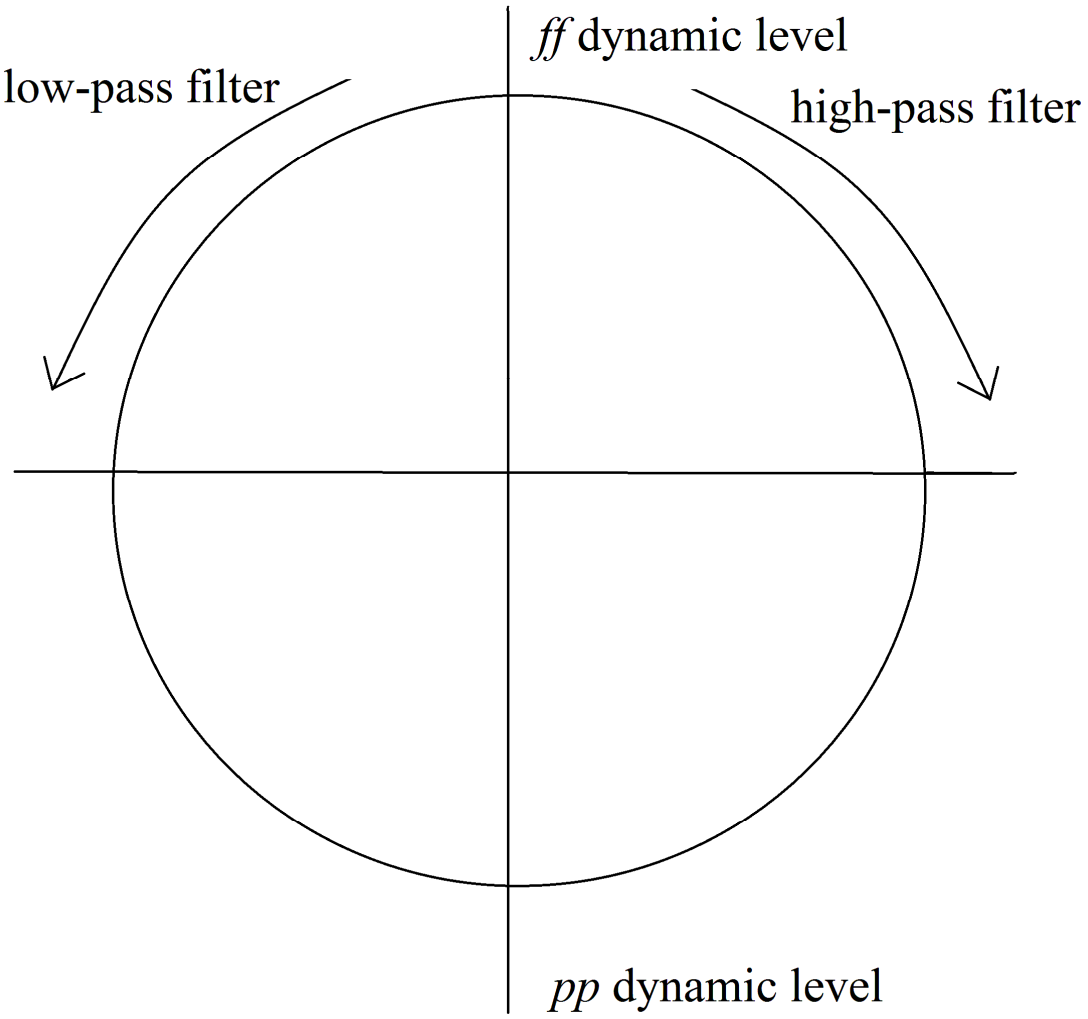

Figure 8. Electronics patch dynamic level and filtering diagram

CHAPTER VII

INTERACTION BETWEEN ELECTRONICS AND CHAMBER ENSEMBLE IN *SONG OF THE SIRENS*

Giving the "Whale" a Voice in the Ensemble

To create a more personal connection between the wild and my composition, I opted to allow the field recordings to speak in their most natural way, keeping the recordings as close to their original state as possible with minimal altering and layering. My usage contrasts with the Hovhaness example. Instead of using the humpback whale song samples to create dense textures, I allow the instrumental and vocal ensemble to provide support for the whale to weave in and out of the textures, more closely resembling the Winter, Halley, and Payne, *Whales Alive*, template.

The laptop performer, however, is able to give nuances to the field recordings in real time, via WiiMote, to respond to what is occurring within the ensemble at any given moment. With the interactive electronic component, the dynamic level, filtering, and entrances are able to be altered for the moment and adjusted in real time to facilitate a more nuanced performance. Live manipulation allows the laptop performer to give real-time nuance and contour to the recordings, and provides the possibility of interaction between the performer and the ensemble. This gives the "whale" a role in the ensemble that is as interactive as any other instrument or voice, through the lens of a laptop performer.

To facilitate the original material and adaptations, transcriptions, and quotations, the samples of the recordings were selected to fit into the ensemble in the most effective way by means of the pitch material, duration, and pitch level. With the ability to have a

more dynamic rendering of the samples, the ensemble has the ability to add slight tempo fluctuations throughout the piece. The real-time triggering also allows for the most exact entrances possible. This allows for a more intricate dialogue between the three choirs of voices (instrumental ensemble, vocal choir, and laptop performer representing the "whale").

Advantages of Live manipulation

The exclusive recordings at my disposal, provided by Dr. Roger Payne out of his personal collection, and other recordings taken from the Roger Payne Marine Archive are used throughout the piece with the capabilities of being transformed in real time. The pitch of the samples are unaltered; however, the entrance, dynamic level, and slight filtering (high-pass and low-pass) of the samples will be triggered and altered in real time, providing a more participatory role for the samples of whale song in a live performance of the composition.

CHAPTER VIII

RELATIONSHIP BETWEEN SIRENS AND WHALES

The concept of Sirens in literature and mythology have been present in several cultures, most notably the ancient Greeks, but also other European and Asian countries such as the Philippines. The Homeric Greek Sirens are depicted as half-bird, half-human creatures that lull sailors into a trance until they either go mad, or jump overboard and die. In literature, Sirens kill the sailors themselves or drive the sailors to suicide.[26] In Asian cultures, Sirens are depicted as mermaid-like creatures, as in the Philippines. No matter what their physical appearance, though, they are most infamous for their song, as it is what brings sailors to their demise.

For centuries, the songs of the humpback whale could have been mistaken for melodies sung by Sirens.[27] My goal is to present the beautiful songs created by these intelligent animals by the inclusion of actual field recordings and imitation of humpback whale song in a chamber ensemble composition to embody the joy and terror that must

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[26] Richmond Alexander Lattimore, *The Odyssey of Homer* (New York: Harper & Row), 1967

[27] Payne, *Among Whales*, 160

have overwhelmed sea-faring folk as they encountered these sounds. The songs of the humpback whale and tales of the Sirens are as beautiful as they are haunting.[28]

The overall construction of the piece begins with sparse field recordings of humpback whale song followed by the "Sirens" (vocal choir) luring the listener with sweet and docile harmonies which become more and more sinister as the piece progresses. The "Sirens" imitate and embellish humpback whale song with the inclusion of original material. In doing so, the "Sirens" allude to the exaggerated experience that ancient sailors may have encountered. This first section includes scarce humpback whale field recordings in the background, accompanying the vocal choir imitating humpback whale song. Near the end of this section, the instrumental ensemble enters and engulfs the sonic palette with the whale imitations and ocean-like textures. The piece then evolves to have the "Sirens" sing with a more agile drone that becomes a major theme throughout the piece – an ever undulating sonority that changes rhythmically and harmonically slightly throughout, much like the evolution of humpback whale song themes. The middle section of the piece is sweet in nature. The Sirens attempt to lure the listener into a trance-like state by using aurally pleasing sonorities and textures intermingled with humpback whale imitation from both the vocal choir and instrumental ensemble with similar field recordings weaving in and out. The final section of the piece contains harsher sonorities that are still somewhat sweet, yet unsettling. This signifies the journey into madness that is described often in the literature about Sirens.

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[28] Ibid, 161

CHAPTER IX

CONCLUSIONS

With this composition, *Song of the Sirens*, I set out to create an interactive sound environment in which humpback whale song could fully participate in real time within a chamber ensemble by means of a laptop/WiiMote performer. My concept for *Song of the Sirens* is to present an allusion of the humpback whale song the way ancient mariners may have perceived it. This perception is reflected in much of mythology.[29] By incorporating the real-time manipulation of field recordings within the context of a chamber ensemble and using similar imitation techniques found in the former examples, I give the songs of the humpback whale an interactive sound environment and create a more intimate atmosphere than in previous literature. By blurring the line between instrument, voice, and recording, the listener is taken on an aural experience reminiscent of ancient sailors who fictionalized the songs of the humpback whale to explain the natural phenomenon that they were experiencing.

To accomplish this, I use techniques I have found in humpback whale song and expand upon them in order to create the experience of humpback whale song that ancient people may have understood to be the singing of Sirens. This deeper connection of

[29] Ibid, 160

humpback whale song and compositional process comes from an informed understanding and application of humpback whale song into human composition.

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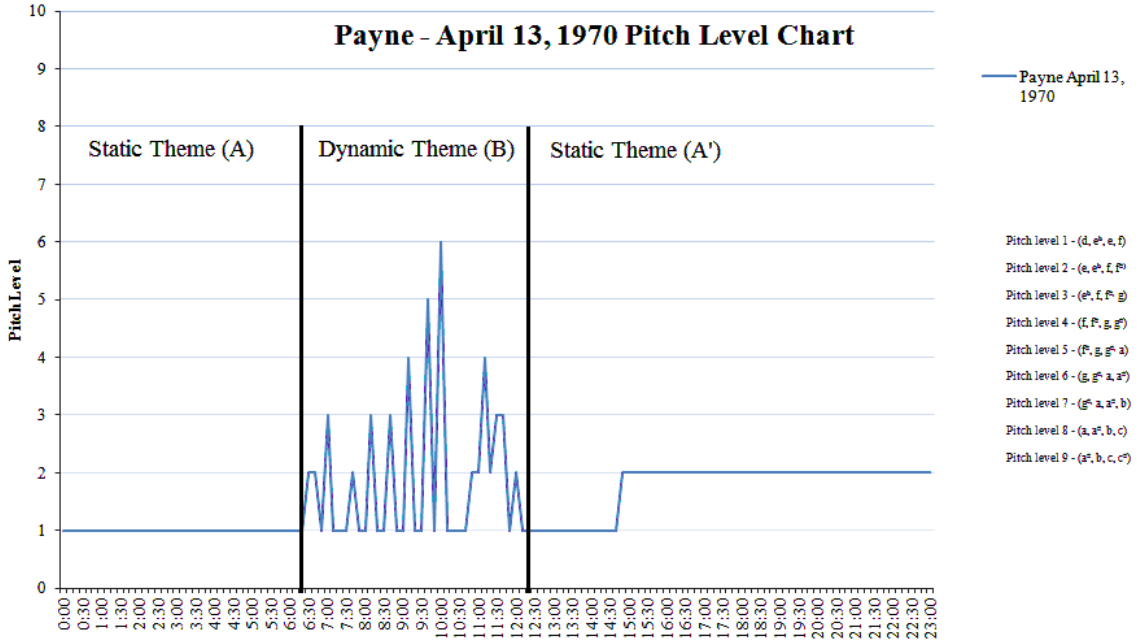
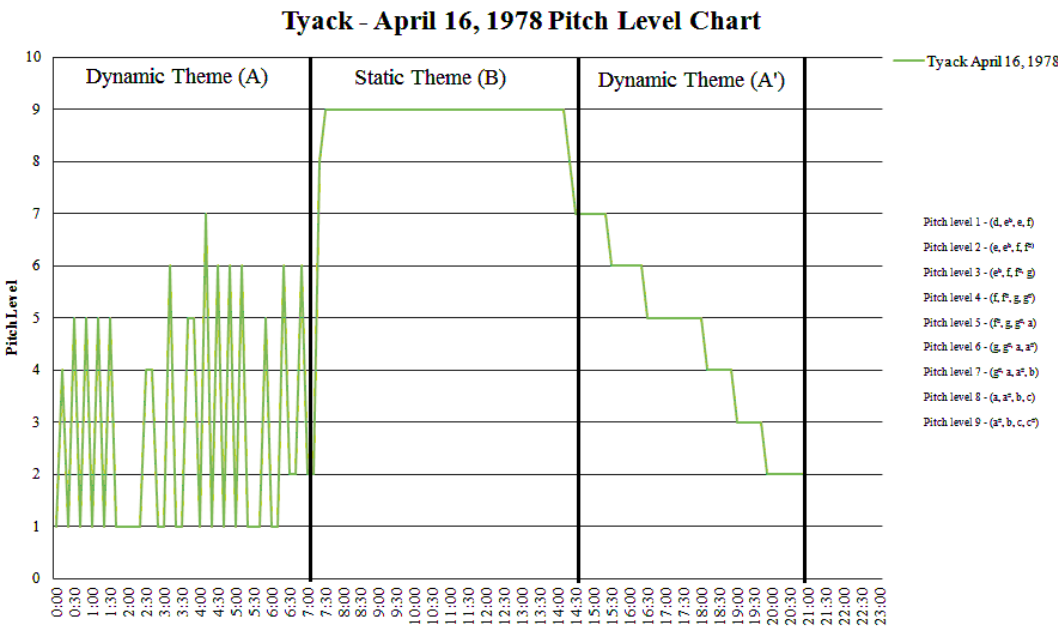
APPENDIX A

PITCH LEVEL DIAGRAM OF PAYNE FIELD RECORDING



APPENDIX B

PITCH LEVEL DIAGRAM OF TYACK FIELD RECORDING



APPENDIX C

SCORE OF *SONG OF THE SIRENS*

Song of the Sirens

Joshua Marquez

For Mixed Chamber Ensemble and Electronics

Transposed Score

duration c. 14 minutes

Song of the Sirens

Electronics (Laptop Performer)*

Bb Clarinet
Soprano I
Soprano II
Soprano III
Soprano IV

Piano

Violin

Violoncello

Indicates a smooth, whale-like gliss. between given pitches, evenly over the course of the indicated duration.

IPA Legend:

a = "aah" as in "p**a**lm"
i = "ee" as in "fl**ee**ce"
u = "oo" as in "f**oo**d"

*The electronics were created with the Roger Payne Sound Archive from the recordings from April 13th, 1970 (previously unheard). The laptop performer will use the corresponding Max/MSP patch to facilitate the electronic performance, using the pitch and roll of the WiiMote to create the proper dynamics and filtering, respectively. There will also be a corresponding patch that will allow for the same treatment of the electronics without a WiiMote - the trackpad will be used, instead.

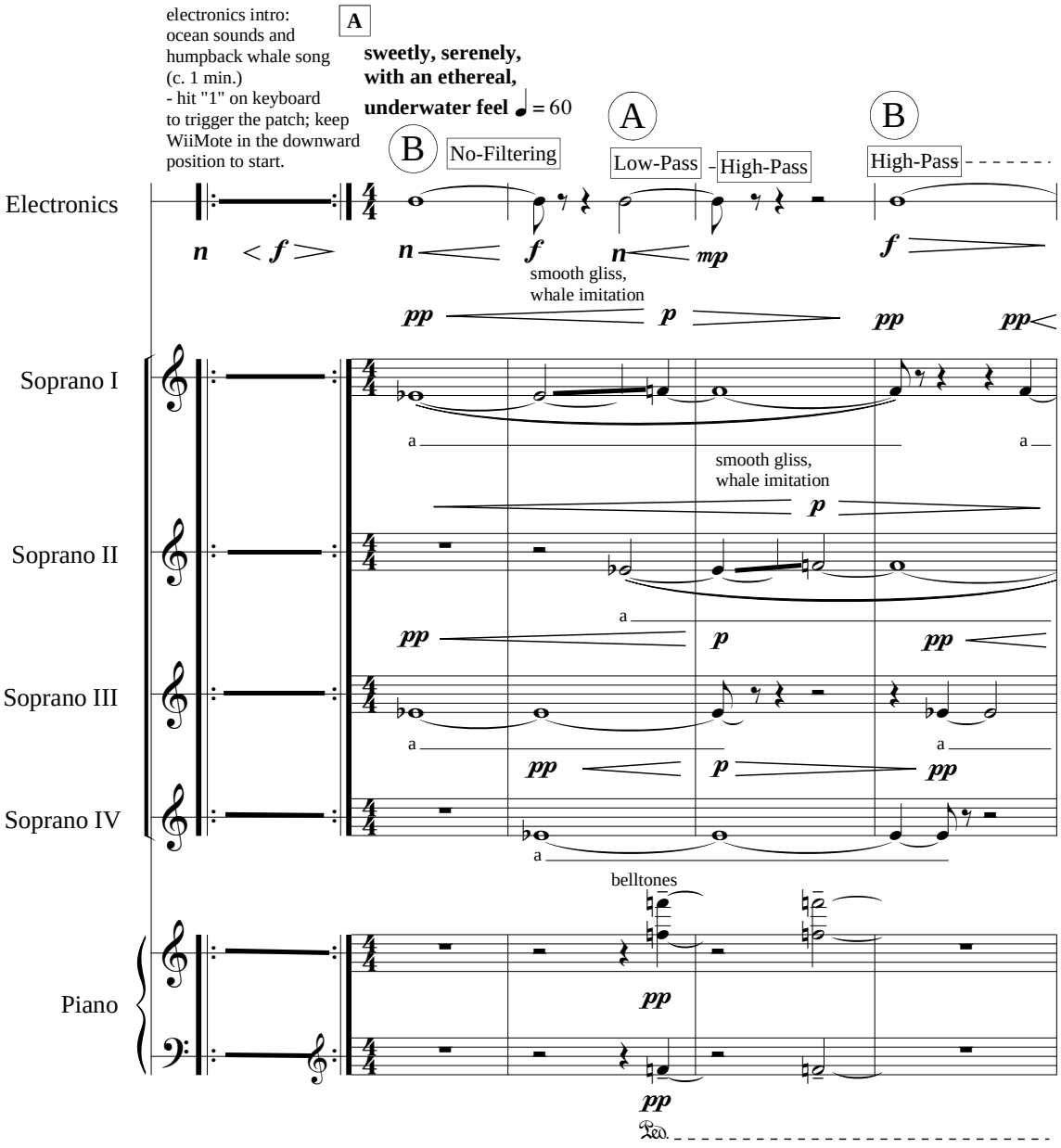
If there is a sustained duration notated in the electonics part, the corresponding sound sample will need to be "sustained" (given button held down on the WiiMote) and the sample, however sparse, will continue to sound. The dynamics/filtering should be followed as closely as possible based on the location of the given instructions in the measure. If the sound does not last the entire indicated duration, follow the contour of the dynamics and filtering as indicated even if the sample ends prematurely. The filtering instructions are as follows: No Filtering (WiiMote held "straight"/in a "normal", non-rotated position), Low-Pass Filtering (WiiMote rotated to the left), High-Pass Filtering (WiiMote rotated to the right). The rotation from one filtering position to another should be accomplished over the course of the indicated duration, following as closely to the indicated position in the measure as possible.

Transposed Score

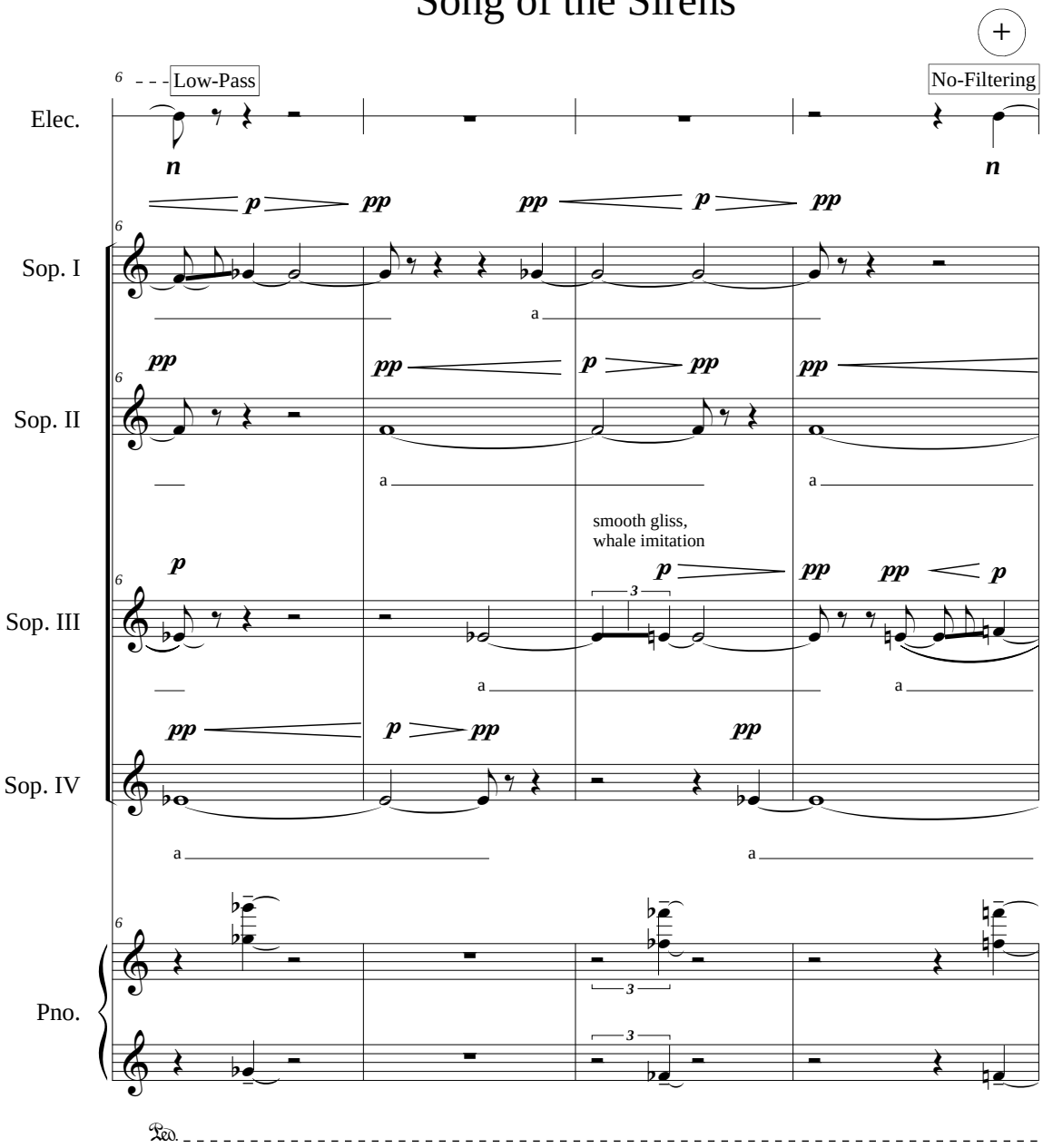
Song of the Sirens

Created Using The Roger Payne Sound Archive

Joshua Marquez



Song of the Sirens



Song of the Sirens

A

B

No-Filtering

Elec.

Sop. I

Sop. II

Sop. III

Sop. IV

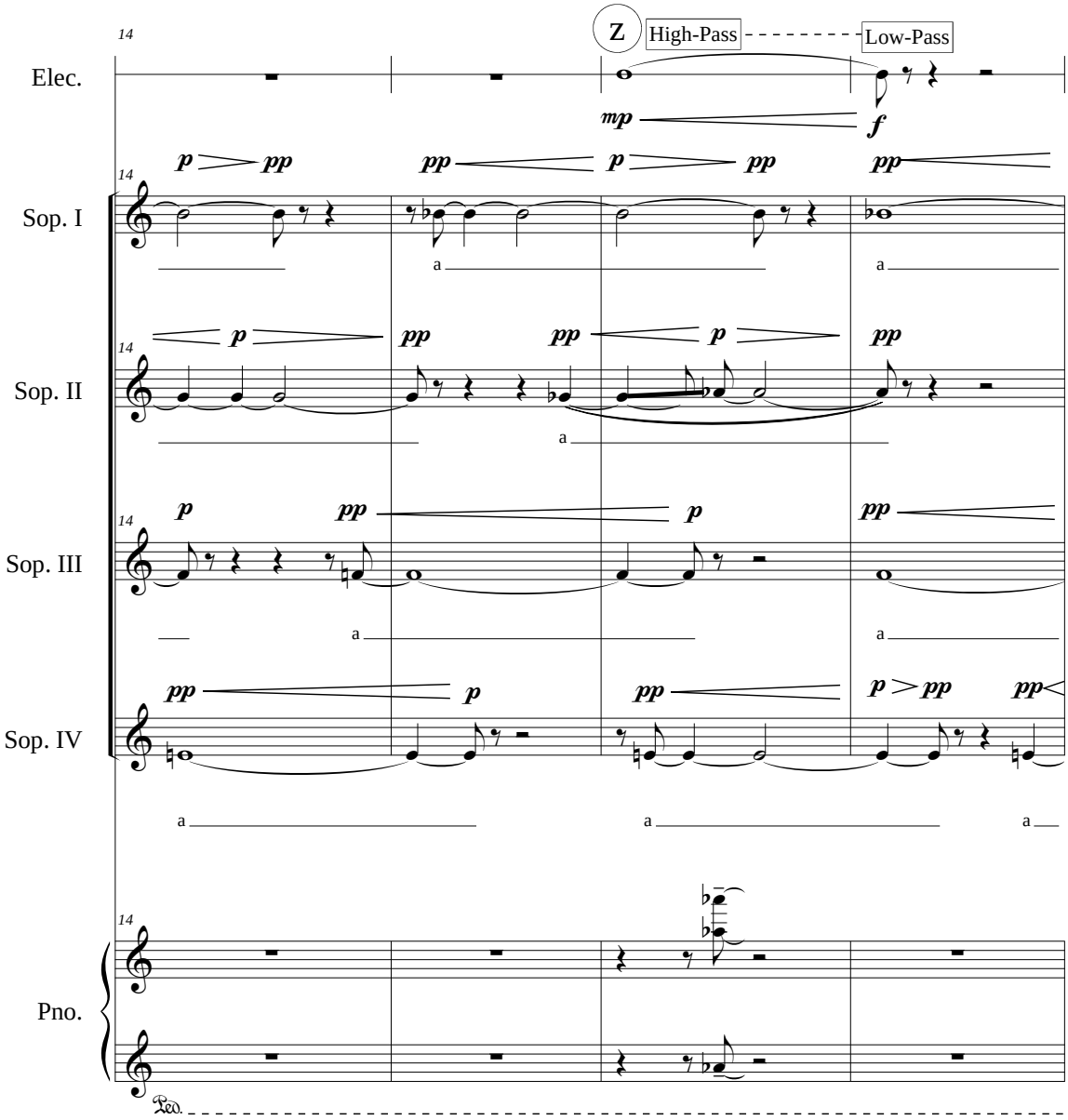
Pno.

ah

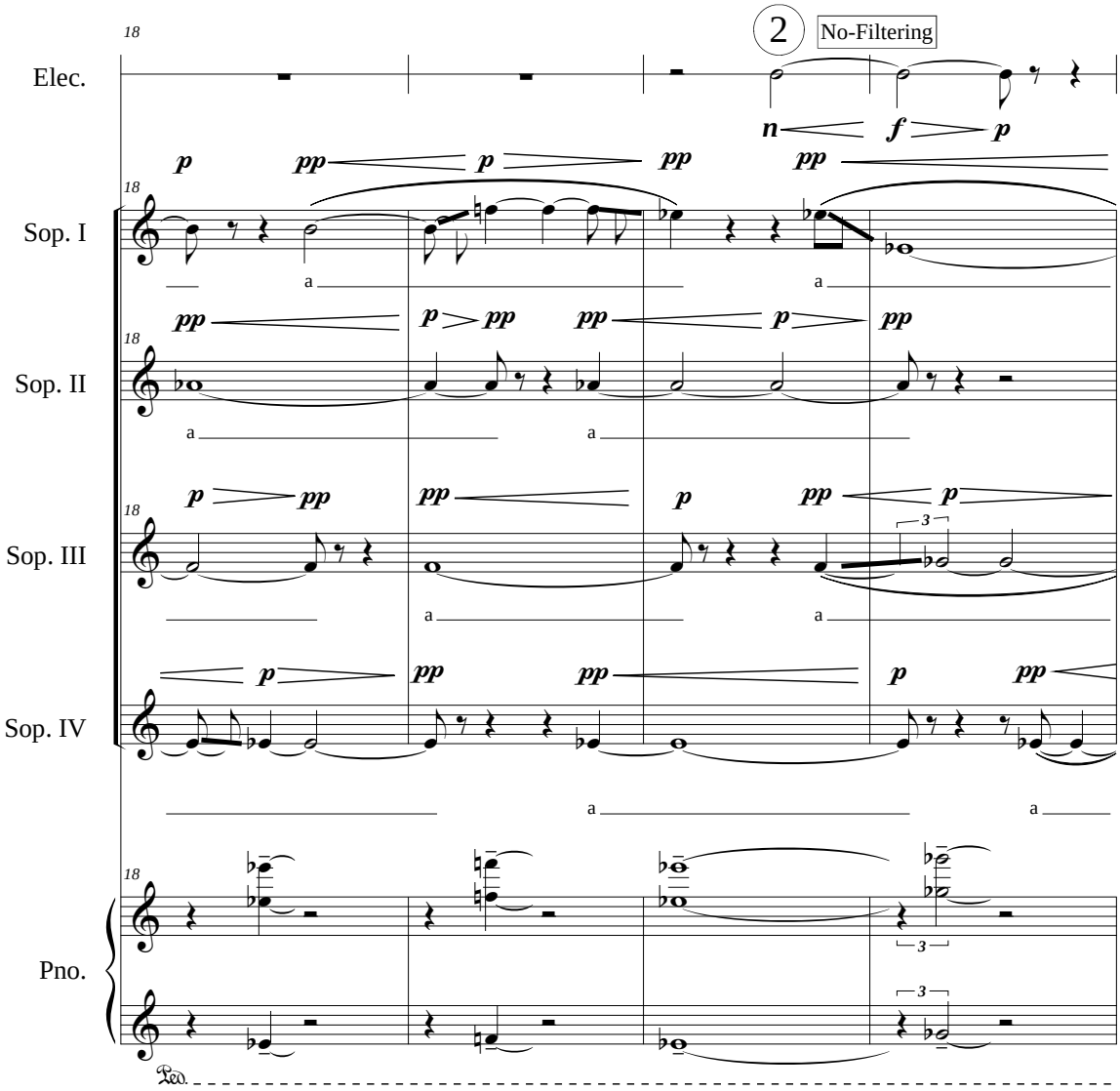
a

smooth gliss,
whale imitation

Song of the Sirens



Song of the Sirens



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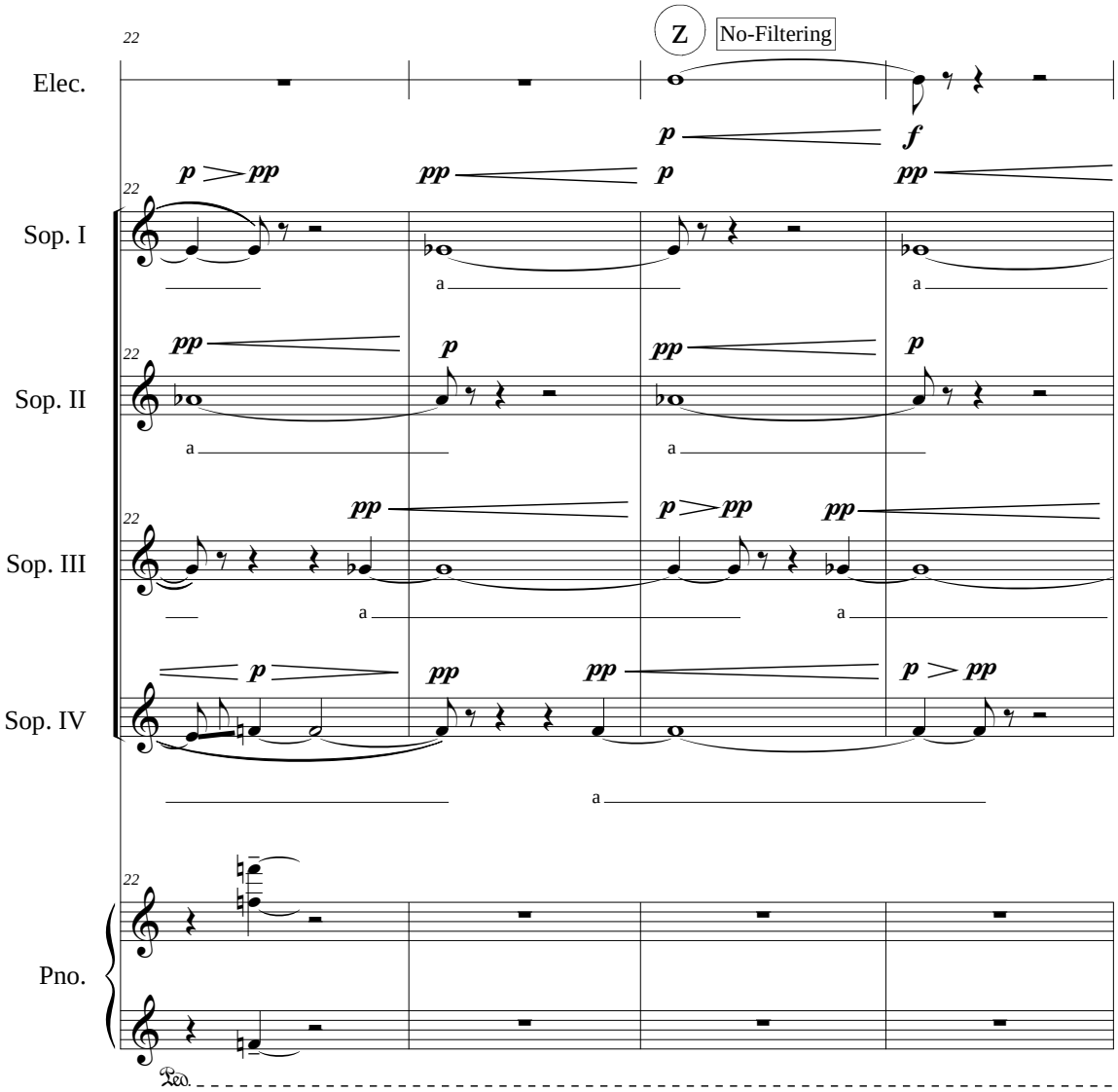

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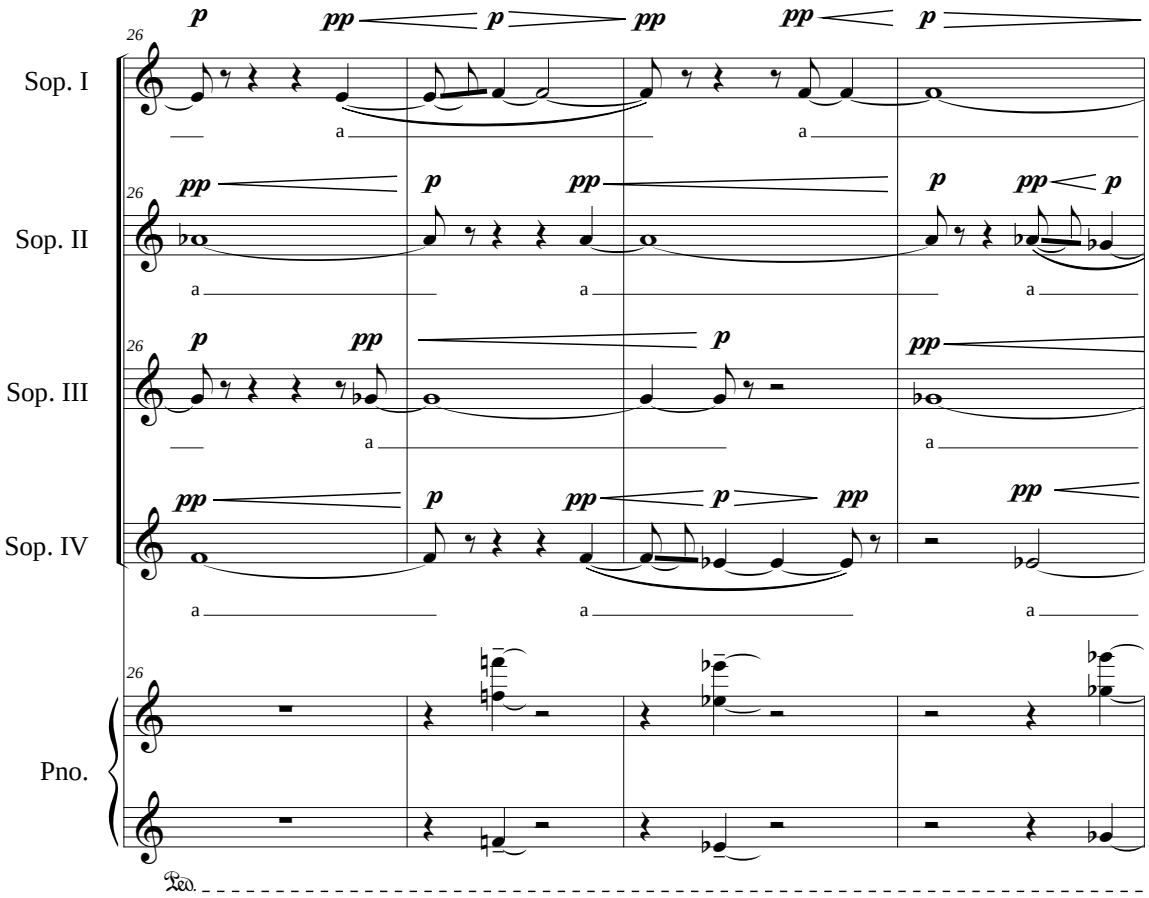
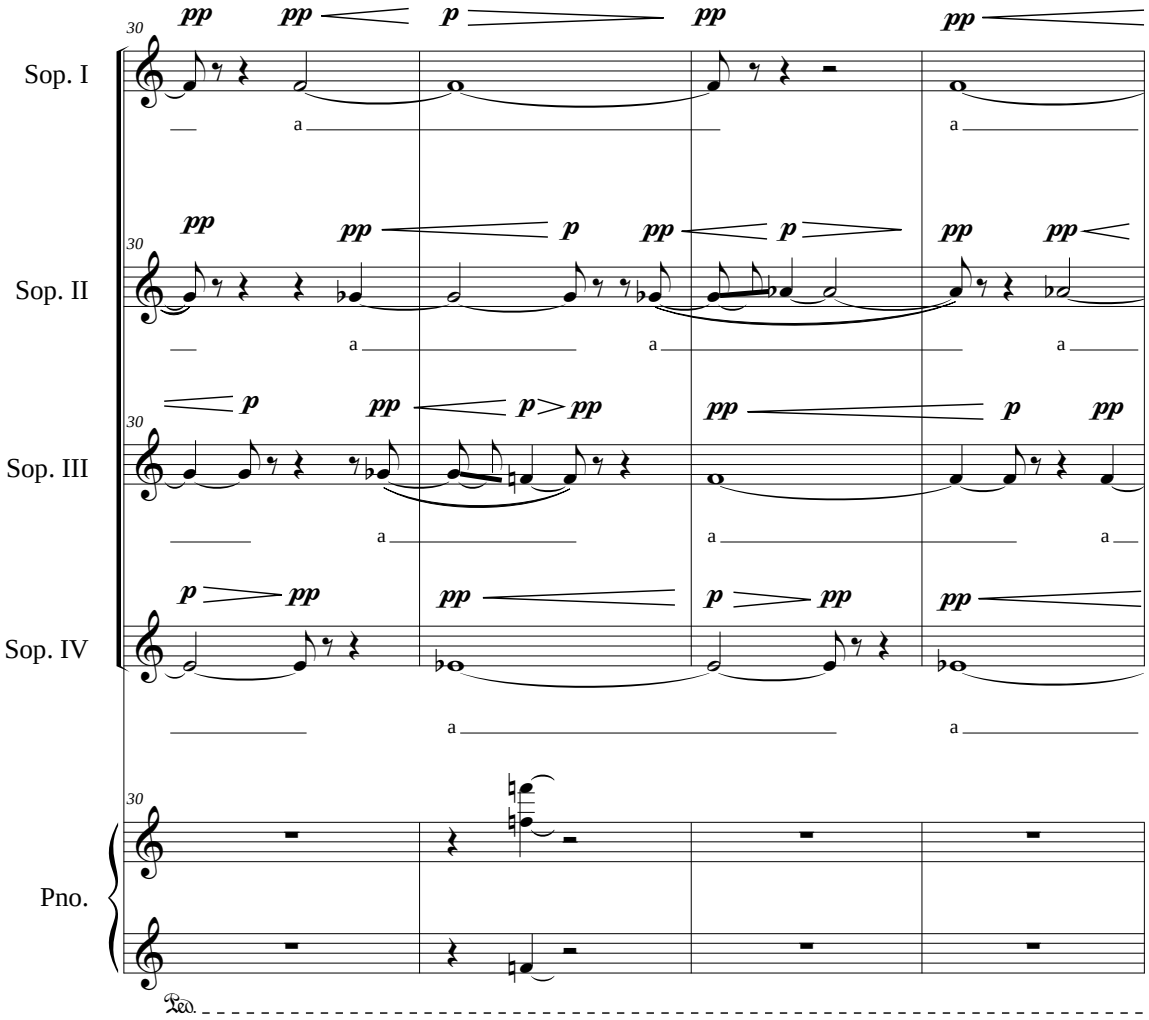


Song of the Sirens



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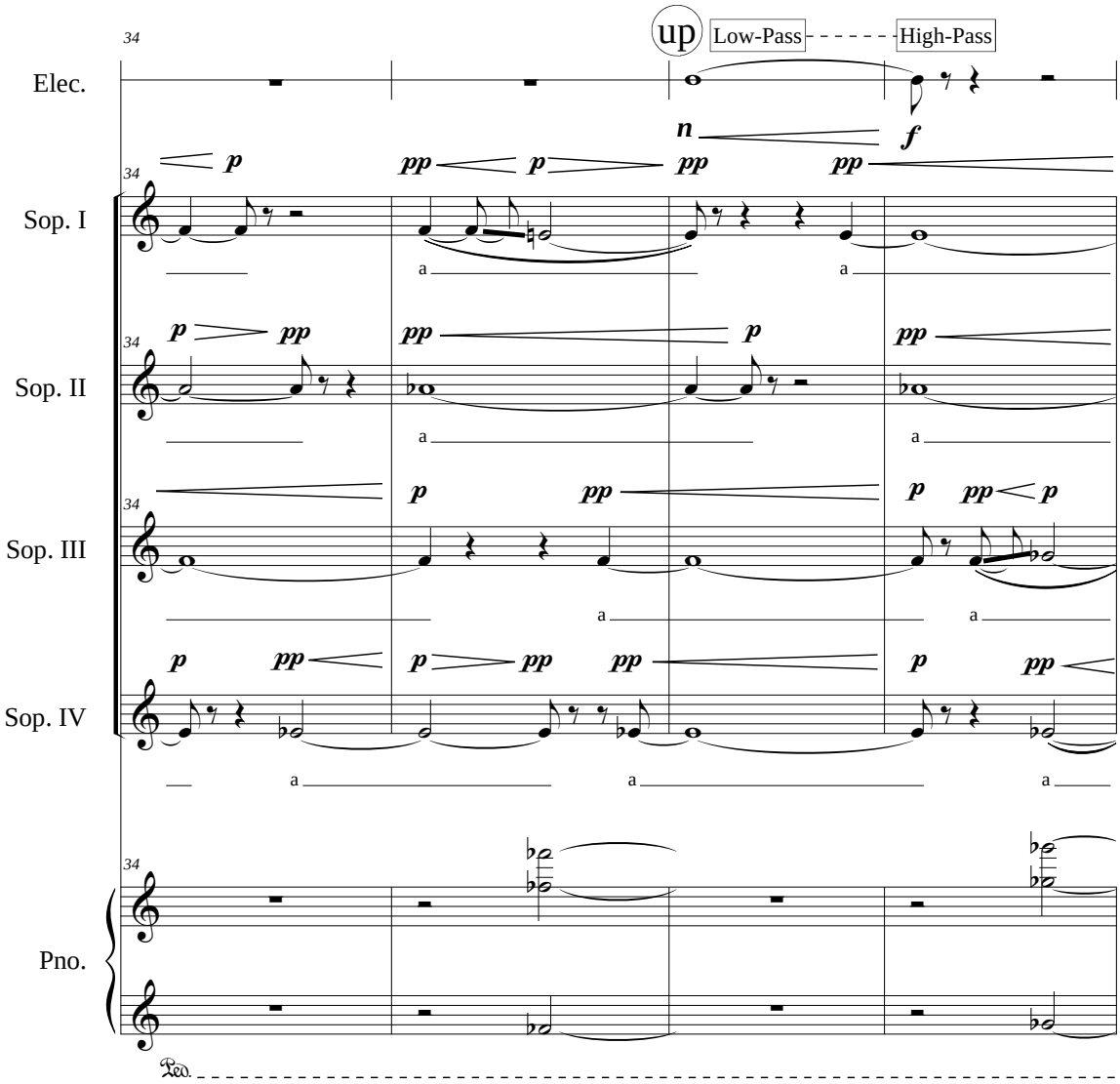

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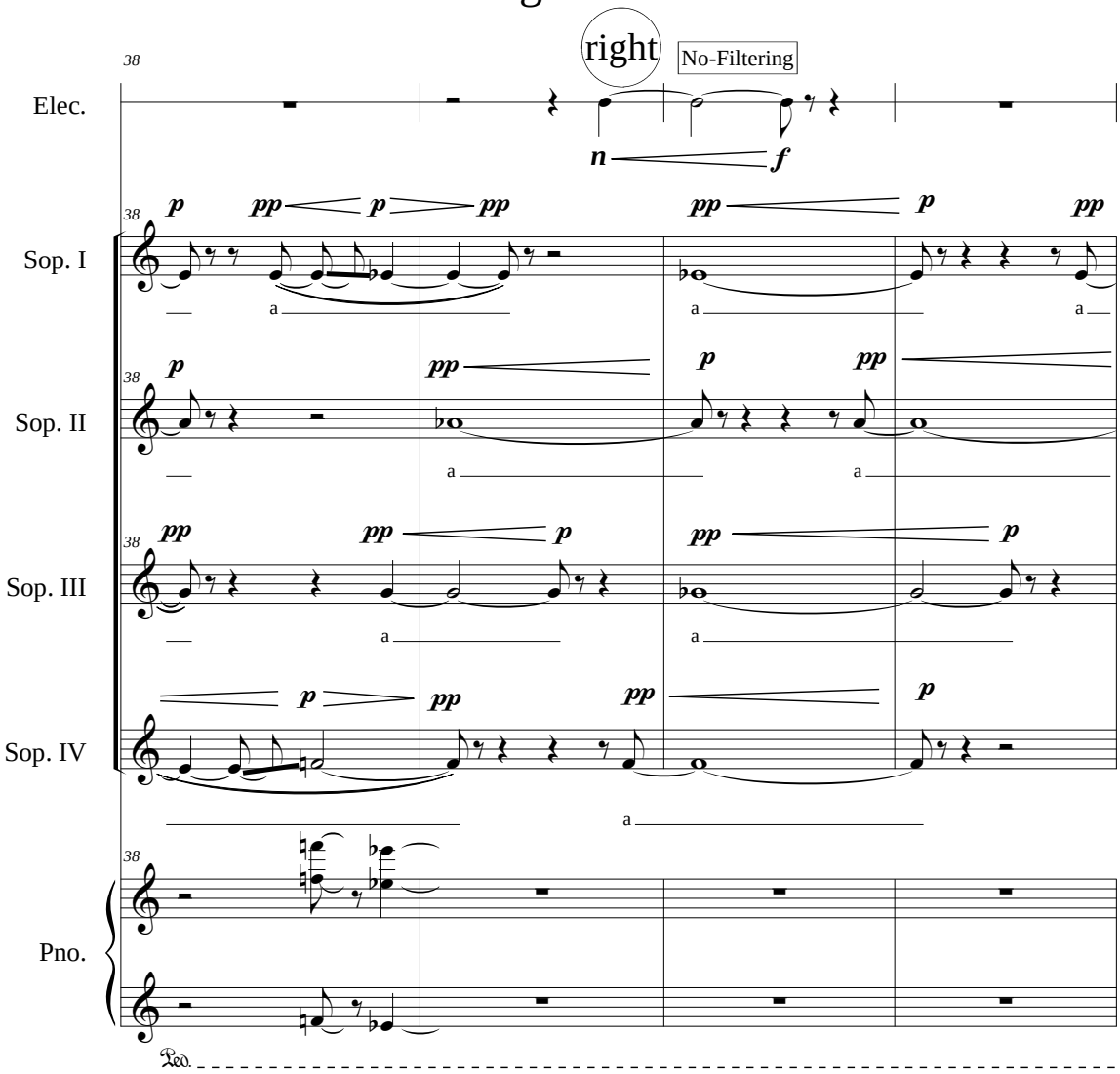

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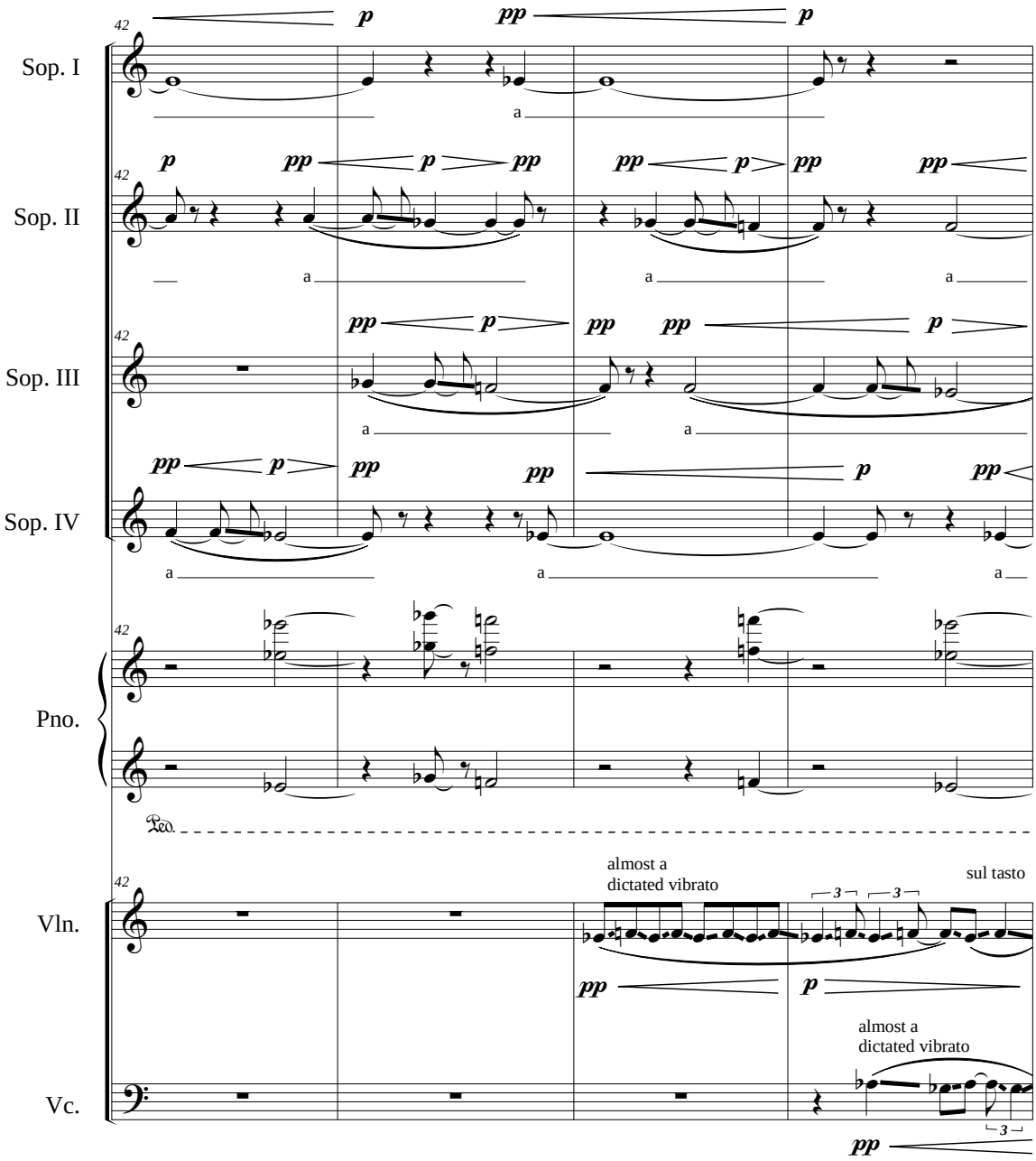

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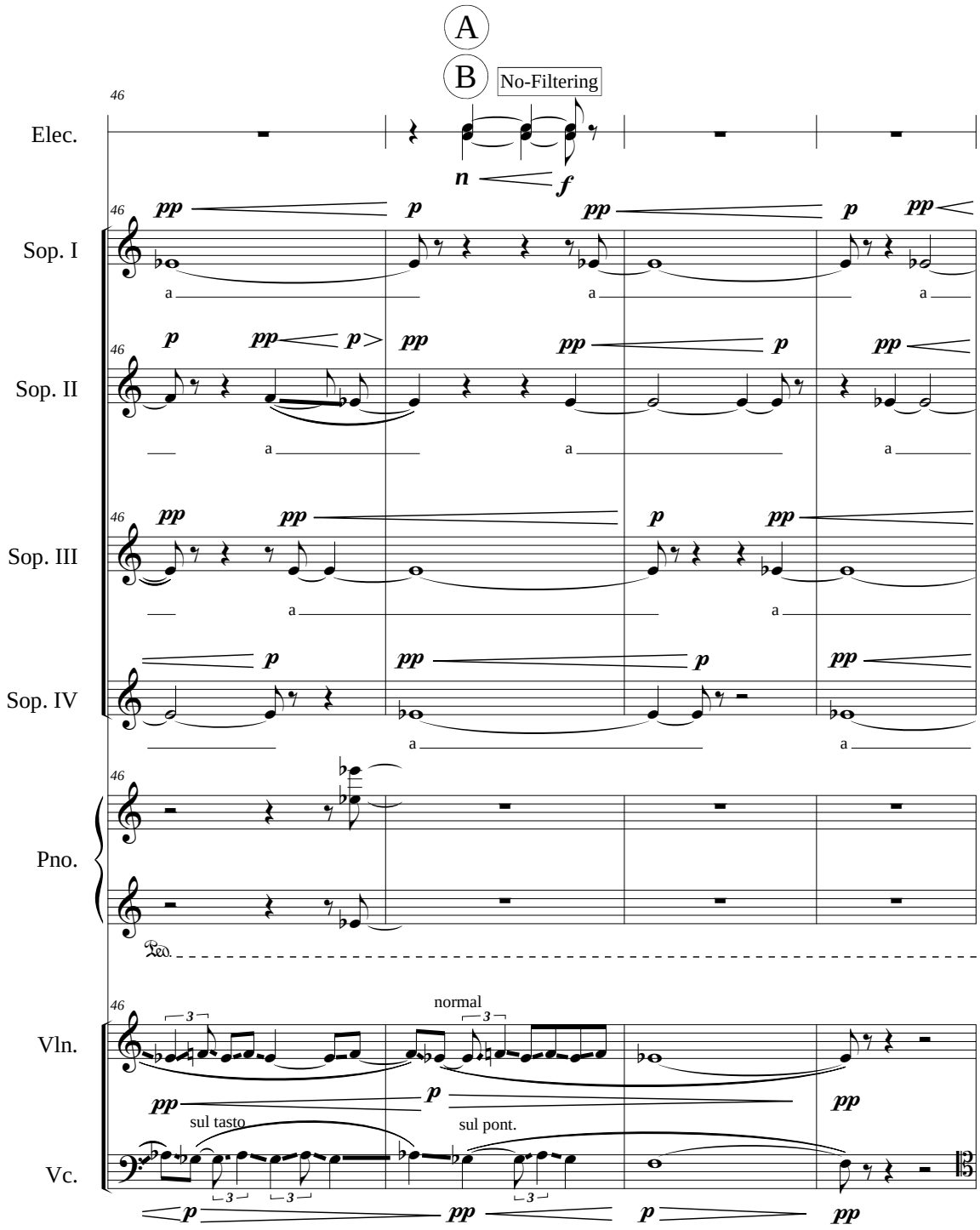


Song of the Sirens

B

B - No-Filtering

Elec.

n

50

B♭ Cl.

p mf p

50

Sop. I

p

50

Sop. II

p

50

Sop. III

p

Sop. IV

gently; delicately flowing

50

Pno.

mp

Ped. Ped.

50

Vln.

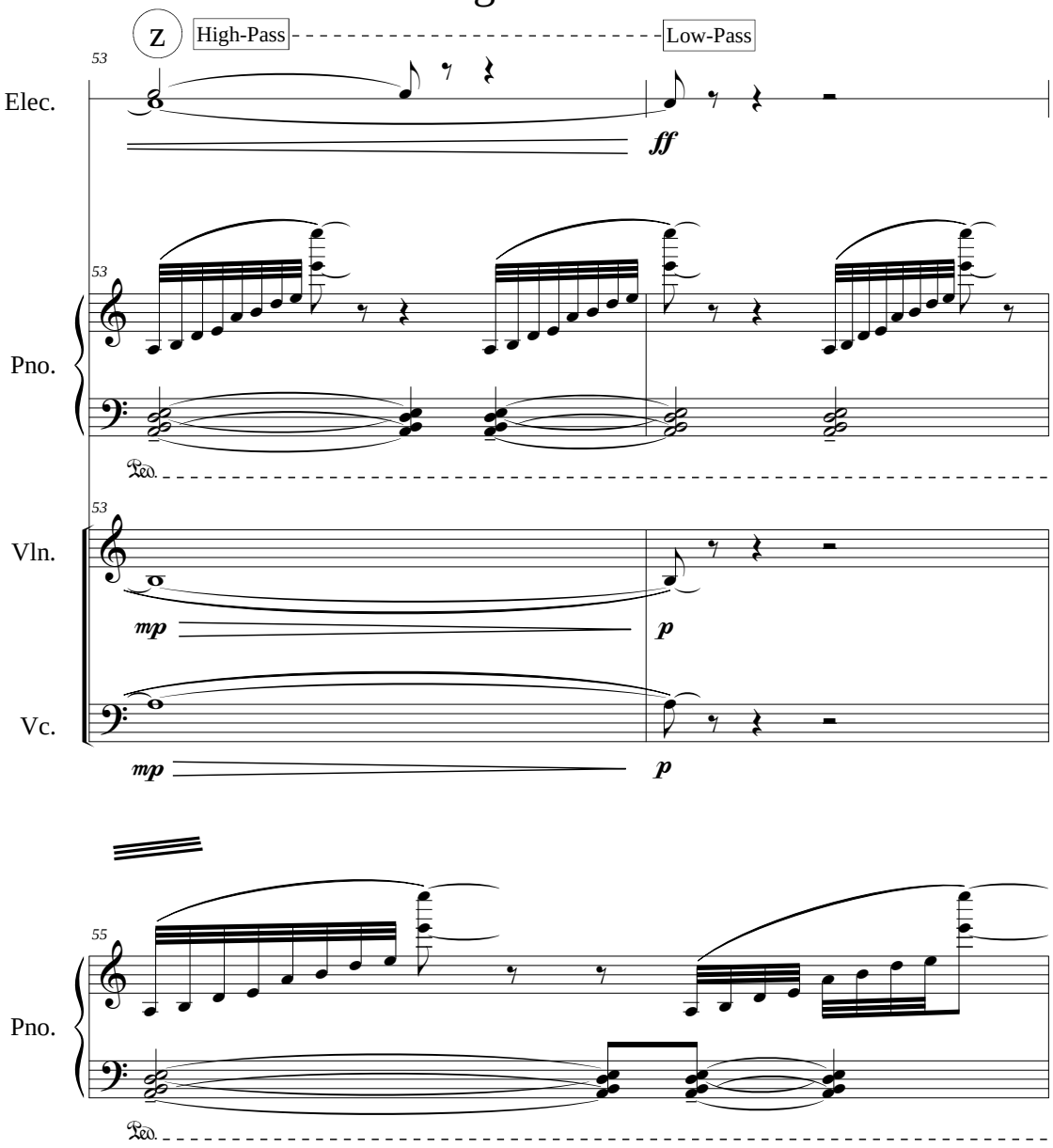
pp p pp

normal

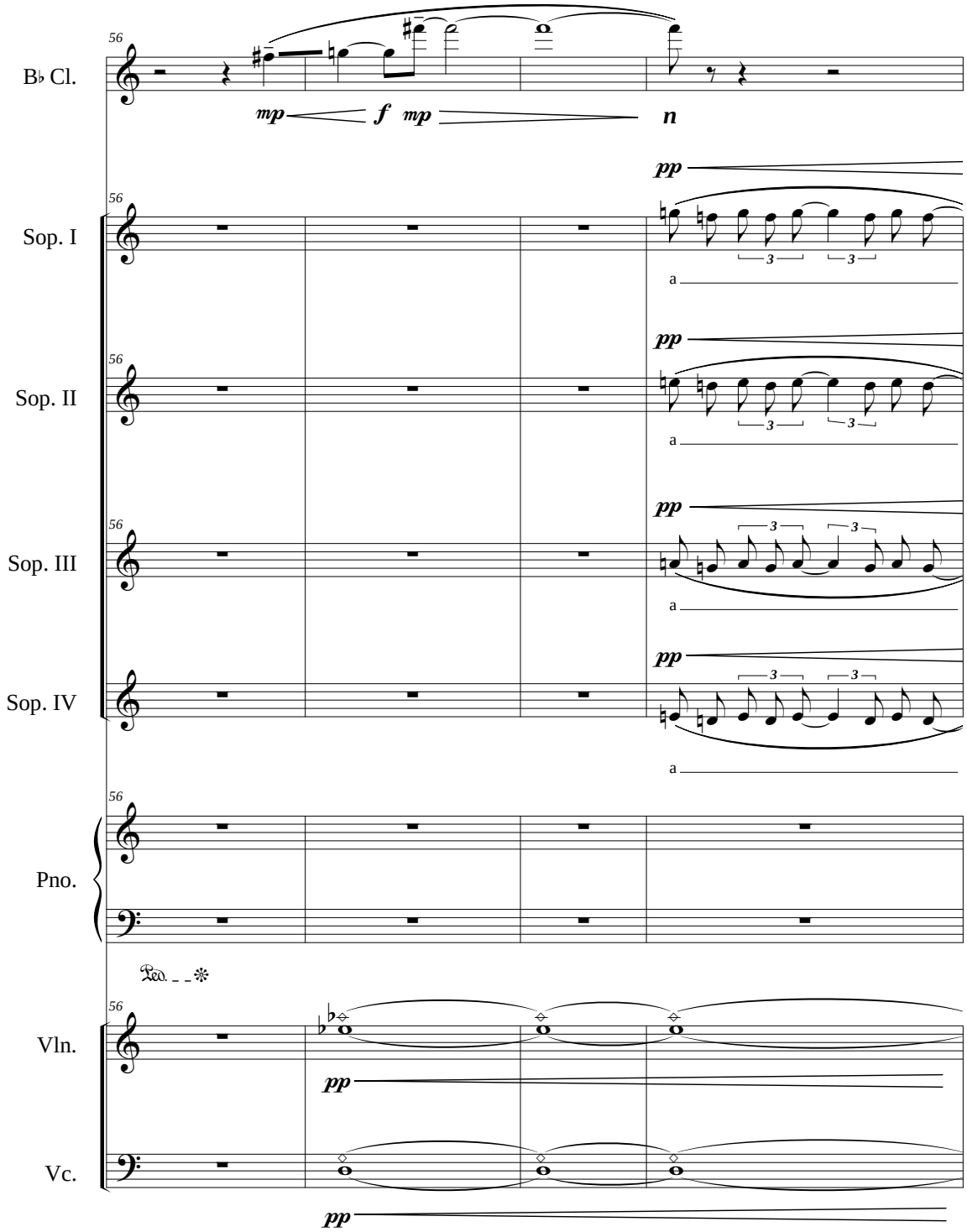
Vc.

pp p pp

Song of the Sirens



Song of the Sirens



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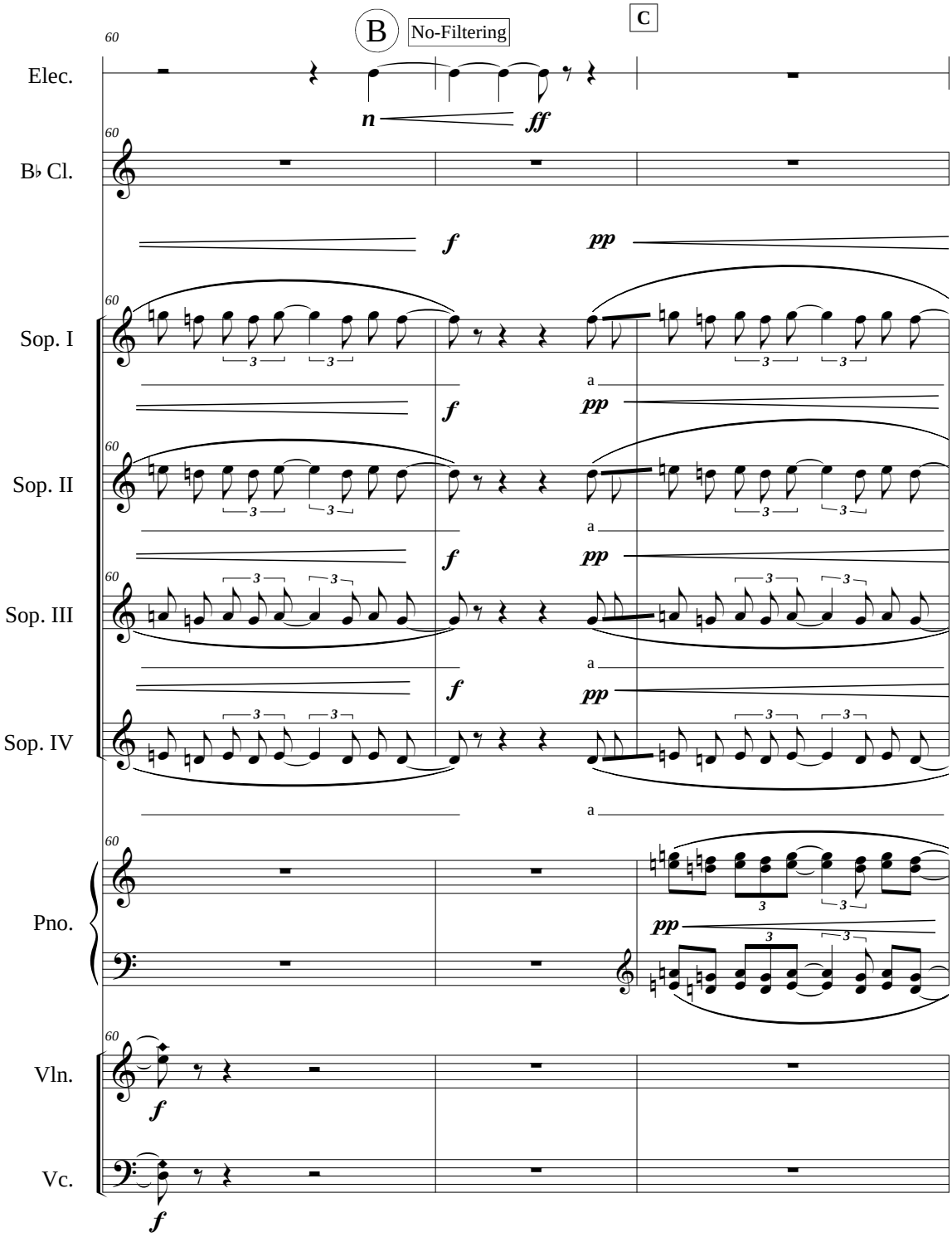

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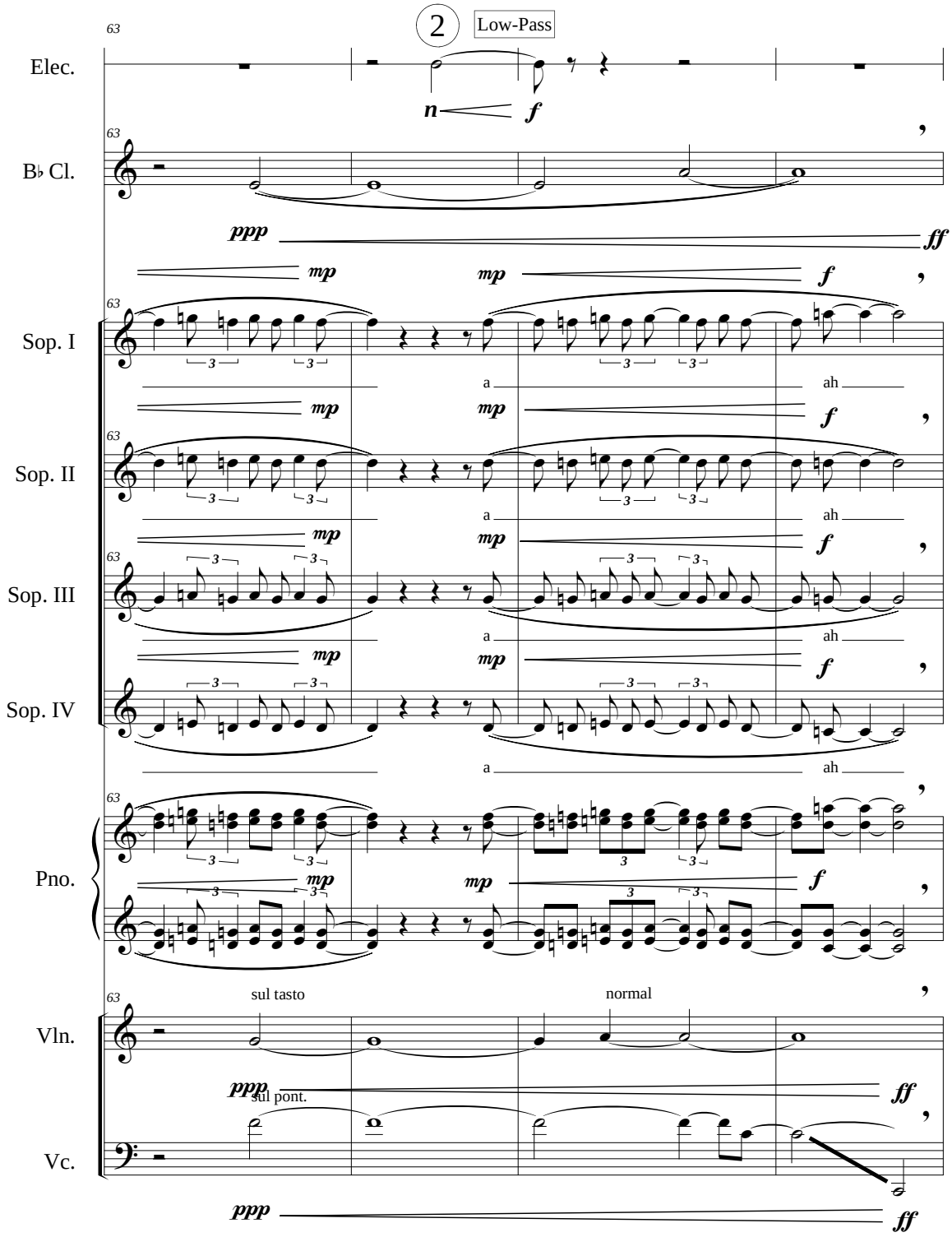

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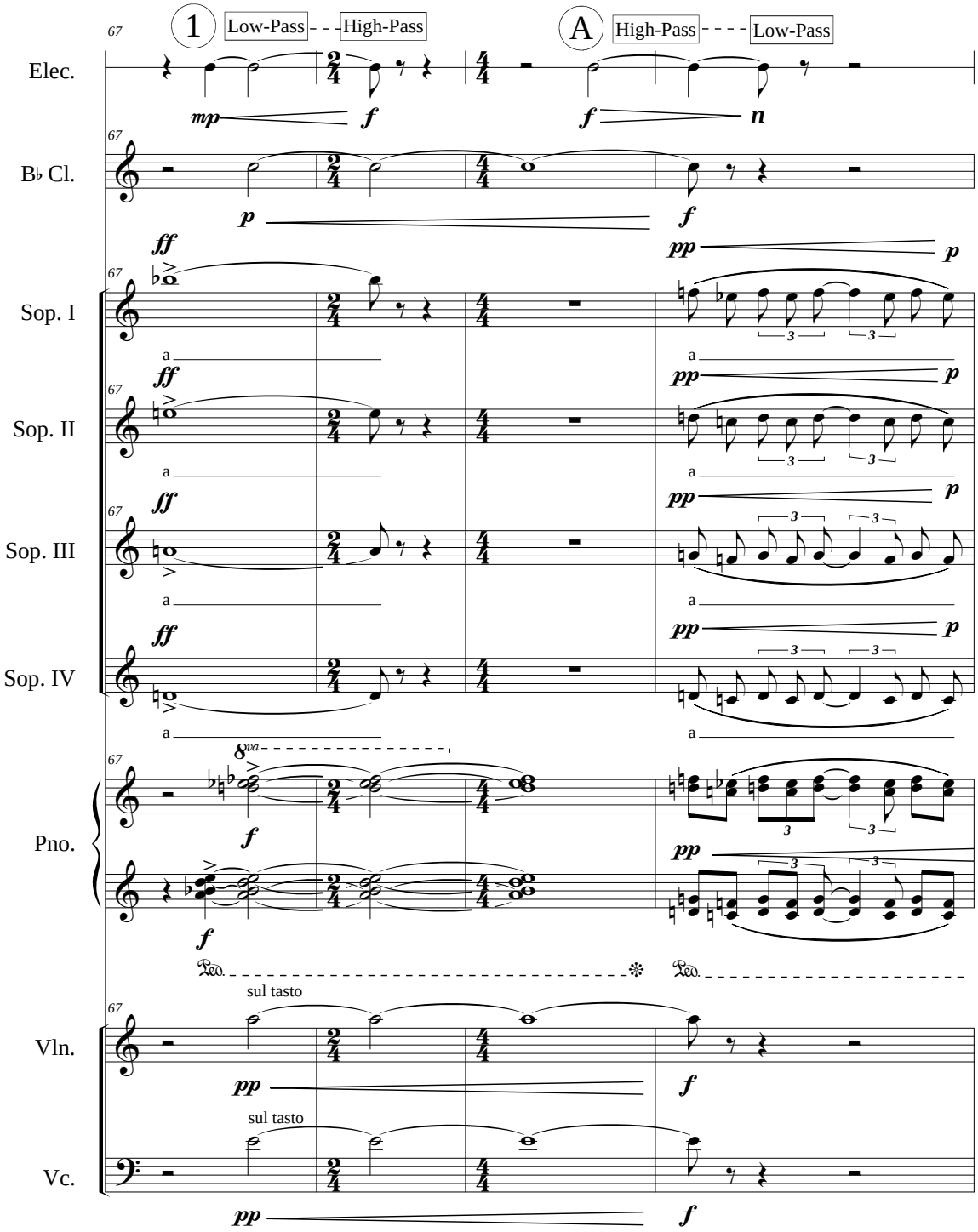


Song of the Sirens

71

2

Low-Pass

High-Pass

home

No-Filtering

Elec.

B♭ Cl.

Sop. I

Sop. II

Sop. III

Sop. IV

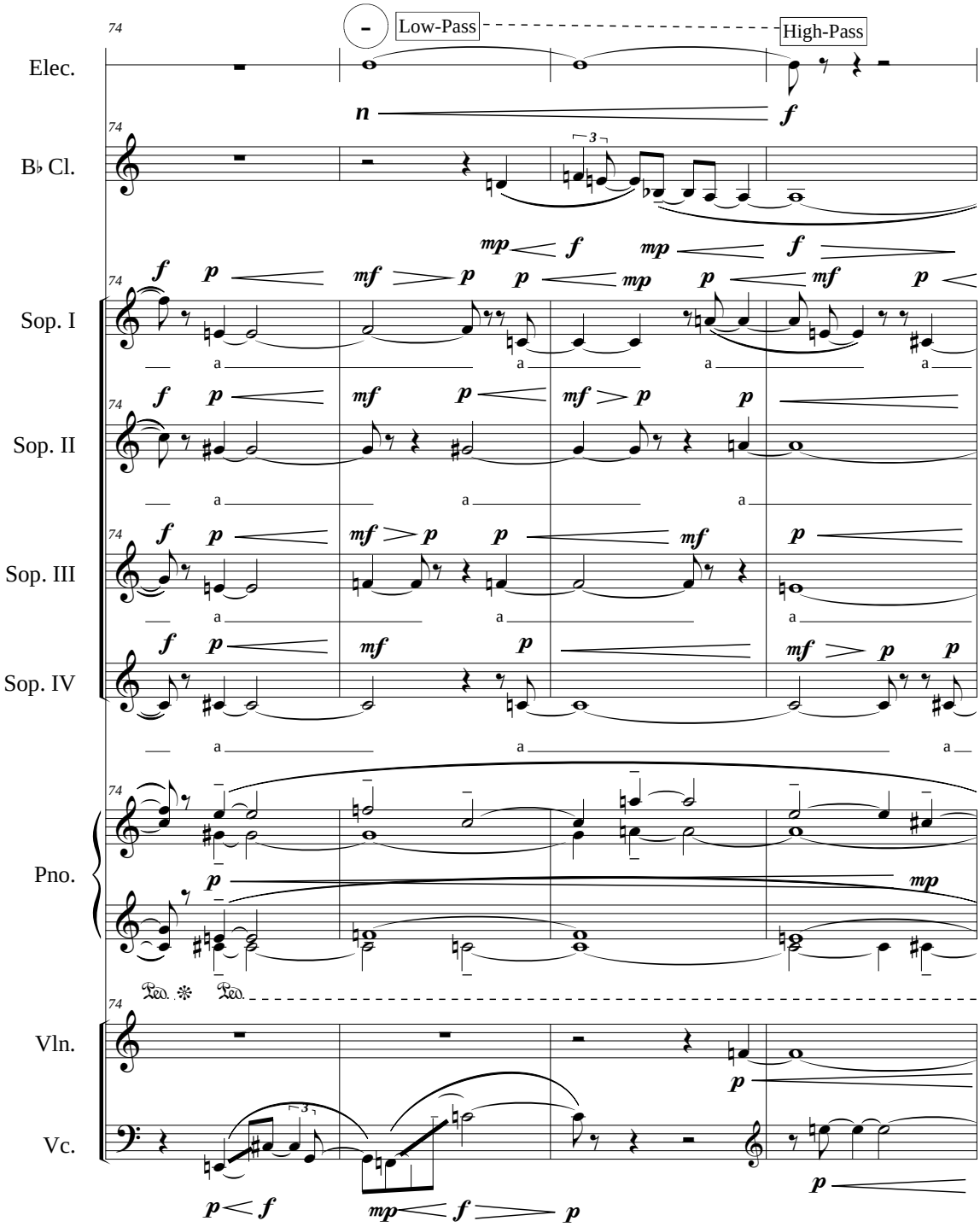
Pno.

Vln.

normal

Vc.

Song of the Sirens



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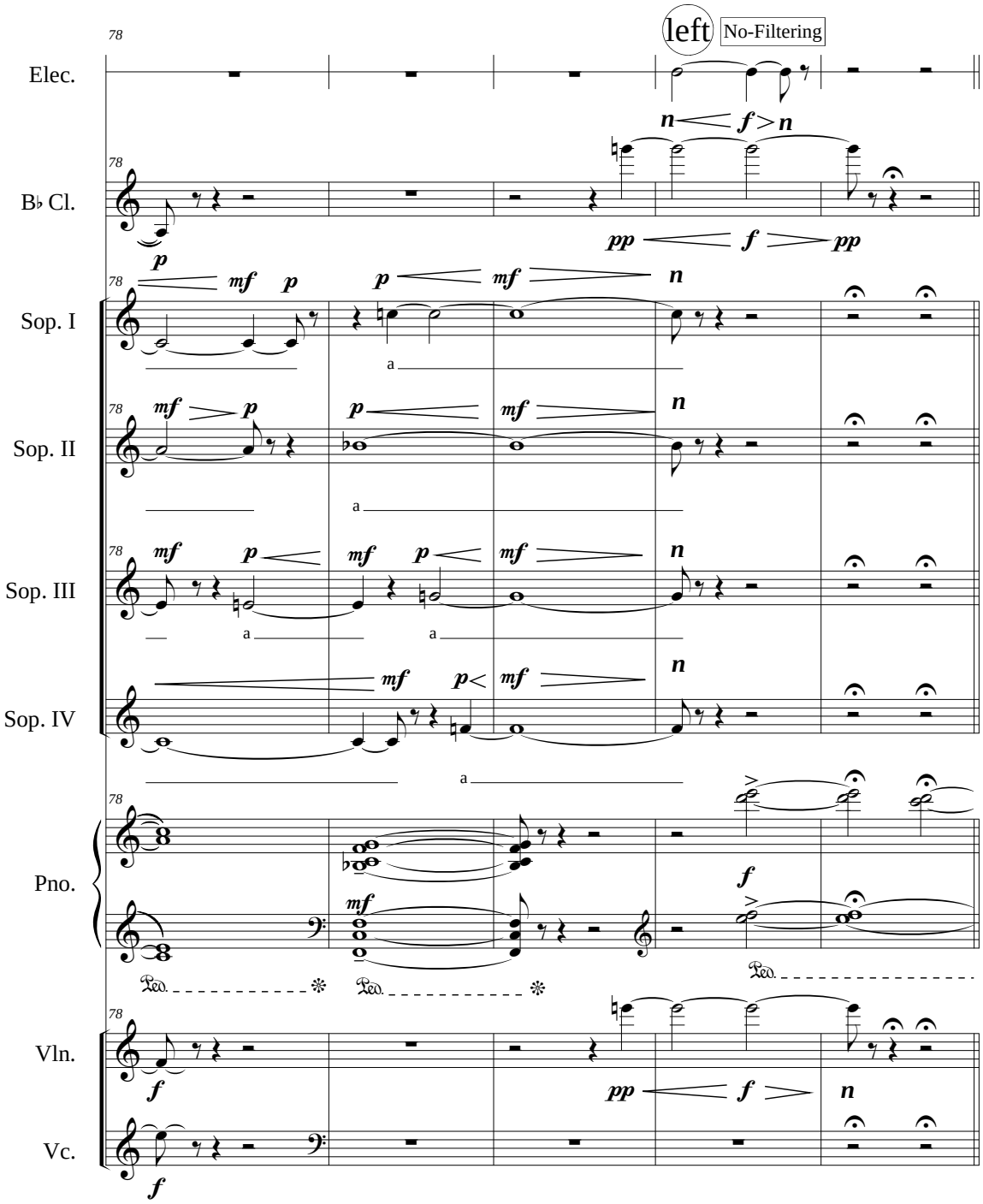

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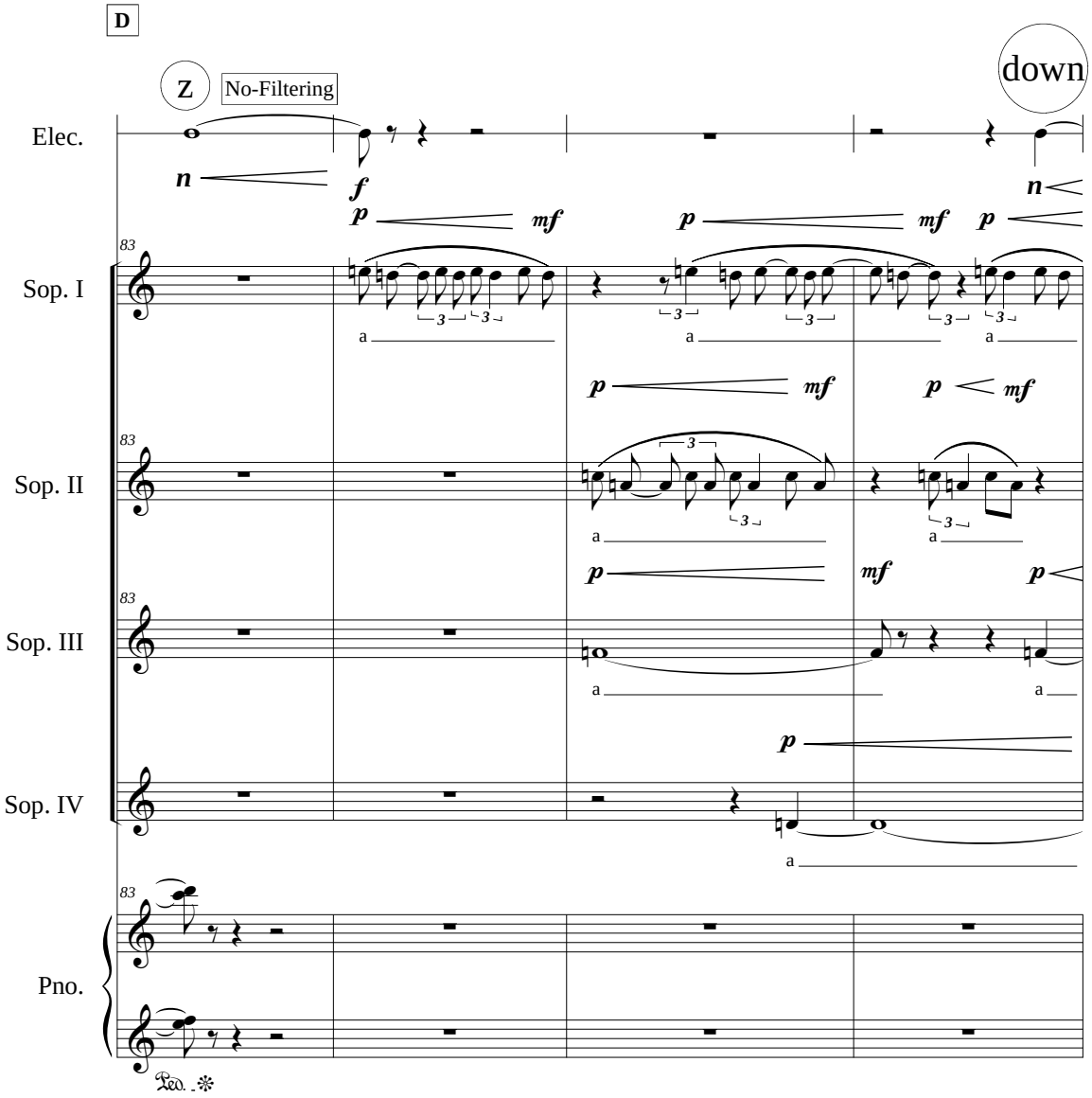

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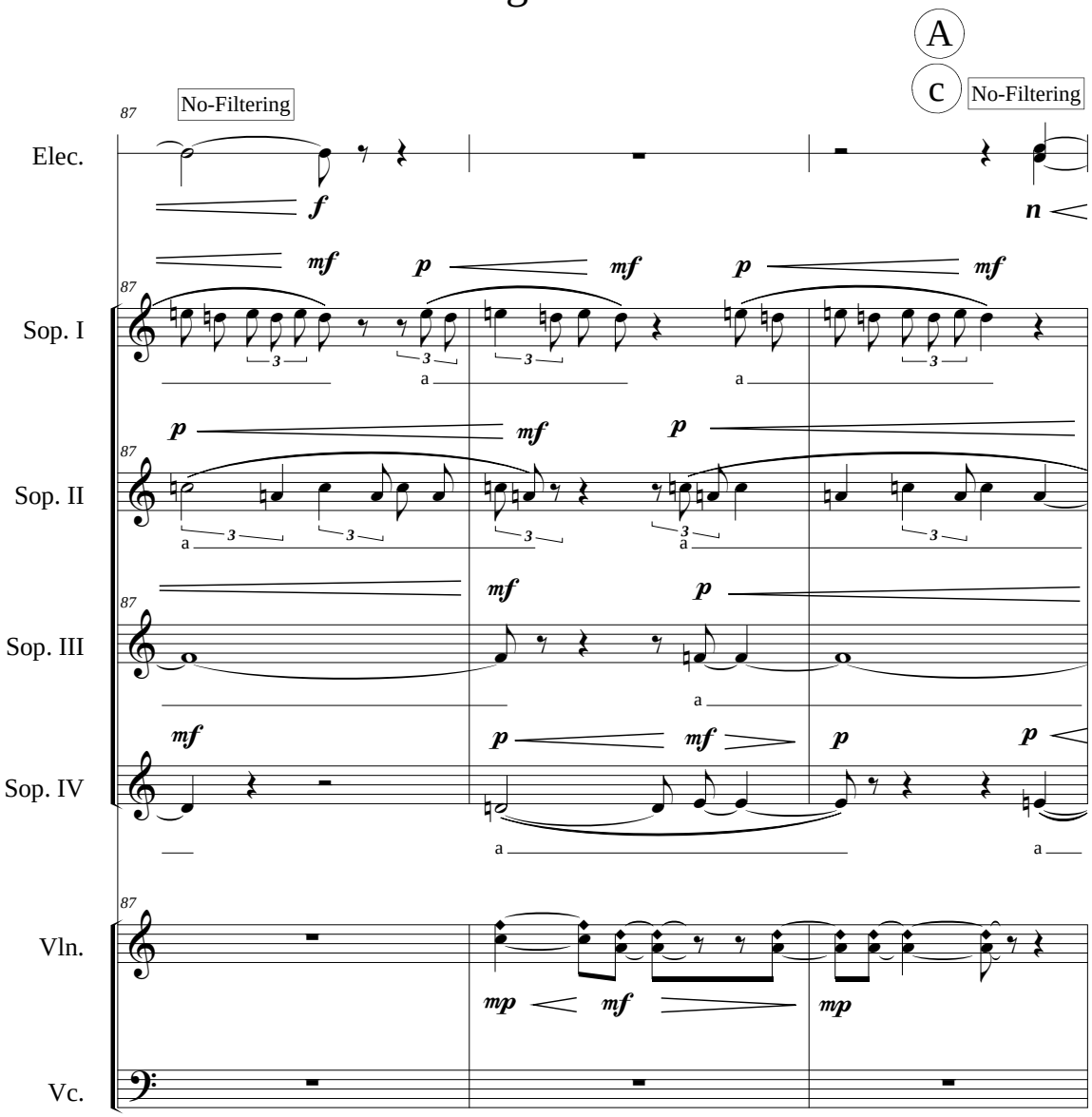

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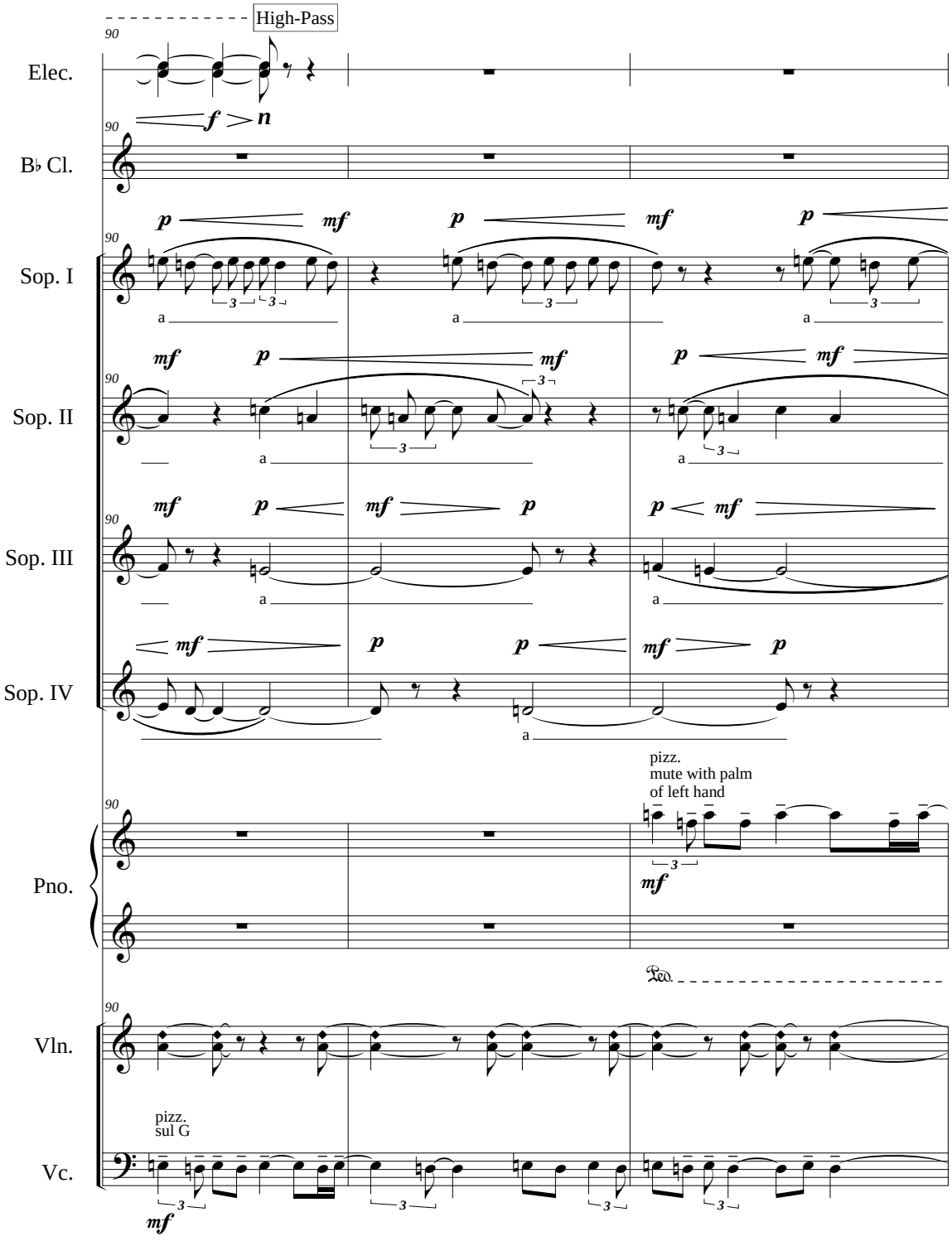

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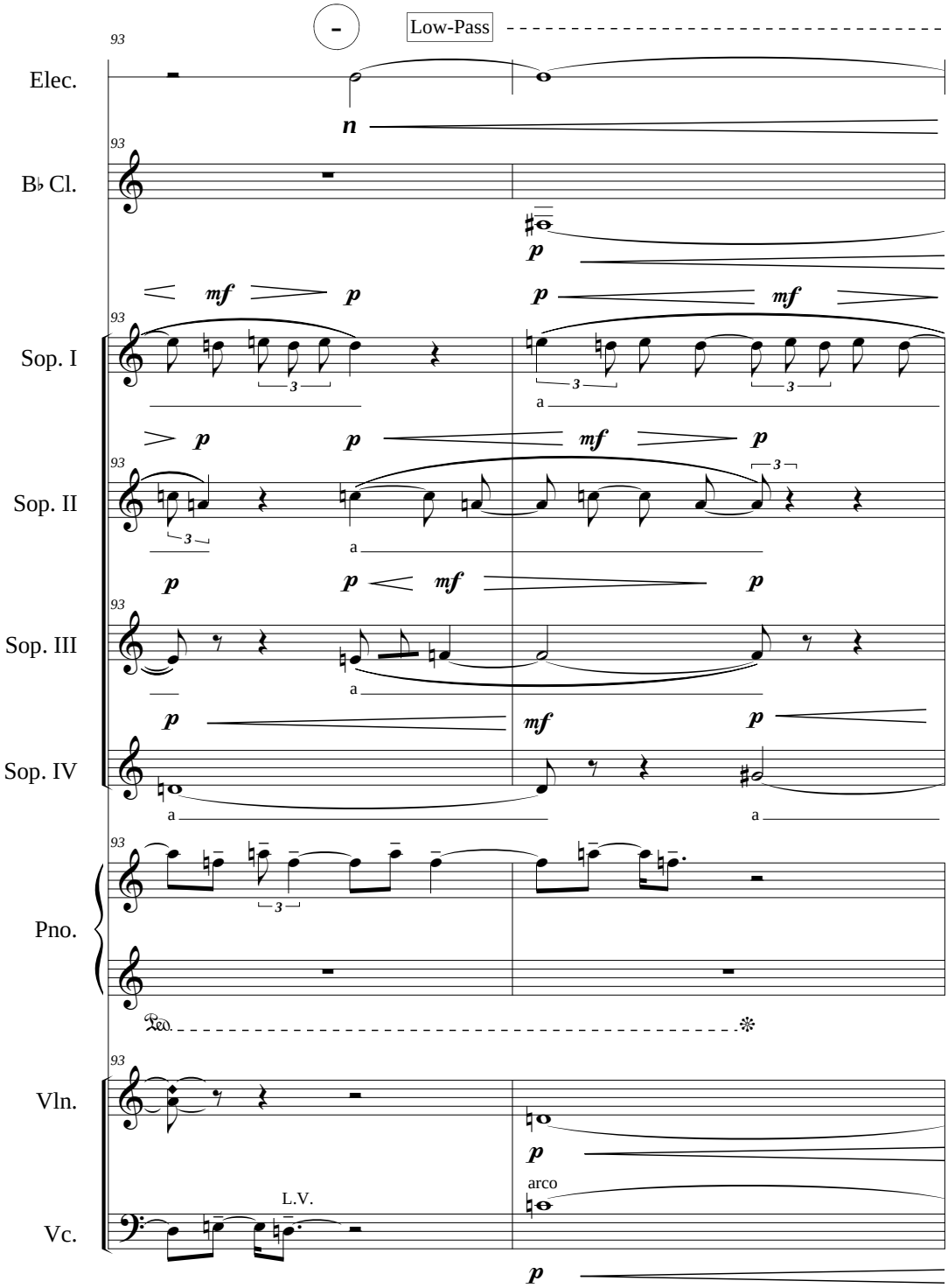

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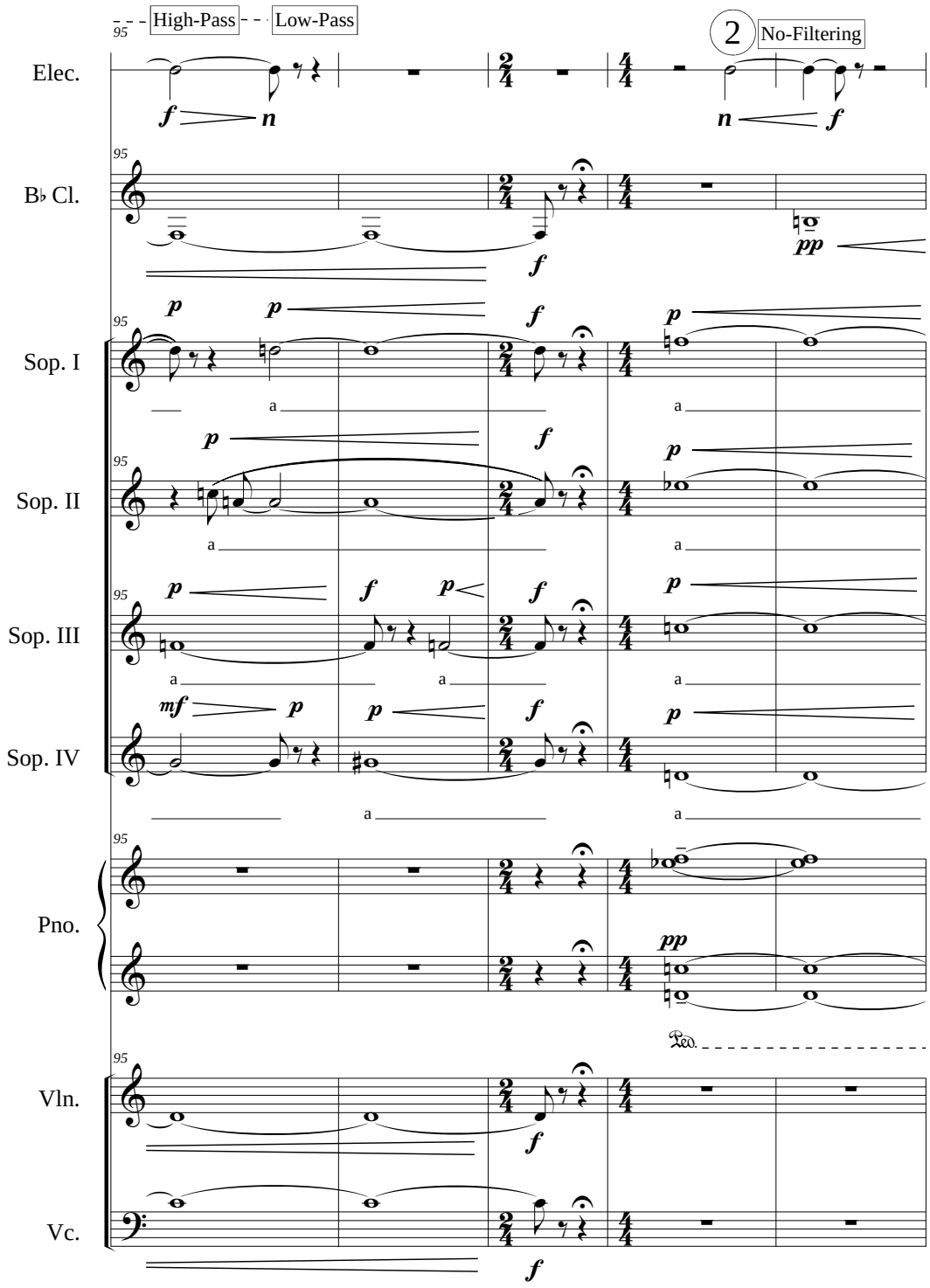

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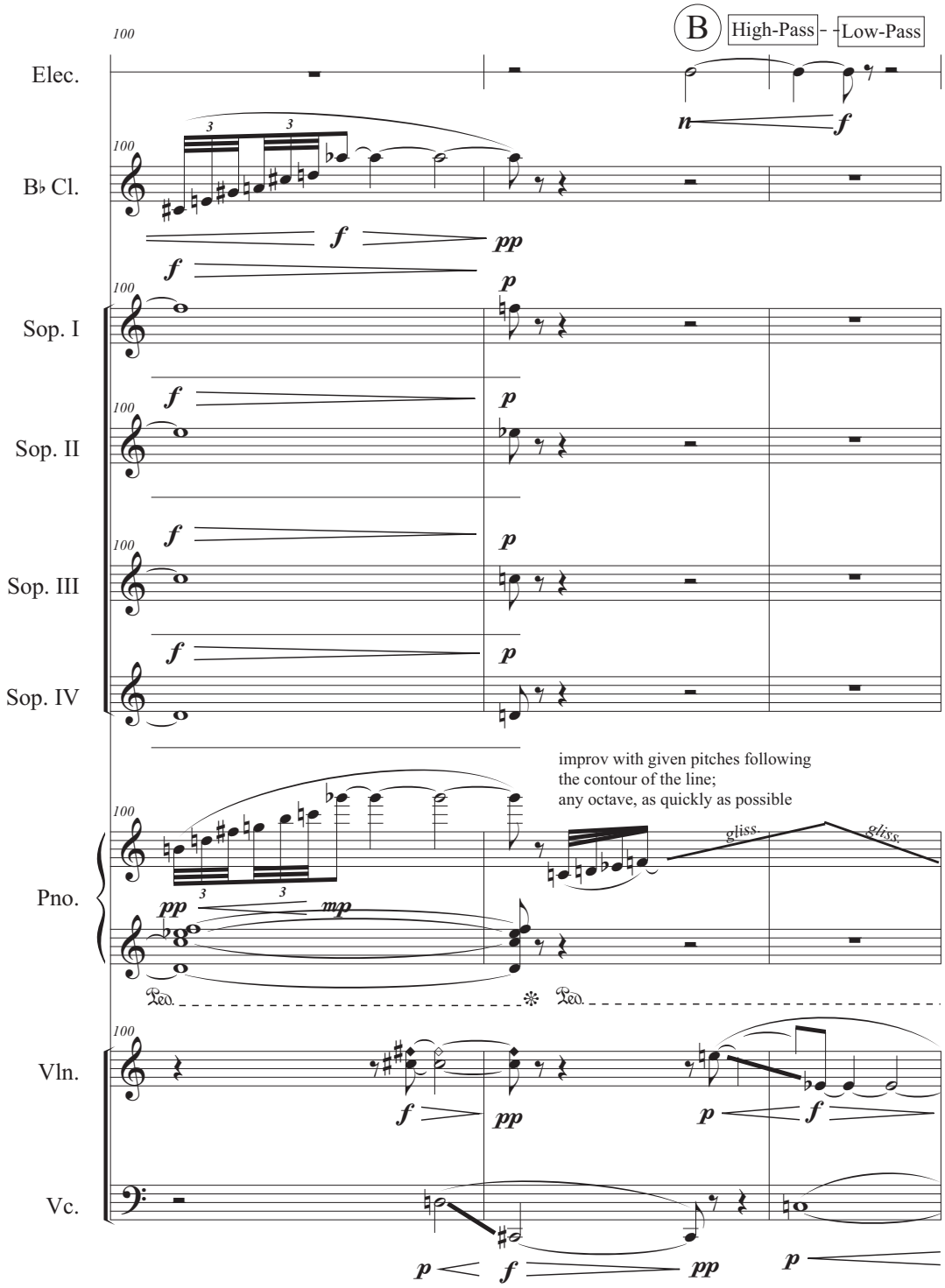

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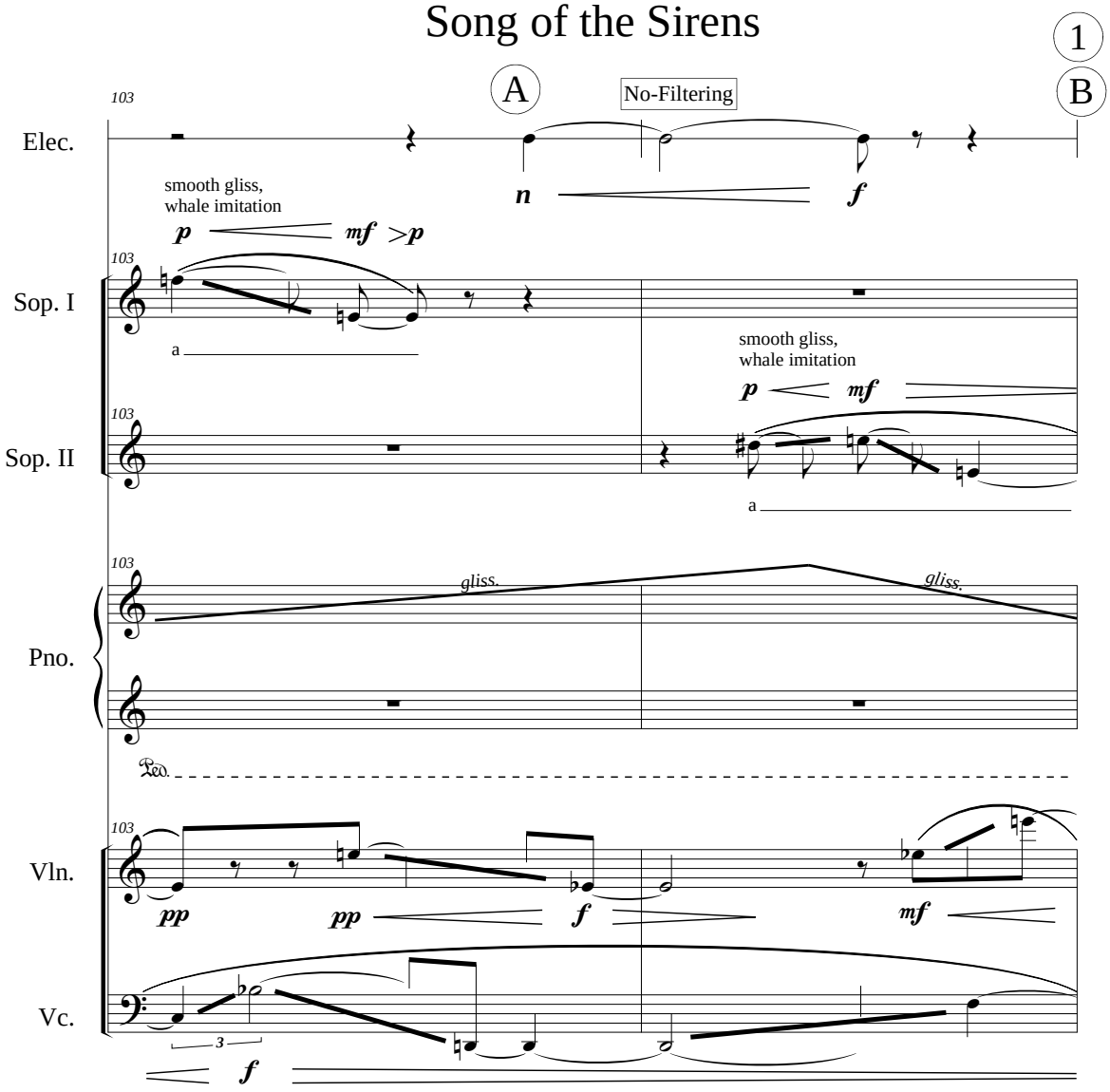


Song of the Sirens

105

Elec.

High-Pass

Low-Pass

down

Low-Pass

n f n

B♭ Cl.

Sop. I

p mf > p p mf p

a a

Sop. II

> p p mf

a

smooth gliss,
whale imitation

Sop. III

p mf > p

a

Pno.

gliss. gliss. gliss.

Vln.

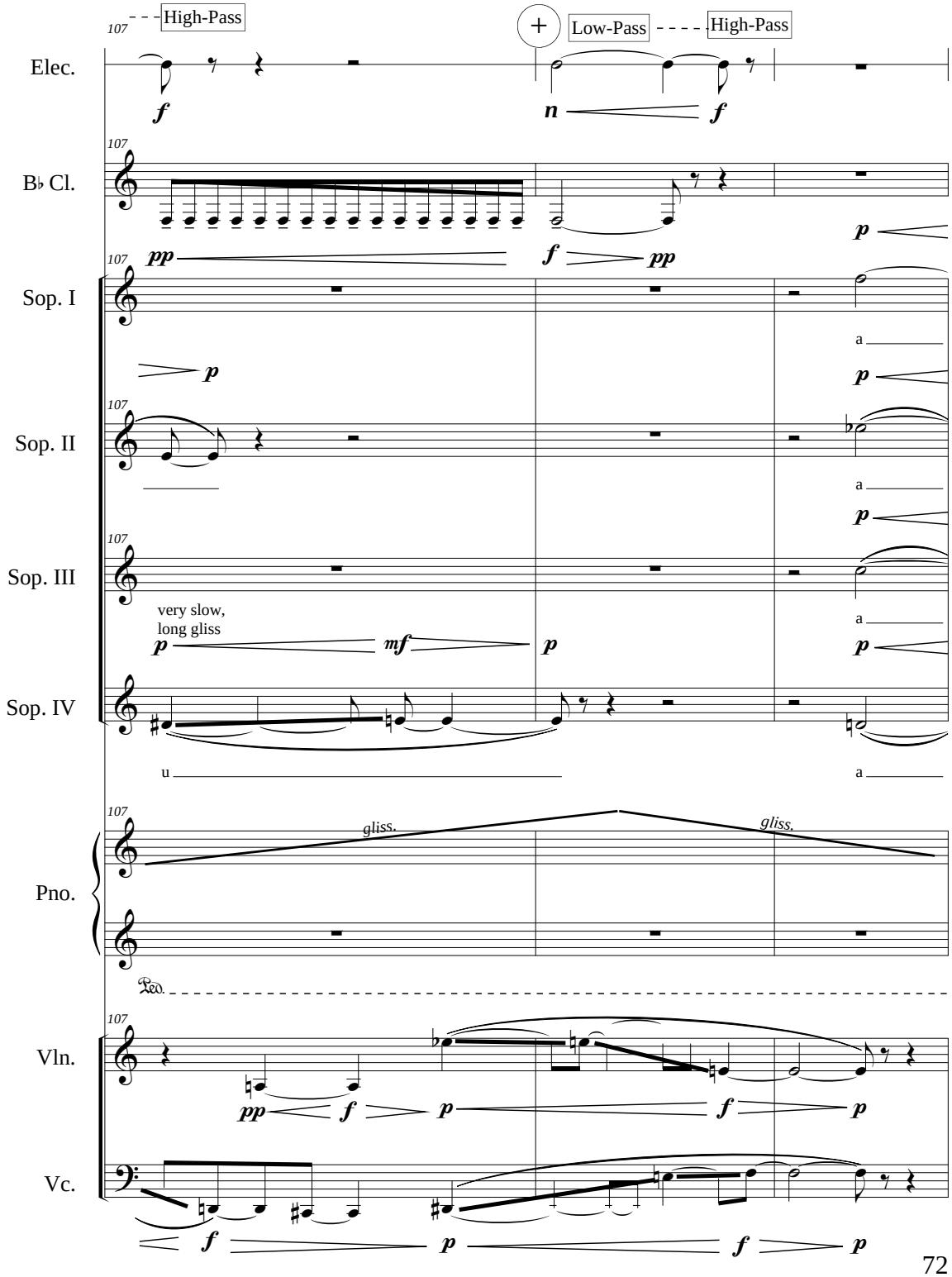
f mf f mf f mf f

Vc.

smooth gliss,
whale imitation

< pp mp f mp f mp

Song of the Sirens



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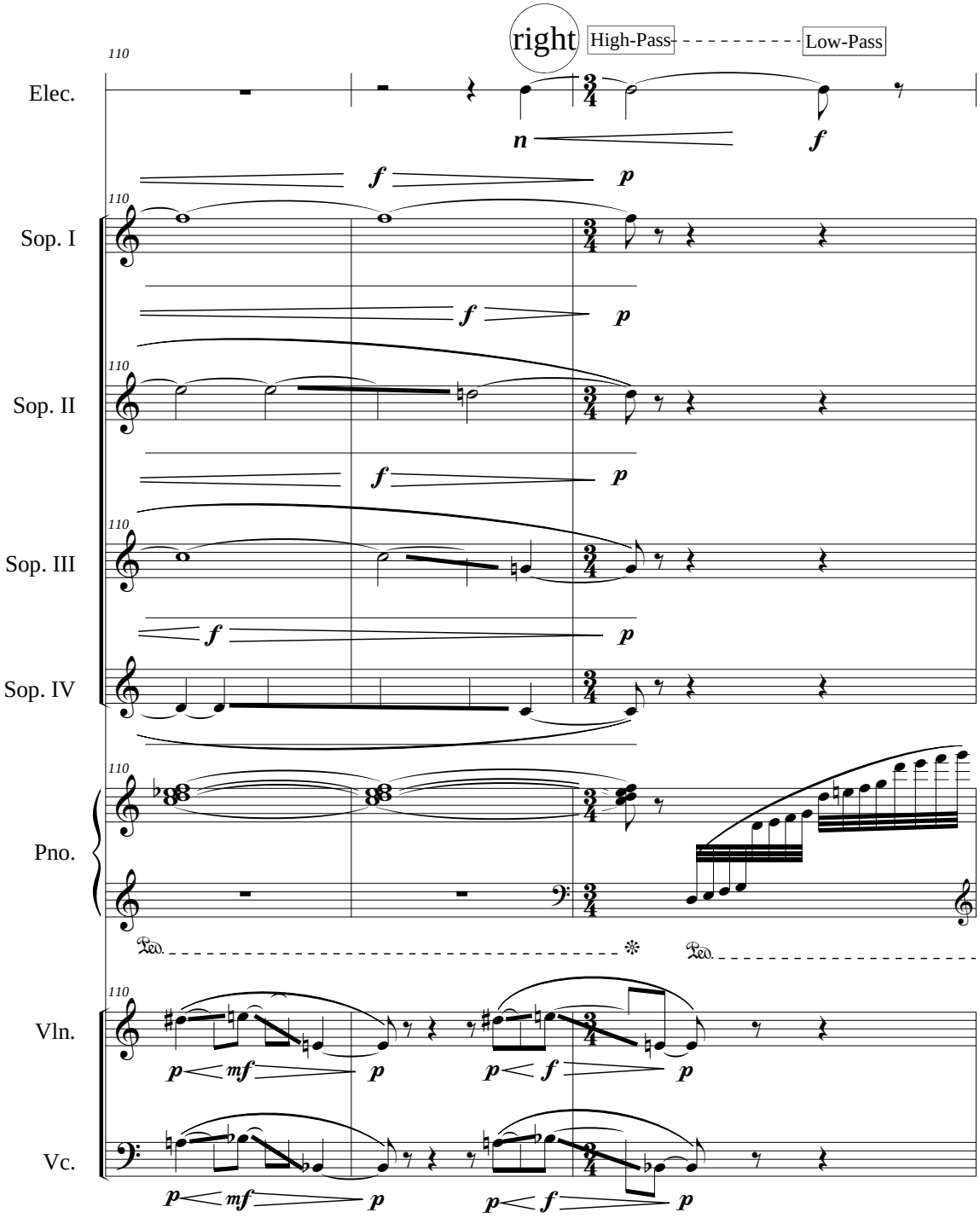

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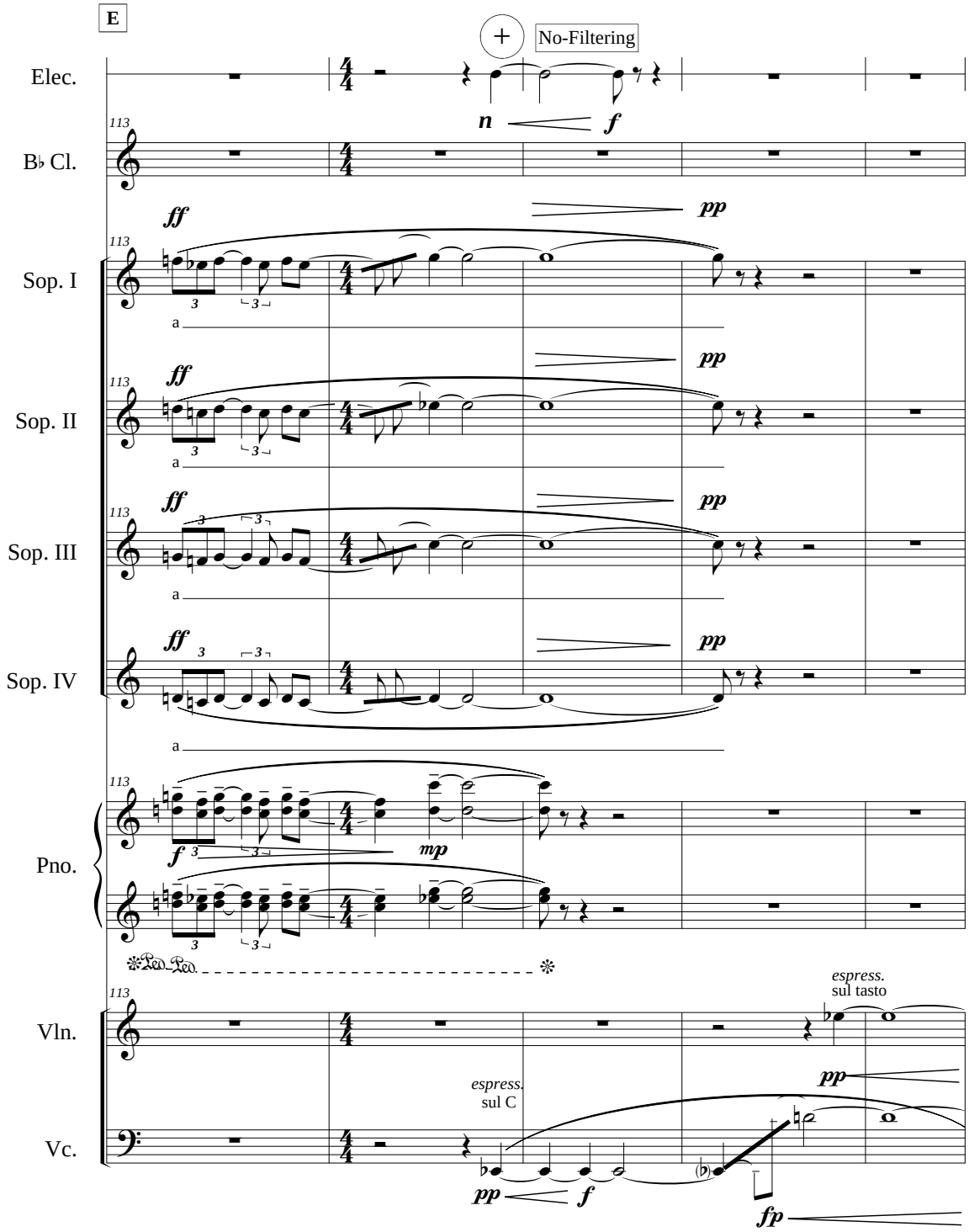

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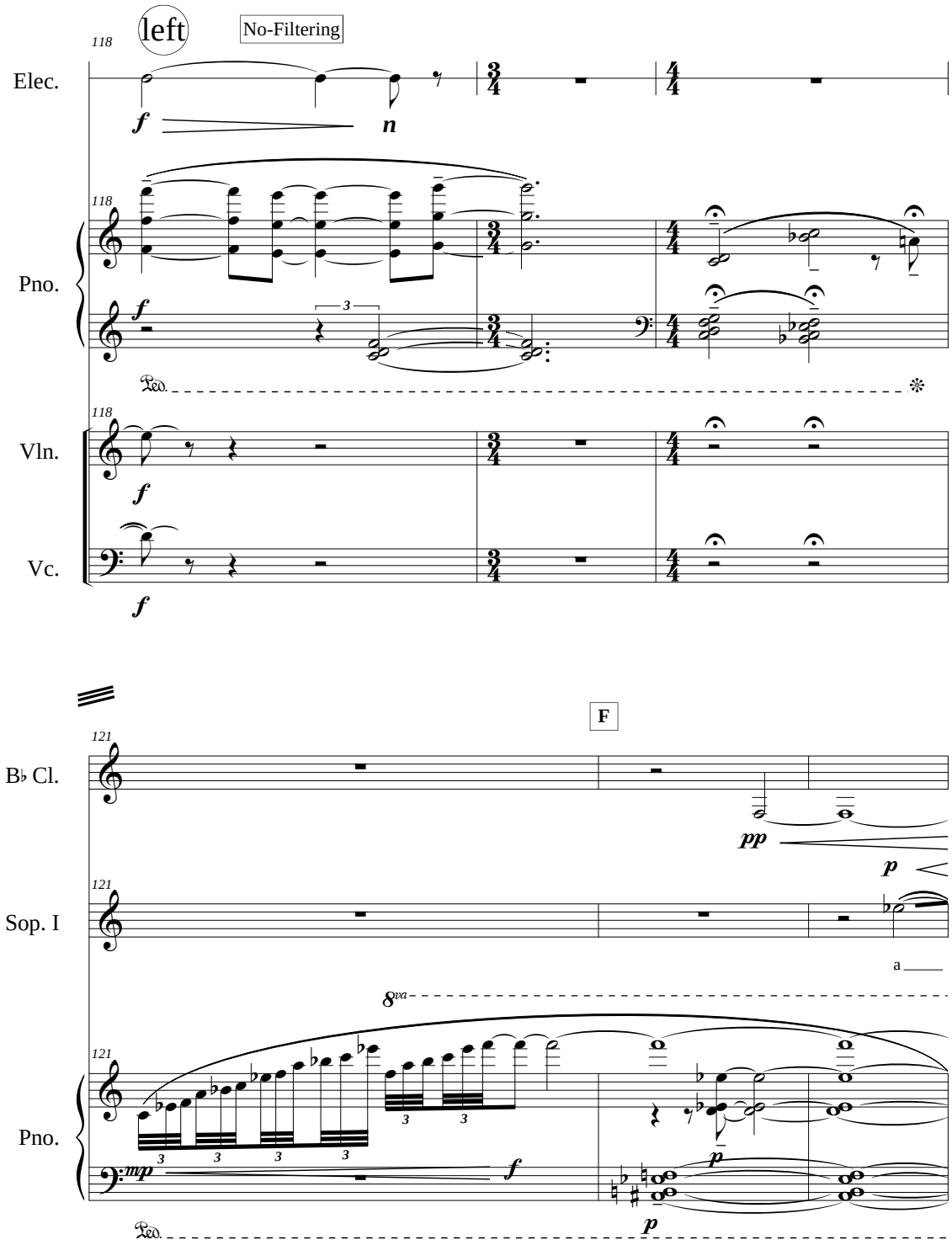

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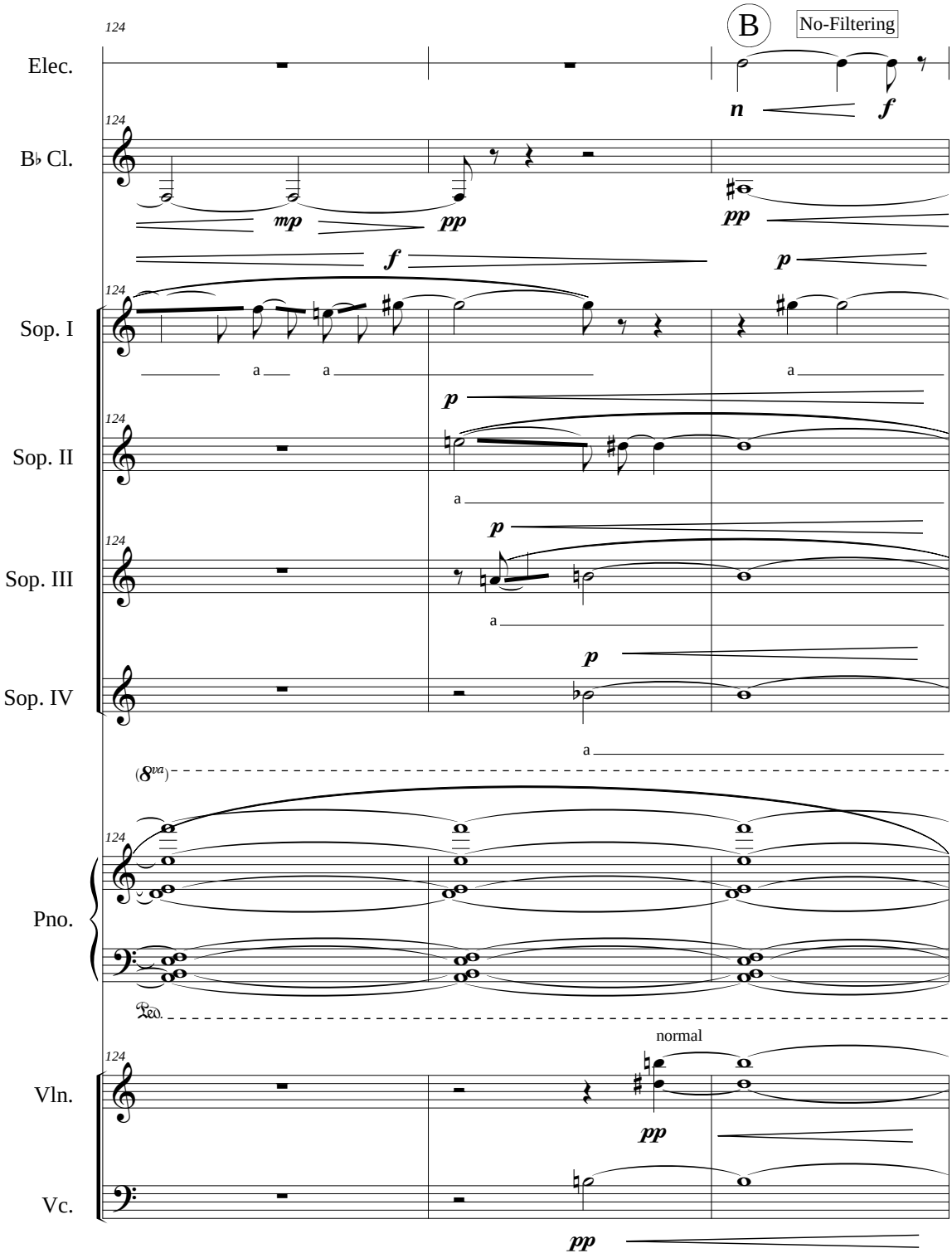

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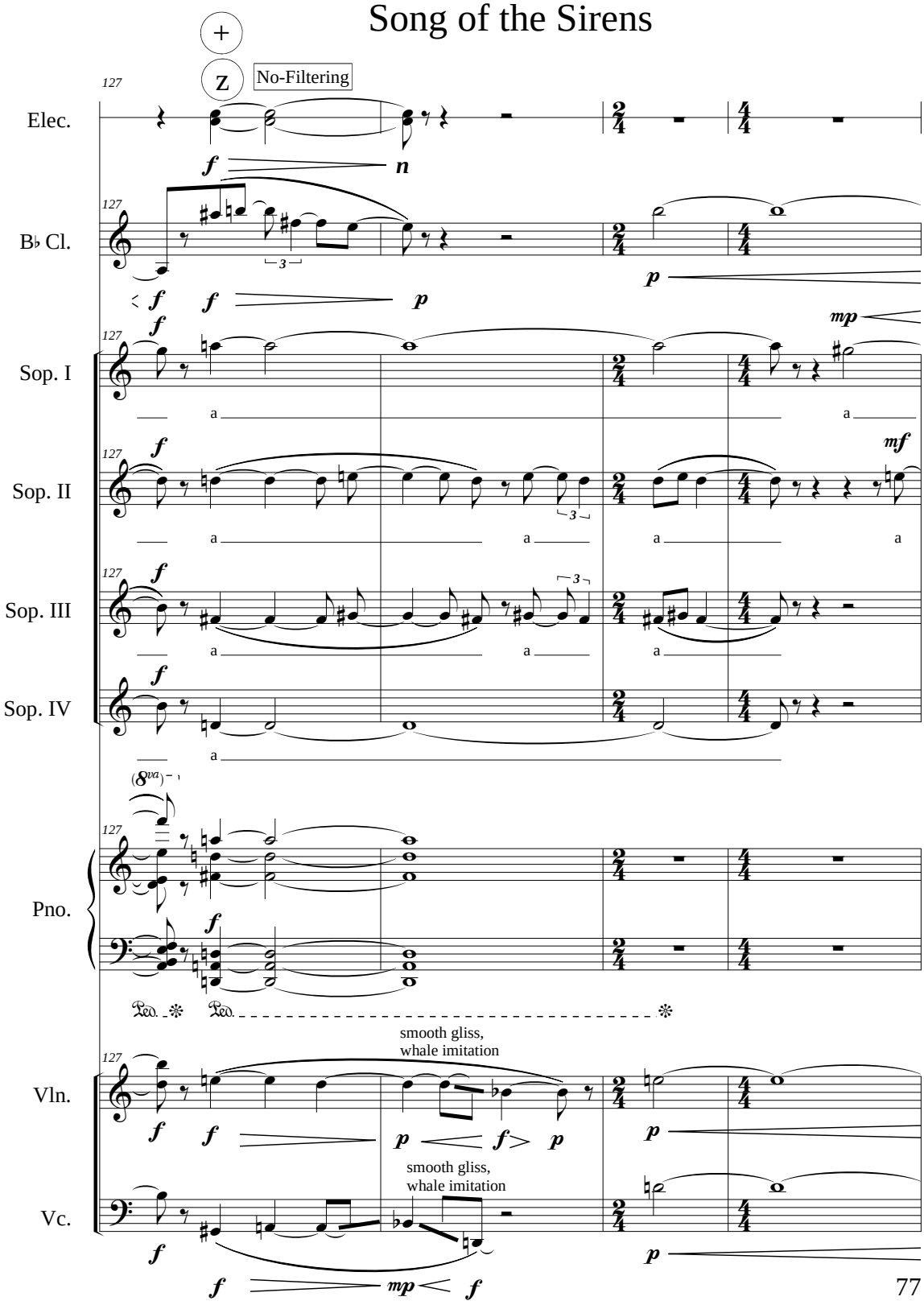

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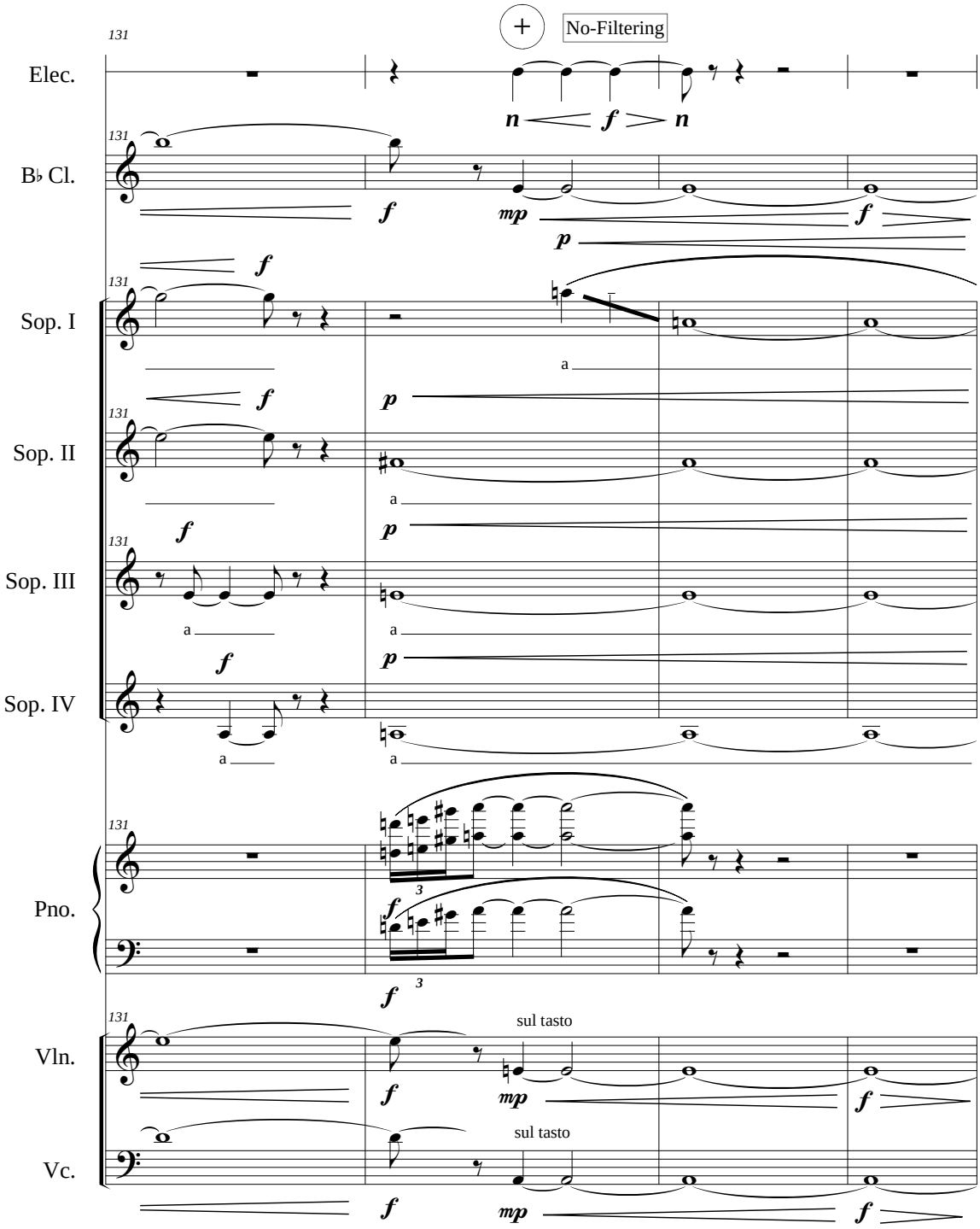
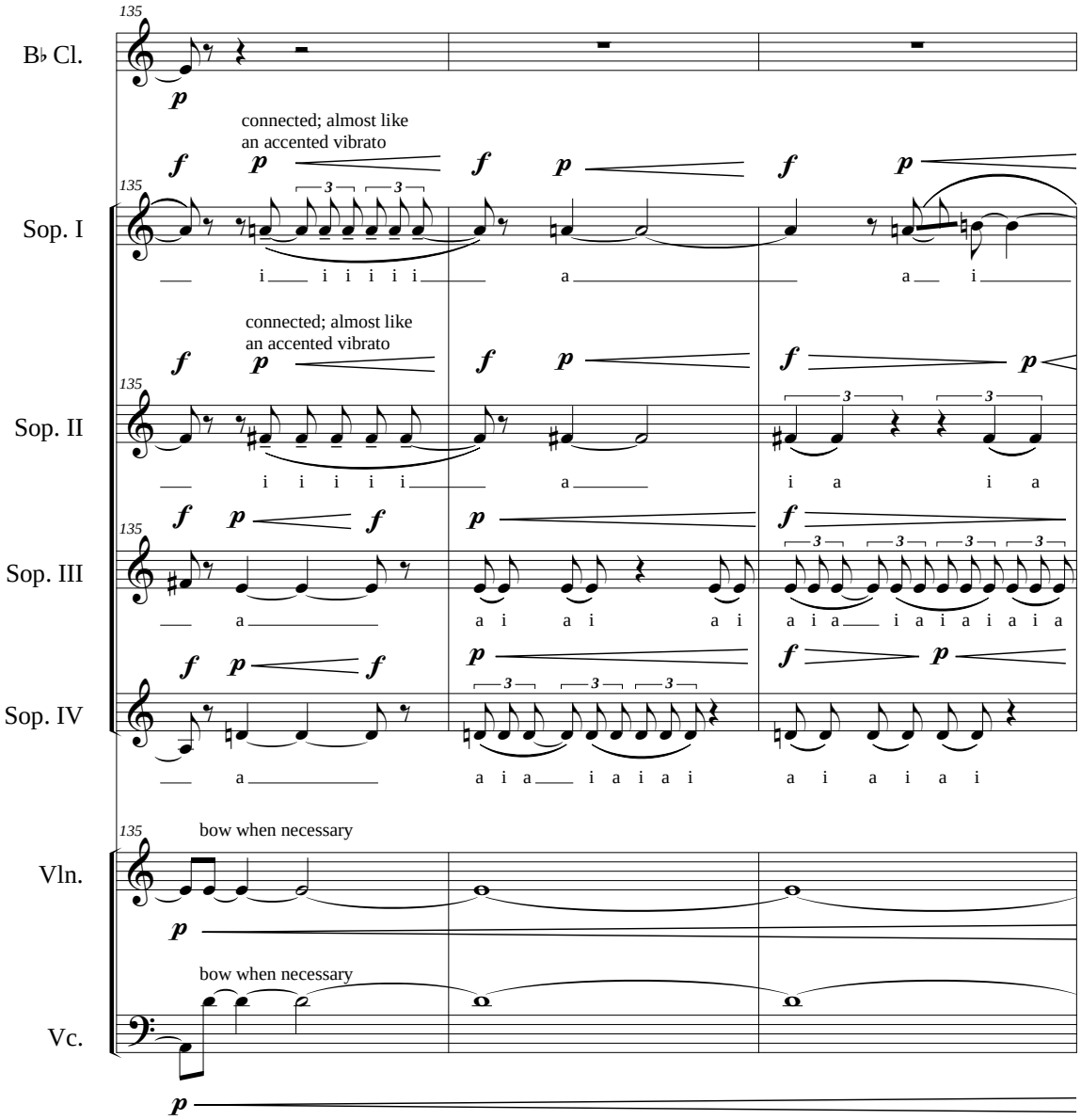
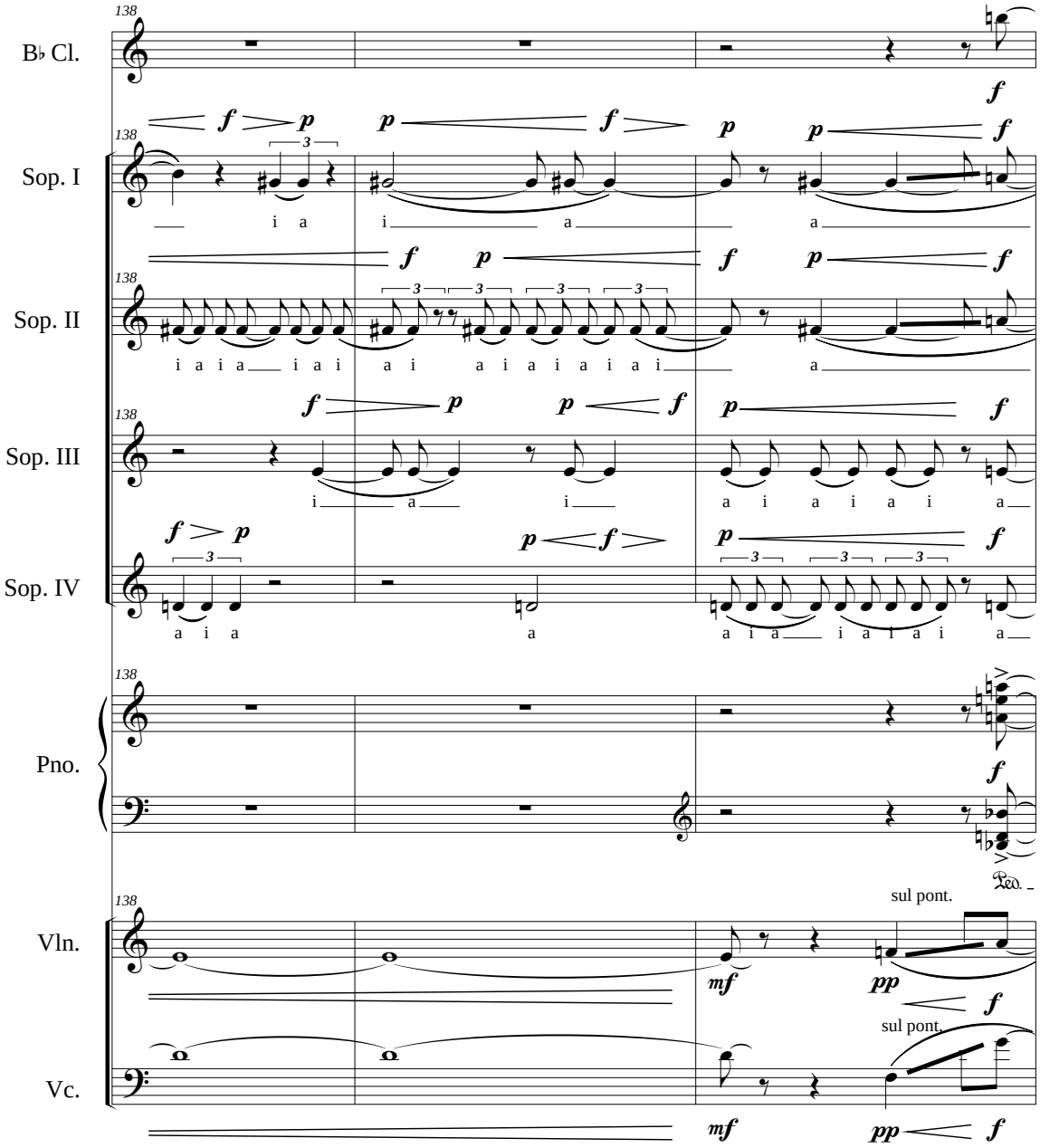


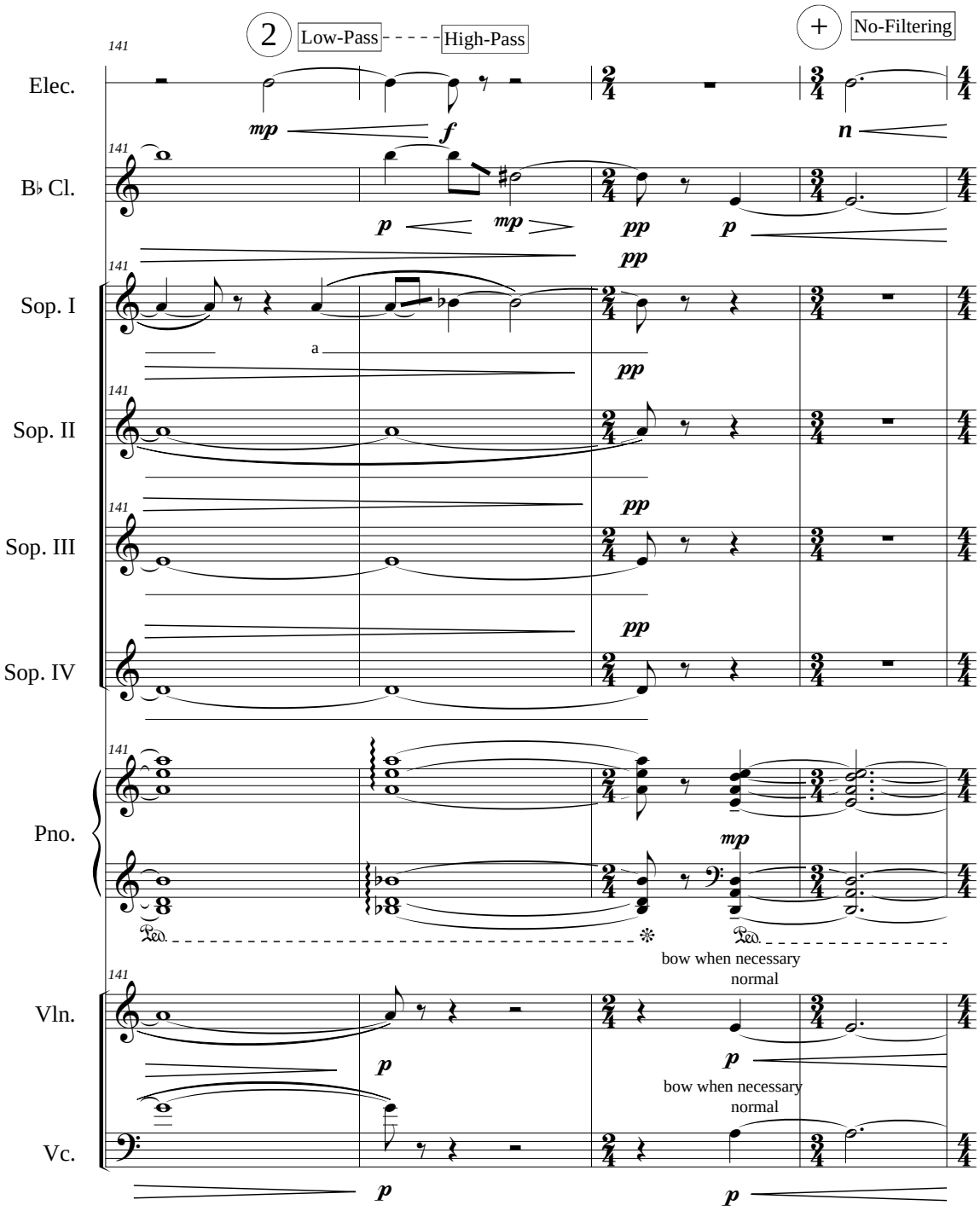
Song of the Sirens



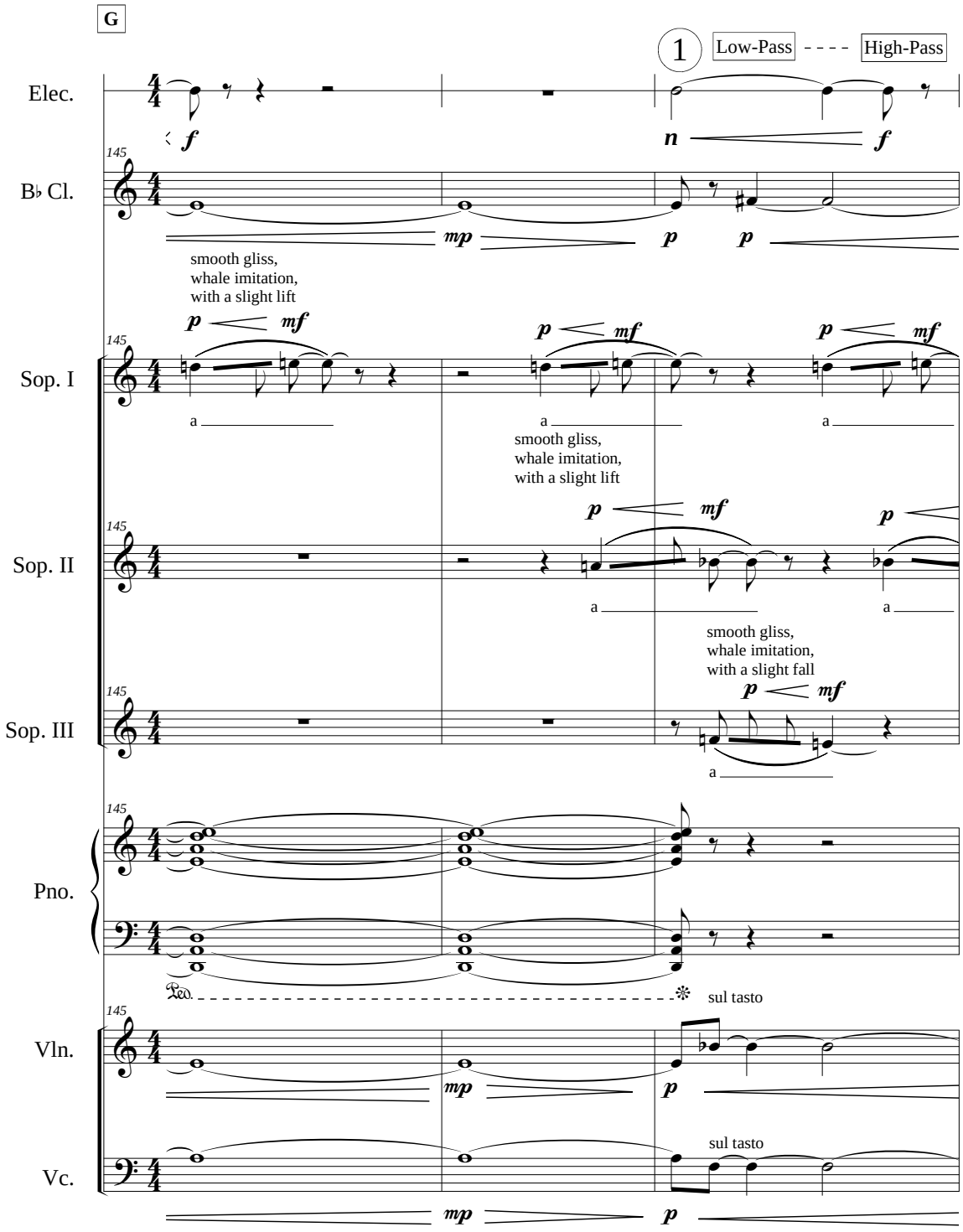
Song of the Sirens



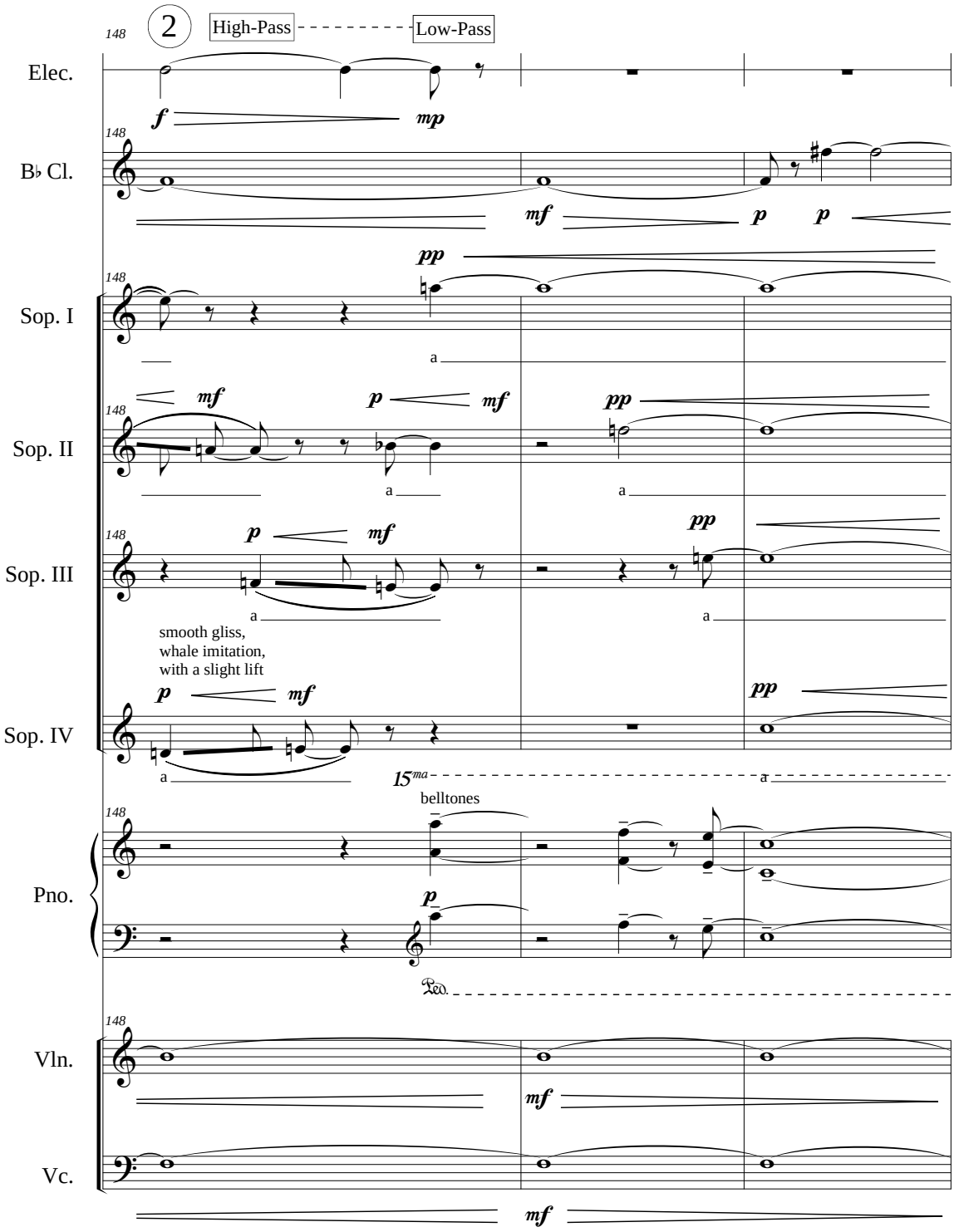
Song of the Sirens



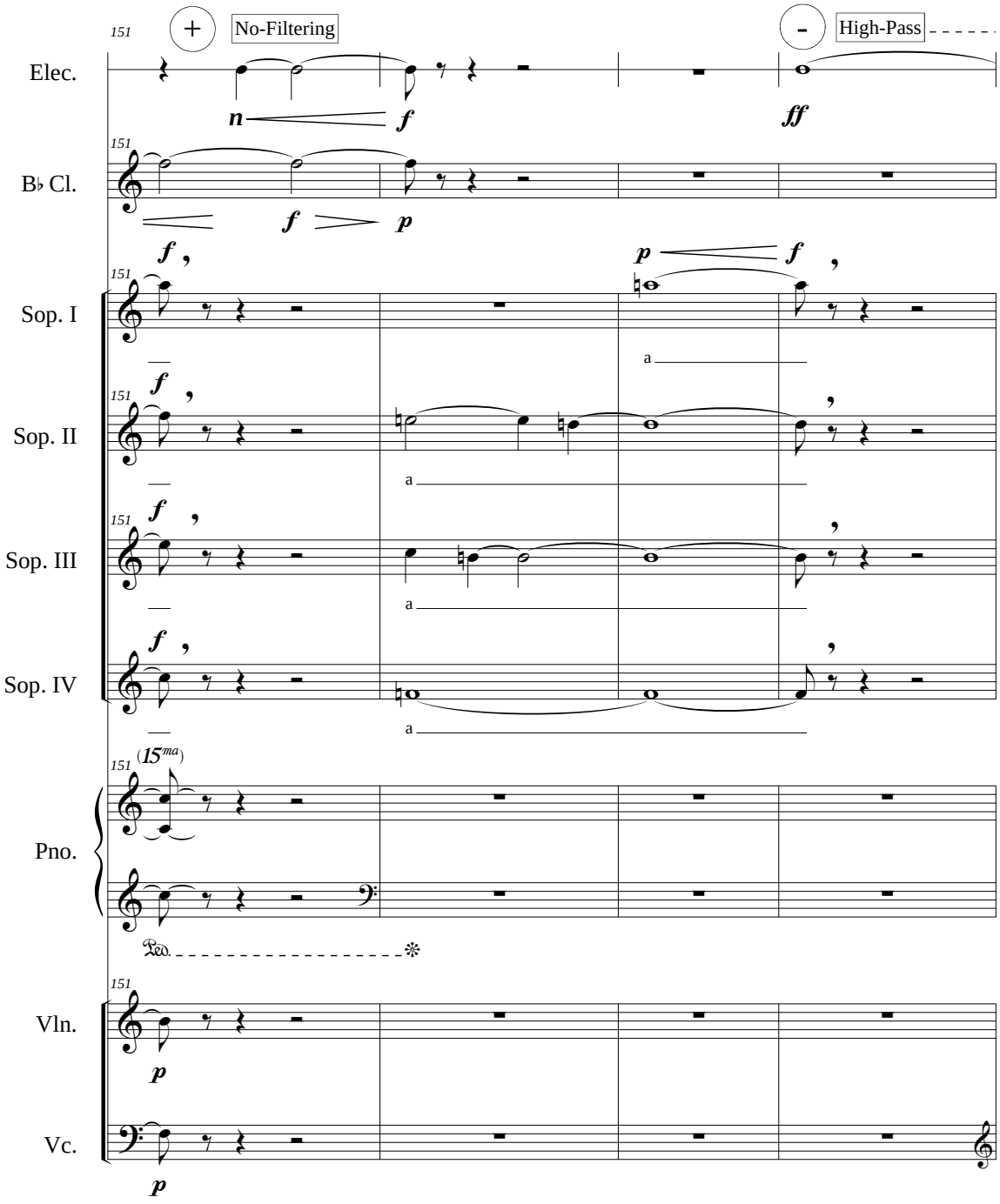
Song of the Sirens



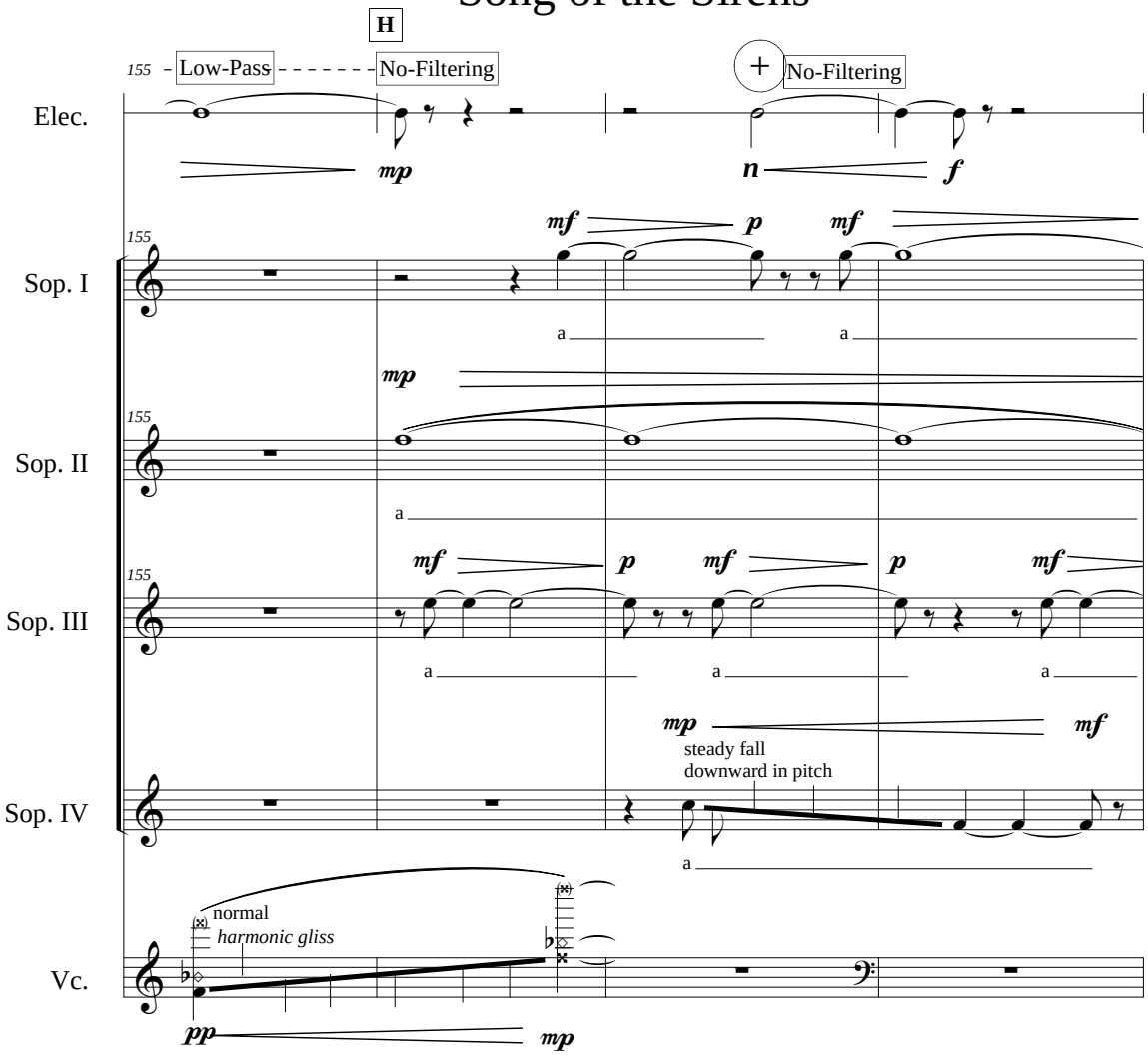
Song of the Sirens



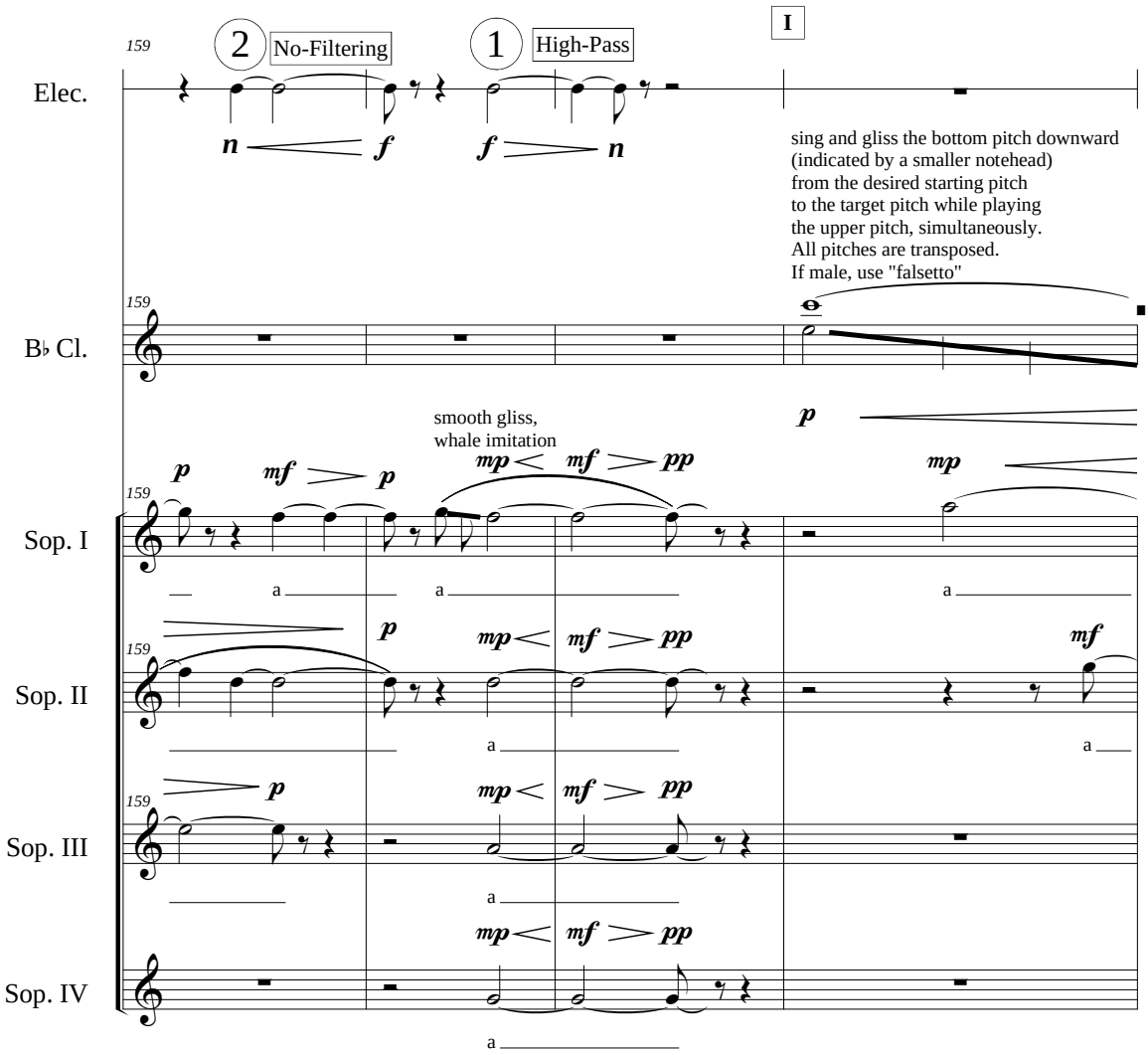
Song of the Sirens



Song of the Sirens



Song of the Sirens



Song of the Sirens

up 1 No-Filtering

Elec.

B♭ Cl.

Sop. I

Sop. II

Sop. III

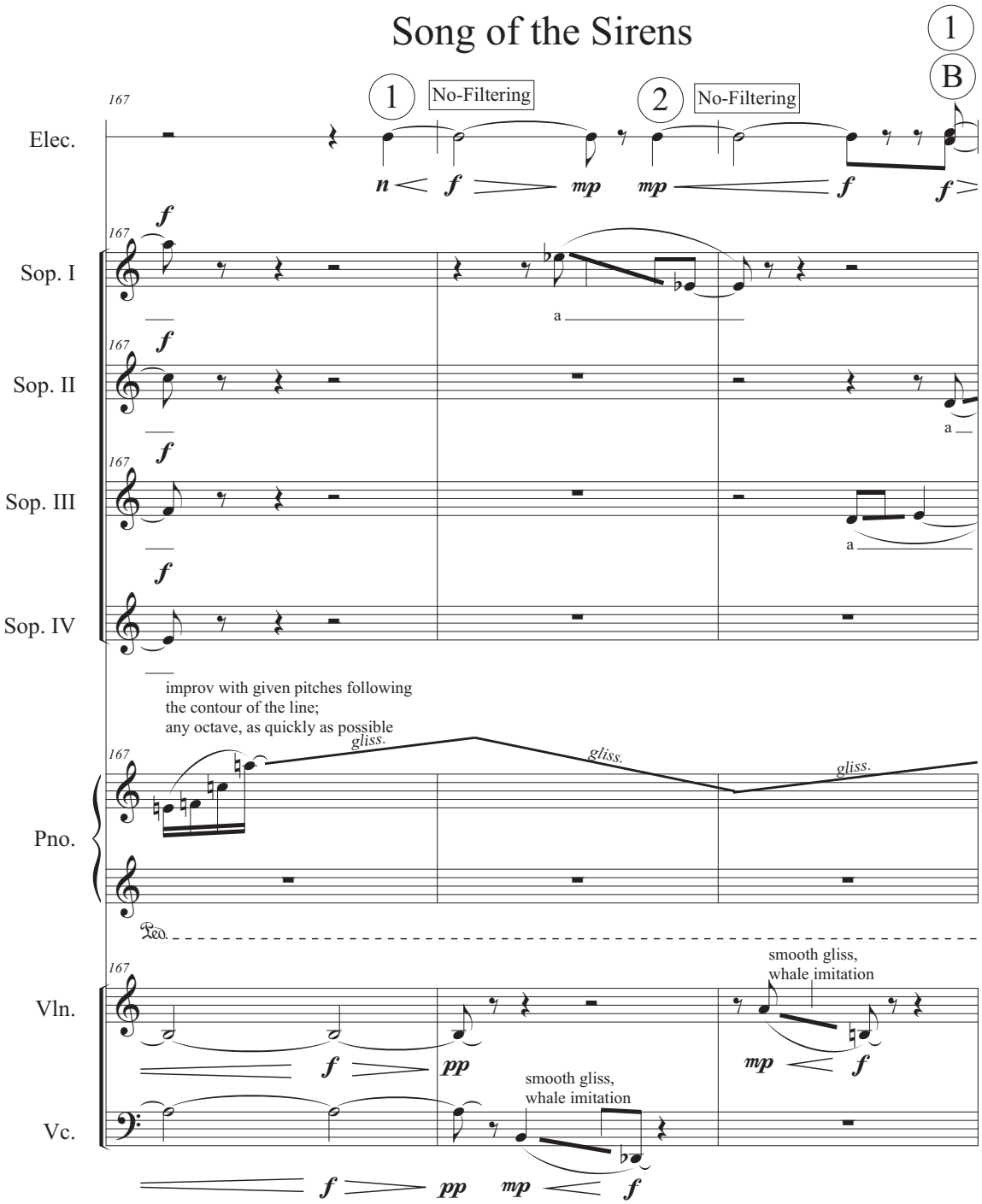
Sop. IV

Pno.

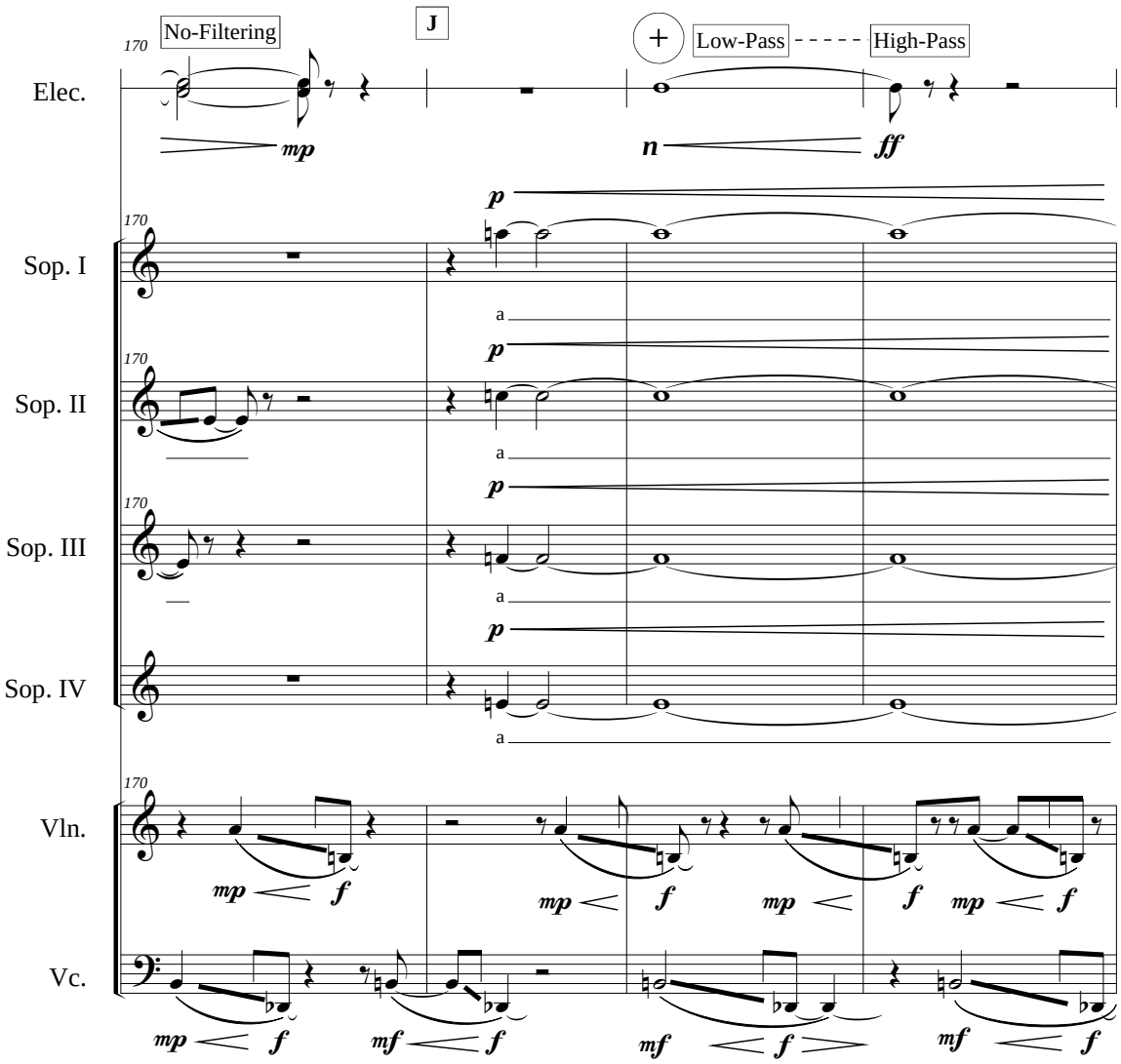
express.
normal

Vln.

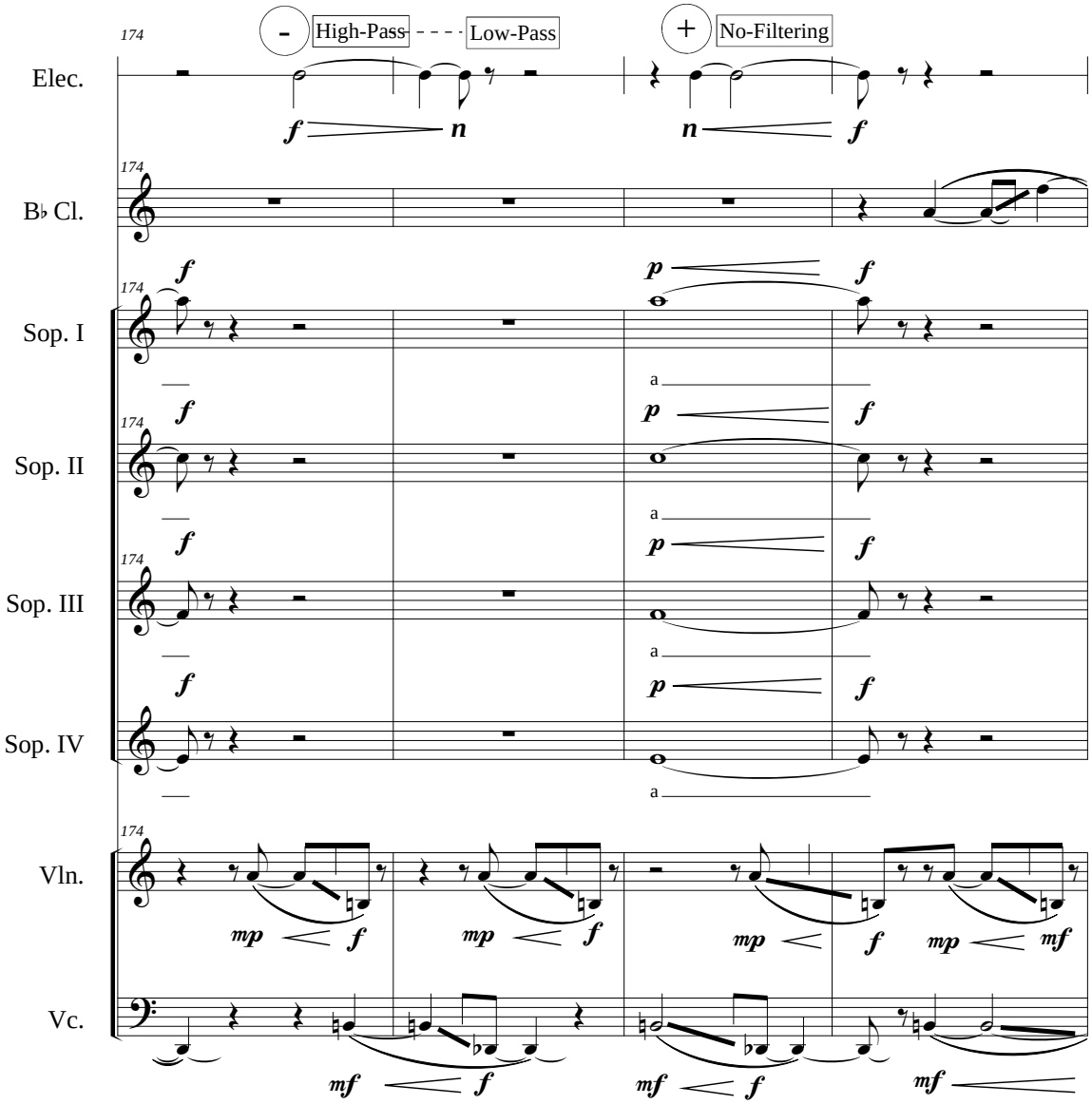
Vc.


Song of the Sirens
1
B
167
Elec.
1
No-Filtering
2
No-Filtering
n
f
mp
mp
f
f
Sop. I
Sop. II
Sop. III
Sop. IV
a
improv with given pitches following
the contour of the line;
any octave, as quickly as possible
gliss.
gliss.
gliss.
Pno.
Ped.
Vln.
Vc.
smooth gliss,
whale imitation
smooth gliss,
whale imitation
pp
mp

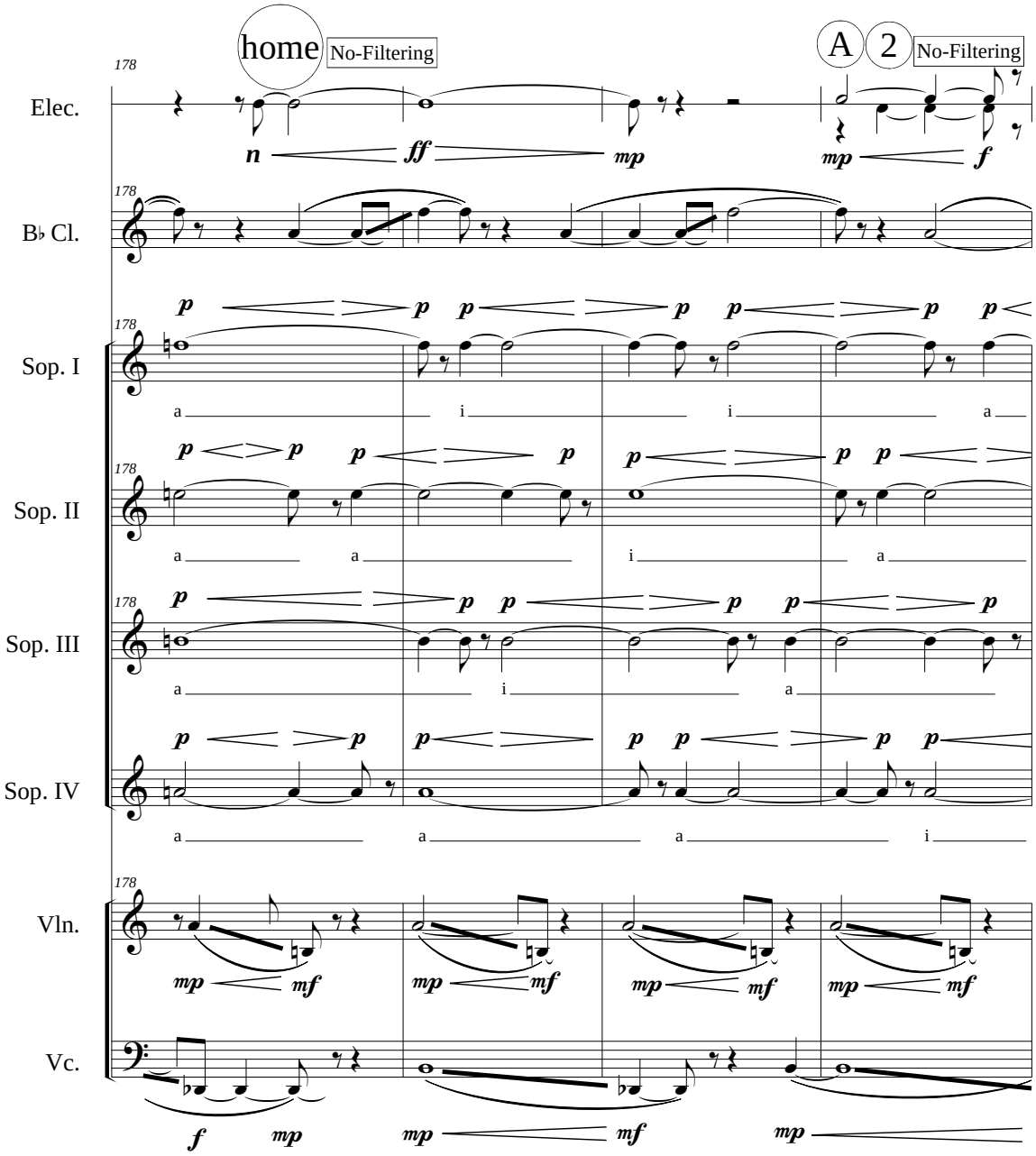
Song of the Sirens



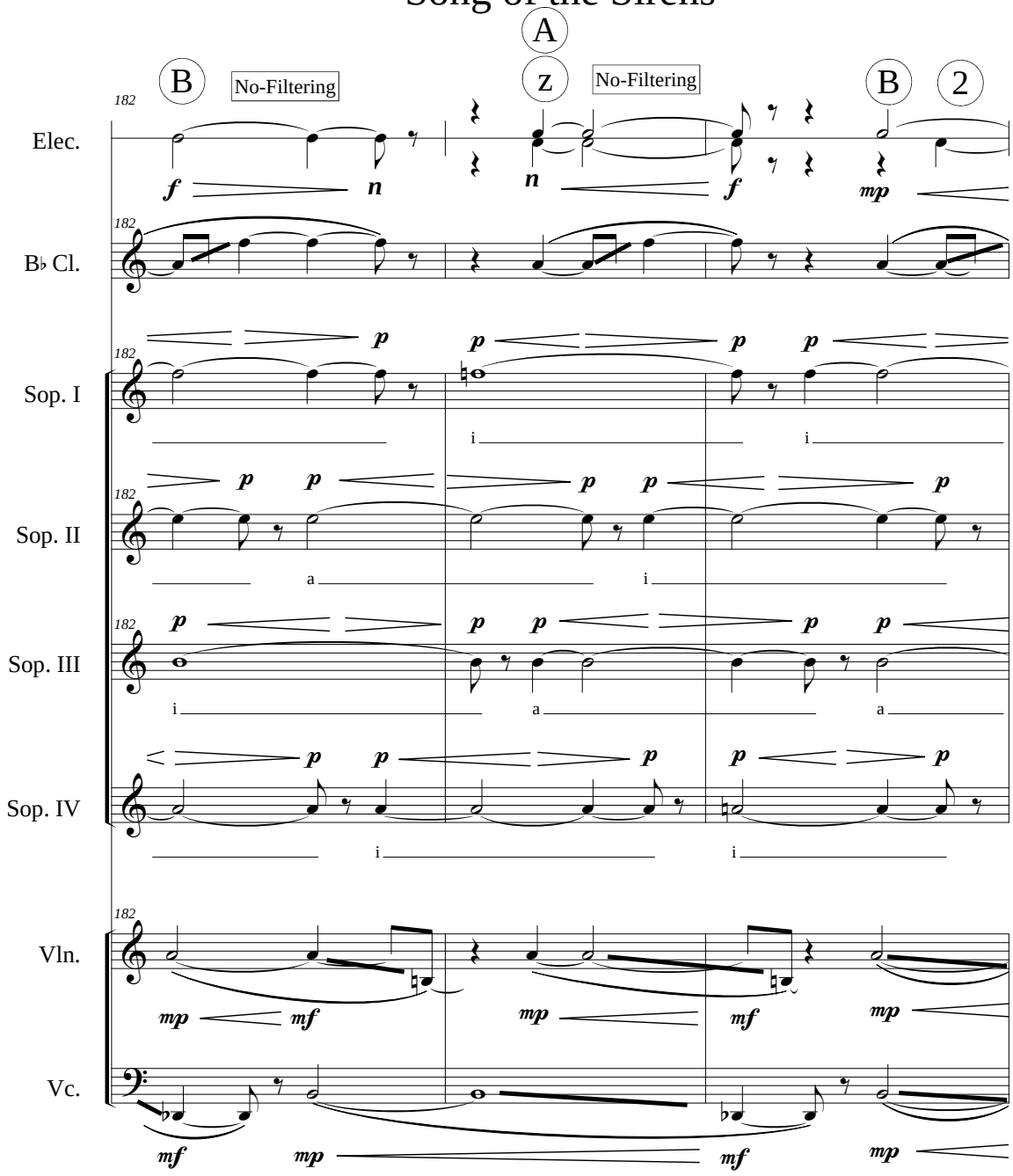
Song of the Sirens



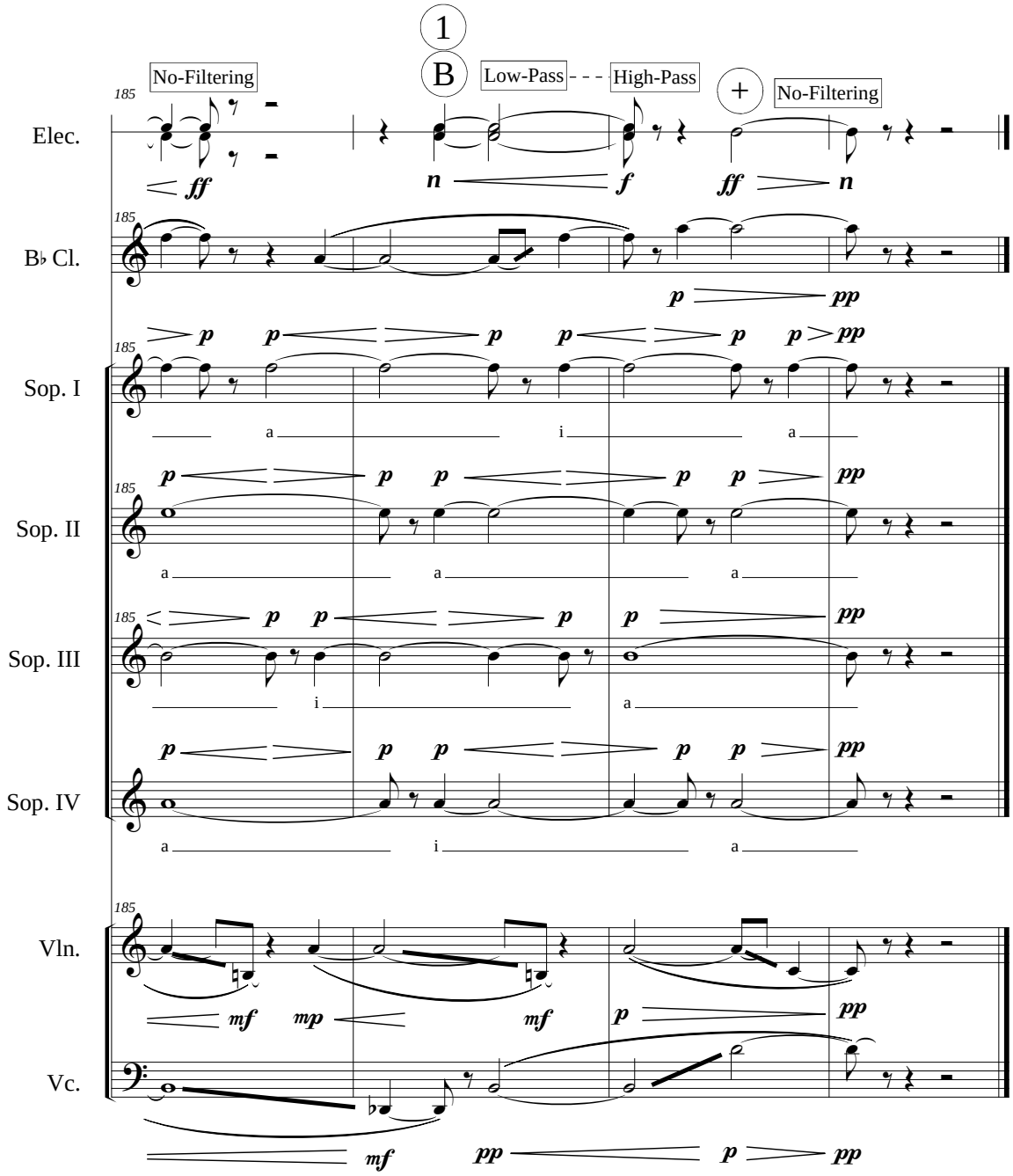
Song of the Sirens



Song of the Sirens



Song of the Sirens



APPENDIX D

ELECTRONICS PATCH FOR *SONG OF THE SIRENS*