# JON CHRISTOPHER NELSON'S *FANTASIES AND FLOURISHES: AN INTERACTIVE CONCERTO FOR DISKLAVIER AND ORCHESTRA*: A PERFORMANCE ANALYSIS

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Marosek, Scott, Jon Christopher Nelson's *Fantasies and Flourishes: An Interactive Concerto for Disklavier and Orchestra*: A Performance Analysis. Doctor of Musical Arts (Performance), August 2007, 109 pp., 1 table, 40 illustrations, bibliography, 43 titles.

Jon Christopher Nelson's *Fantasies and Flourishes: An Interactive Concerto for Disklavier and Orchestra* (1995) is the first interactive work to present the Disklavier as the solo instrument in a concerto with orchestra. The purpose of this study is to provide an analysis of *Fantasies and Flourishes* and advice on how to successfully present it in performance. *Fantasies and Flourishes* reveals the composer's interest in the music of Elliot Carter, in particular his *A Symphony of Three Orchestras*. The entire work is based on the two all-interval tetrachords also used by Carter; in *Fantasies and Flourishes*, these tetrachords are combined to form seven octachords that are used in various manipulations.

The Disklavier is an acoustic piano that can be played by a performer, can play by itself, or can be controlled by a computer program. In interactive works for Disklavier, a pianist plays on the Disklavier while the Disklavier plays by itself, much like if a pianist were to play on a player piano while the piano was also playing by itself. However, in interactive Disklavier music the pianist's performance affects what the Disklavier plays; particular notes in the piano part trigger the Disklavier's music.

Chapter I provides an introduction to the dissertation and background on the composition. Chapter II gives a formal analysis of the work, with focus on the composer's use of musical constraints to delineate form. Chapter III supplies information that will help a pianist to prepare for a performance of the concerto and

includes discussion of extended techniques used in performance. Chapter IV gives a detailed discussion of Max, the computer program used to control the Disklavier. Analysis and description of the computer program give the performer insight into how the Disklavier's music works, especially for algorithmically-composed sections that vary between performances. A chart is provided that details information regarding each trigger that the performer must play in order for the Disklavier to function properly.

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All musical examples used in this dissertation are used with permission from Jon Christopher Nelson.

# CHAPTER I

## INTRODUCTION AND BACKGROUND

A stunning amalgamation of styles, Jon Christopher Nelson's *Fantasies and Flourishes: An Interactive Concerto for Disklavier and Orchestra* is a many-sided work that reveals the composer's many influences and interests. These include interactive music, algorithmic composition, the computer program Max/MSP and the music of Jean-Claude Risset; influences also include the theoretical concepts used by Elliott Carter in his orchestral compositions. At the same time *Fantasies and Flourishes* retains many of the aspects of the traditional piano concerto.

The dissertation will provide an analysis of the concerto in order to give future performers the benefit of understanding how the work was constructed, as well as advice on how to successfully present it in performance. Through the analysis, the following questions will be addressed: first, how does Nelson demarcate form in *Fantasies and Flourishes*; and second, how can a pianist successfully present a work which explores so many diverse styles?

### Interactive Music and Algorithmic Composition

Composer Joel Chadabe coined the term "interactive composing," a process of composition where computers are used to produce sounds in real-time in response to the actions of a performer.[1] Interactive compositions have been written for various combinations of instruments and computer programs. The composer creates a system

[1] Chadabe, Joel, "Interactive Composing." *Computer Music Journal* viii, no. 1 (1984): 22.

for interaction that results in new music for every performance.[2] The computer music responds differently depending on what the performer plays, but the system for interaction remains the same in each performance. In an interactive work a computer might alter sounds created by an instrumentalist; the instrumentalist's performance may also trigger other computer-generated sounds. For Chadabe, it is important for the computer system's response to be "recognizably related to the performer's action." Otherwise, "the act of performing would cease to have any meaning."[3]

In order for an interactive system to work and in order for it to have any meaning, the composer must create a set of rules for the interaction to follow. This set of rules is called an algorithm. Algorithms need not be used only in interactive music; algorithms can aid composers writing non-interactive music to save time by helping them to "explore mathematically exact musical relationships and forms" without having to work out the math by hand.[4] Although composers have used algorithms with or without computers to aid in composition, it is only since computer advances in the 1980s that composers have been able to use algorithms to create computer music during a performance, in real time.[5]

Many of today's composers use the program Max/MSP, or Max, to create algorithms for their interactive works. Max is a "graphic programming environment" that has "spawned a user community that is the most active and prolific group of interactive

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[2] Chadabe, 26.
[3] Chadabe, 25.
[4] Janzen T.E., "Algorithms: Real-Time Algorithmic Composition for a Microcomputer," in *Computer-Generated Music*. Denis Baggi, ed. Los Alamitos, California: IEEE Computer Society Press, 1992, 199.
[5] Robert Rowe, *Machine Musicianship*, Cambridge: MIT Press, 2001, 4.

music designers working in the world today."[6] The program was developed by Miller Puckette and David Zicarelli, and released in 1988.[7]

## The Disklavier

After World War I, engineers began creating electronic musical instruments, which often were modified acoustical instruments, including the electric guitar and the Neo-Bechstein Piano.[8] In the 1980s, Yamaha, also the creator of the first digital synthesizer, developed a new modified acoustical instrument, the Disklavier® piano. The Disklavier is a modified acoustic Yamaha piano that can transmit and receive MIDI information about its performance, as well as replicate performances made on it. MIDI information can be sent from a computer directly to the Disklavier to control what is played on the instrument. This information can be used to control what notes are played, when notes are played and released, note volume, and pedal depression and release.

In 1984, Barry Vercoe at MIT first used the Disklavier in interactive music instead of computer sounds or computer-manipulated acoustic sounds. Intended for interactions between the Disklavier and other instruments, his program Synthetic Performer could provide an accompaniment for a violinist.[9] In his composition *Duet for One Pianist: Eight Sketches for MIDI Piano and Computer* (1989), Jean-Claude Risset was the first composer to create an interactive work where the solo part and the

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[6] Rowe, 2-13.
[7] Manning, Peter, *Electronic and Computer Music*, New York: Oxford University Press, 2004,367.
[8] Manning, 4.
[9] Jean-Claude Risset, "From Piano to Computer to Piano," in *Proceedings of the 1990 International Computer Music Conference*, 15-19. San Fransisco: ICMA, 1990.

computer-generated part were both realized on the Disklavier. States Risset, "The computer reacts in real-time to the pianist's performance and adds a part on the same acoustic piano. The part depends upon what the pianist plays and how he plays it."[10] If the pianist plays on the Disklavier while other notes are being played automatically on the same keyboard, this is analogous to a pianist playing on a player piano while the piano was also playing by itself. However, in interactive Disklavier music the pianist's performance affects what the Disklavier plays.

In his *Fantasies and Flourishes: an Interactive Disklavier Concerto*, Jon Christopher Nelson uses Risset's idea of interactive Disklavier to even greater extent as the solo instrument in a concerto with orchestra.

## Interaction in *Fantasies and Flourishes*

Nelson wrote a program for *Fantasies and Flourishes* using Max to set parameters for the Disklavier's music and its interaction with the performer. The score to *Fantasies and Flourishes* provides only a limited amount of information about how the pianist is to interact with the Disklavier part.[11] A pianist with an awareness of how the program works will be better able to interact with the Disklavier's music.

Max is a graphical programming language.[12] Composers who program with Max work with graphic boxes called "objects" which are connected to each other with lines. Each object has its own unique function. The lines are the wiring by which messages

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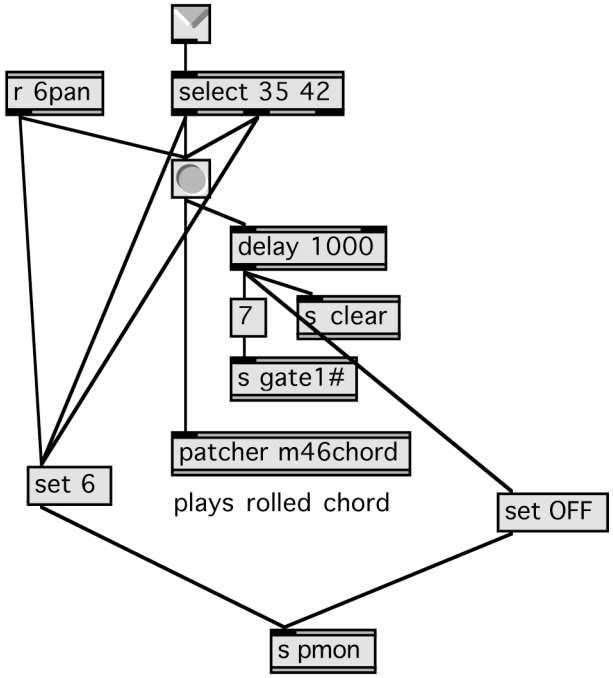
[10] Ibid, 15.

[11] Although the piano part and the computer part are both realized on the same keyboard, this paper will refer to music performed by the pianist as the "piano part," and music performed by the computer as the "Disklavier part."

[12] Winkler, Todd, Composing Interactive Music: Techniques and Ideas Using Max, Cambridge: MIT Press, 1998, 10.

containing information are sent and received between objects. This system of interconnected objects is called a "patch"[13]. Example 1 shows a Max patch from the concerto.

Example 1: *Fantasies and Flourishes*, Patch 6




Each patch controls a particular function that the Disklavier performs. The data flow to the Max patches in *Fantasies and Flourishes* is controlled by a series of gates. When a gate is opened, the data will be routed to a patch, causing it to function. There are 29 gates in *Fantasies and Flourishes*. Each gate receives a number (1-29). Most of the gates are followed by only one patch, so a patch's number corresponds to the gate that precedes it (e.g. gate 14 precedes patch 14). Some gates are followed by multiple patches; these patches each receive a number and a letter (e.g. gate 25 is followed by patches 25A, 25B and 25C).

[13] Winkler, 50.

In *Fantasies and Flourishes*, the main interactive feature is that the pianist is responsible for starting and stopping much of the Disklavier's music. Certain notes in the pianist's part called "triggers" cause the Disklavier's music to start or stop. When a gate is open, the program for that particular gate's patch will run unless it is stipulated in the patch that the performer must trigger the patch's events. Most of Nelson's patches will not run, even if the gate is open, unless the performer plays certain notes.

## History and Influence

*Fantasies and Flourishes* was composed between 1994 and 1995. During much of this time, the composer was working on a piece for voice and tape, *They Wash Their Ambassadors in Citrus and Fennel*, in Stockholm at Sweden's National Electronic Music Studios on a Guggenheim Fellowship. During the subway rides to and from the studios, Nelson sketched and composed much of the concerto.[14]

This is Nelson's first composition using Max to control an interactive environment, and his first piece for Disklavier. Several years prior to the composition of this *Fantasies and Flourishes*, Nelson worked as technical assistant for Jean-Claude Risset at MIT. Around the same time, Risset was composing the first interactive Disklavier composition, *Duet for One Pianist*. Nelson was present at the premiere at MIT, and heard several performances of this and other Disklavier works, including those Clarence Barlow's *Variazioni e un pianoforte meccanico*.[15]

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[14] interview

[15] Nelson, Jon Christopher, interview by author, 21 May, 2007, Denton, mini disc recording, Univeristy of North Texas College of Music, Denton.

Nelson's compositional choices, evident in this concerto in particular, have been strongly influenced by the music of Elliott Carter. His dissertation on Elliott Carter's orchestra work *Penthode* gives insight into Nelson's understanding of Carter's music. Nelson has noted that *Fantasies and Flourishes* is influenced to a large degree by another orchestral work of Carter's, *A Symphony of Three Orchestras*.[16]

## CHAPTER II

## FORM IN *FANTASIES AND FLOURISHES*

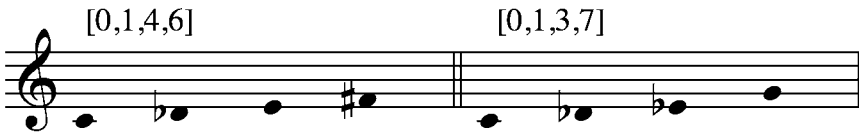
The composer made available to me several pages of compositional sketches for *Fantasies and* Flourishes, including a short score of the concerto. These sketches contain much precompositional work, including several drafts for the planned large-scale formal structure. From the start, the work was intended to be divided into several distinct sections. Through analysis it becomes evident that much effort was put into demarcating form by giving each section its own unique character. The character of each section is made distinct from the others through the composer's choice of harmony, rhythm, orchestration, motivic development, phrasing, dynamics, and tempo. The constraints placed on these factors and the ways in which the composer works within these constraints define the character of the music in each section. The sections, as indicated in the notes on "Formal Structure" preceding the piano part, are labeled as follows: "Introduction," "A," "Interlude," "B," "Interlude," "C," "Cadenza," and "Coda."

[16] Nelson, interview.

Introduction

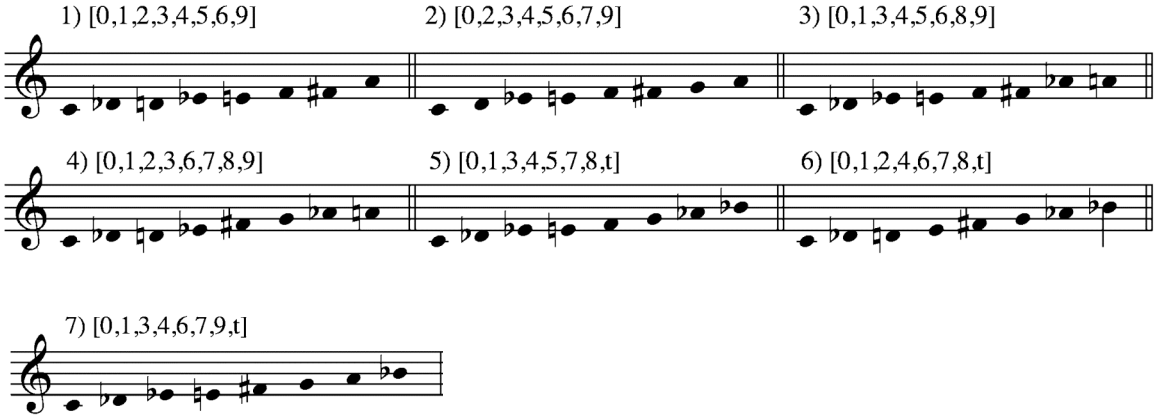
The “Precompositional Notes/Ideas” (also distributed with the piano part) and the sketches indicate that much of the work is based on two all-interval tetrachords. All-interval tetrachords contain every interval from a minor second to an augmented fourth.

Example 2a: All-interval Tetrachords




Influenced by the music of Elliott Carter, Nelson chose to use these tetrachords that have been used in Carter’s compositions as a harmonic base. Nelson chose to combine the tetrachords to form seven octachords. In his “Precompositional Notes,” these are each given a number, 1 through 7. (See Appendix, Precompositional Notes/Ideas.”)

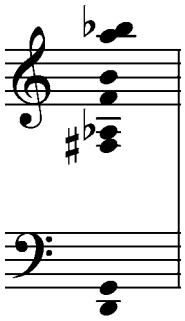
Example 2b: Octachords



These octachords provide much of the harmonic material for this work.[17] Many sections of music are harmonically distinct because of the particular octachord or octachords employed and because of the ways in which these octachords are used.[18]

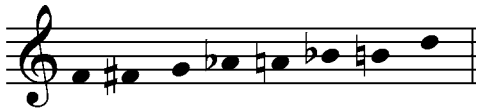
The introduction is in three parts. There is an "orchestral entrance" which "establishes the harmonic palette" for the work, a "trumpet solo," and the "Disklavier entrance."[19] The orchestral entrance is unique in its vertical presentation of octachords. In this section, most instruments play long, held notes that are stacked to create the harmonies. Throughout much of the rest of the work, octachords and hexachords are presented in a linear, melodic fashion. The orchestral entrance begins with the construction of octachord 1 in the strings—the pitches in measures 1 through 6 are all found in the same transposition of this octachord.

Example 3a: measure 6, octachord 1



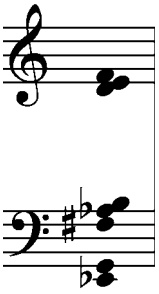
[17] The octachords will be labeled octachord 1, octachord 2, etc., as in Example 2
[18] In *Fantasies and Flourishes*, pitch sets can be found in various transpositions, inversions, and with various orderings of notes. Examples of an octachord, hexachord, etc. as an abstract figure will be given in normal order at the C transposition level. Examples of particular sets that are taken from the score will be presented at the transposition level found in the score).
[19] Nelson, Jon Christopher, "Formal Structure" in "Fantasies and Flourishes: An Interactive Concerto for Disklavier and Orchestra," Piano part, 1995, personal collection.

Example 3b: measure 6, octachord 1, normal order

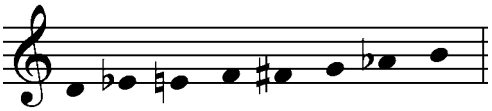


This is immediately followed by a second presentation of octachord 1 in the winds and strings. Octachord is now heard at a new transposition level, but six of the notes from the original hexachord are retained.

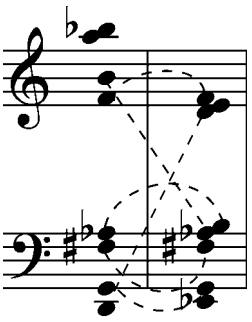
Example 4a: measure 7, octachord 1



Example 4b: measure 7, octachord 1 normal order

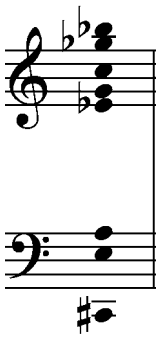


Example 4c: octachord 1—two versions, showing retained pitches

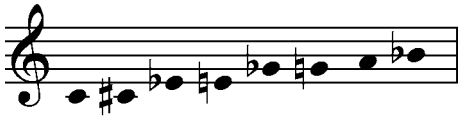


In measure 8, the brass and winds create octachord 7.

Example 5a: measure 7, octachord 7



Example 5b: measure 7, octachord 7, normal order

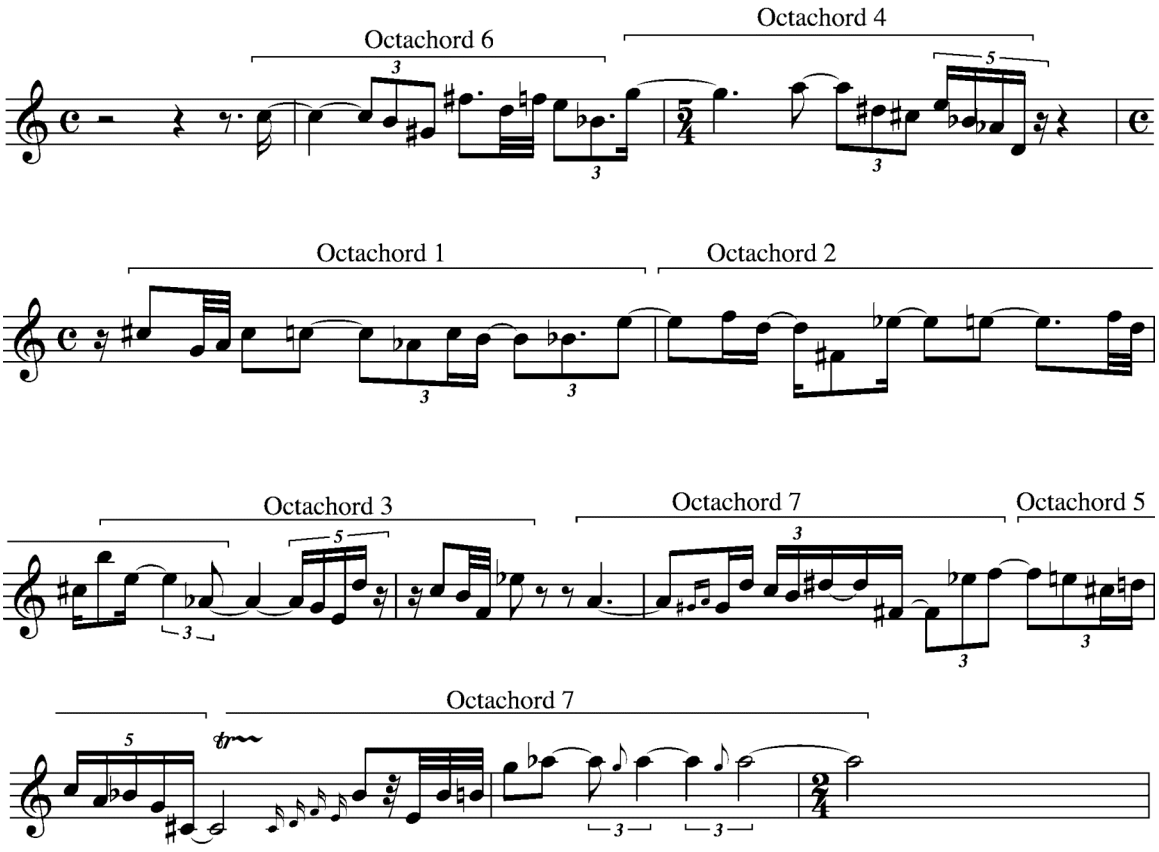


The quiet static chords of the opening become the accompaniment for a trumpet solo in measures 8 through 18. As indicated by the composer, this solo is another reference to Elliot Carter; Carter's *A Symphony of Three Orchestras* also features a long trumpet solo near the beginning of the work.[20] The trumpet solo in *Fantasies and Flourishes* is one of several sections in the concerto dominated by a long, melodic solo line with accompaniment. The others include a massive cello solo extending from measure 36 to 138, and a piano solo, measures 148 to 216. The orchestral accompaniment for the trumpet solo, while similar in texture to the opening, is constructed of pentachords rather than octachords. The material in the trumpet part is

[20] Nelson, interview.

built on octachords, but they are used in an entirely different way from the orchestral introduction in that the trumpet presents the notes from the octachords linearly rather than vertically. Each of the seven octachords is stated once, except for octachord 7, which is stated twice.

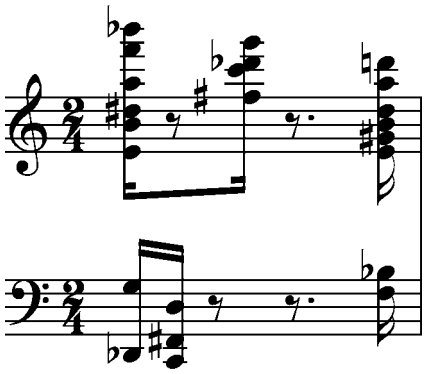
Example 6: Measure 9 through 17, Trumpet solo w/octachord analysis[21]




The solo ends with four chordal attacks in the orchestra. The first chord is octachord 4 and the last is octachord 6.

Example 7: measure 18

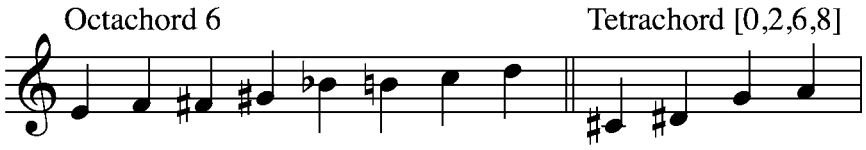
[21] All examples are at concert pitch, regardless of instrument.



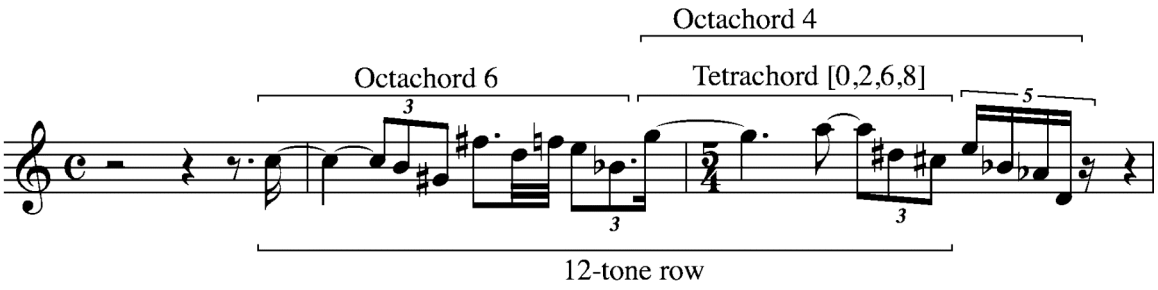
The trumpet solo highlights the connections between octachords 6 and 4. In addition to framing the solo, they are emphasized in other ways. In my interview with the composer, he mentioned his interest in 12-tone composition, and how in this piece he was finding ways to work with octachords and simultaneously "look at the ways that one could still have chromatic saturation in pieces and cycle through all twelve pitch classes on a fairly regular basis."[22] In the "Precompositional Notes" Nelson lists the octachords used in this work next to their complementary tetrachords, that is, the tetrachords they combine with to form the full chromatic. These tetrachords have a prominent role in this section in creating the "chromatic saturation" mentioned by the composer. For example the first octachord in this section, octachord 6, is complementary with tetrachord [0,2,6,8]. This particular octachord needs the pitches C#, D#, G, and A to complete a 12-tone aggregate. The series becomes complete, as these are the first four pitches of octachord 4 in the next measure.

Example 8a: Octachord 6 and its complementary tetrachord

[22] interview

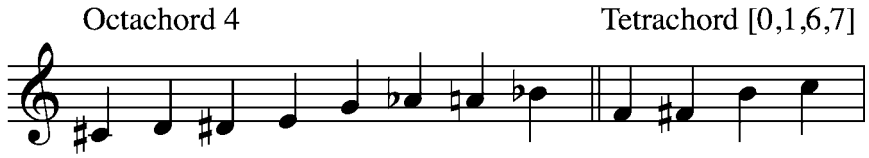



Example 8b: Measures 9 through 10, trumpet, 12-tone aggregate completion between octachord 6 and first four notes of octachord 4

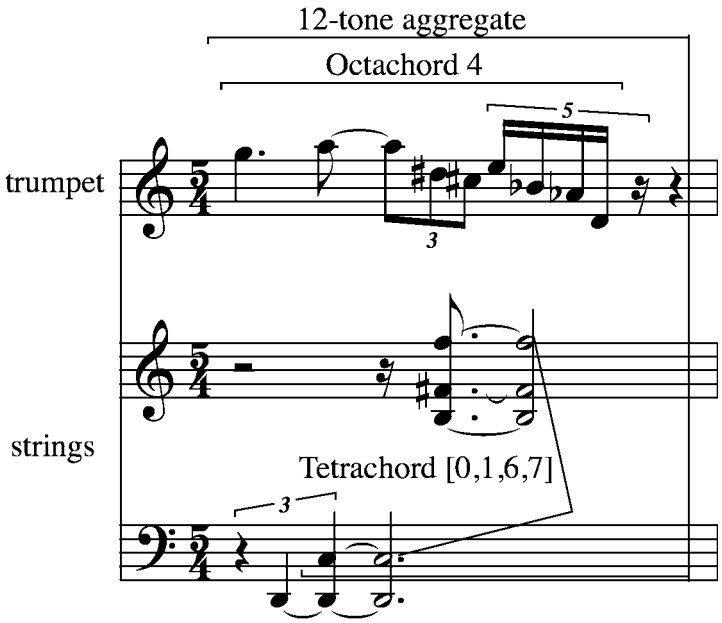



In measure 10, octachord 4's complementary tetrachord is found in the accompaniment.

Example 9a: measure 10, octachord 4, complementary tetrachord

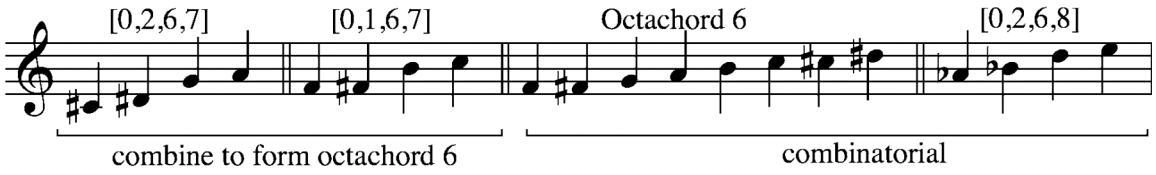



Example 9b: measure 10, trumpet and strings, 12-tone aggregate in melody & accompaniment

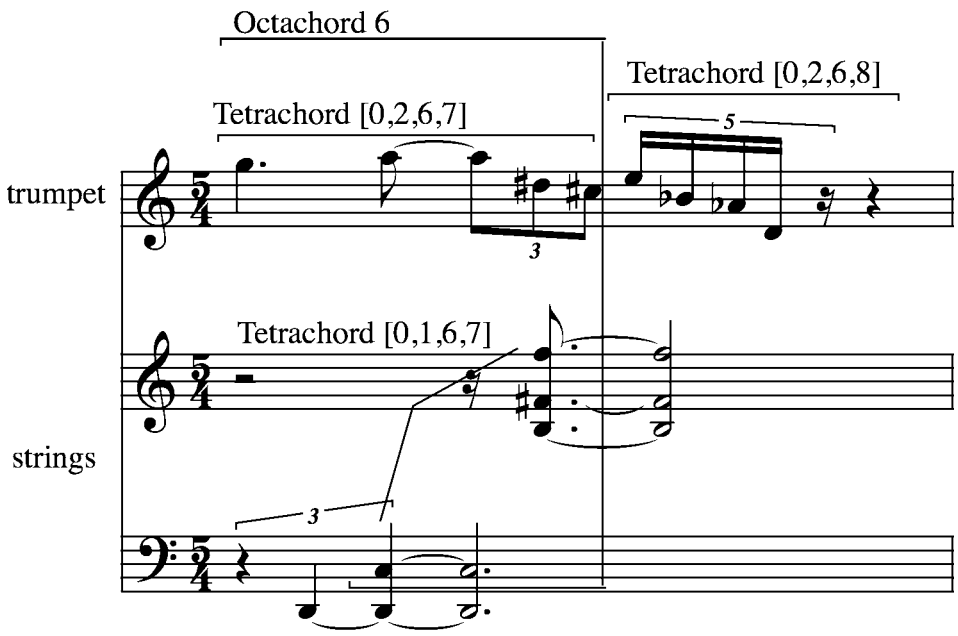



Other connections between octachords 6 and 4 are made; when their respective complementary tetrachords [0,2,6,8] and [0,1,6,7] are combined with each other, they form a new transposition of octachord 6. This octachord's complementary tetrachord comprises the last four notes of measure 10.

Example 10a: 12-tone aggregate in measure 10



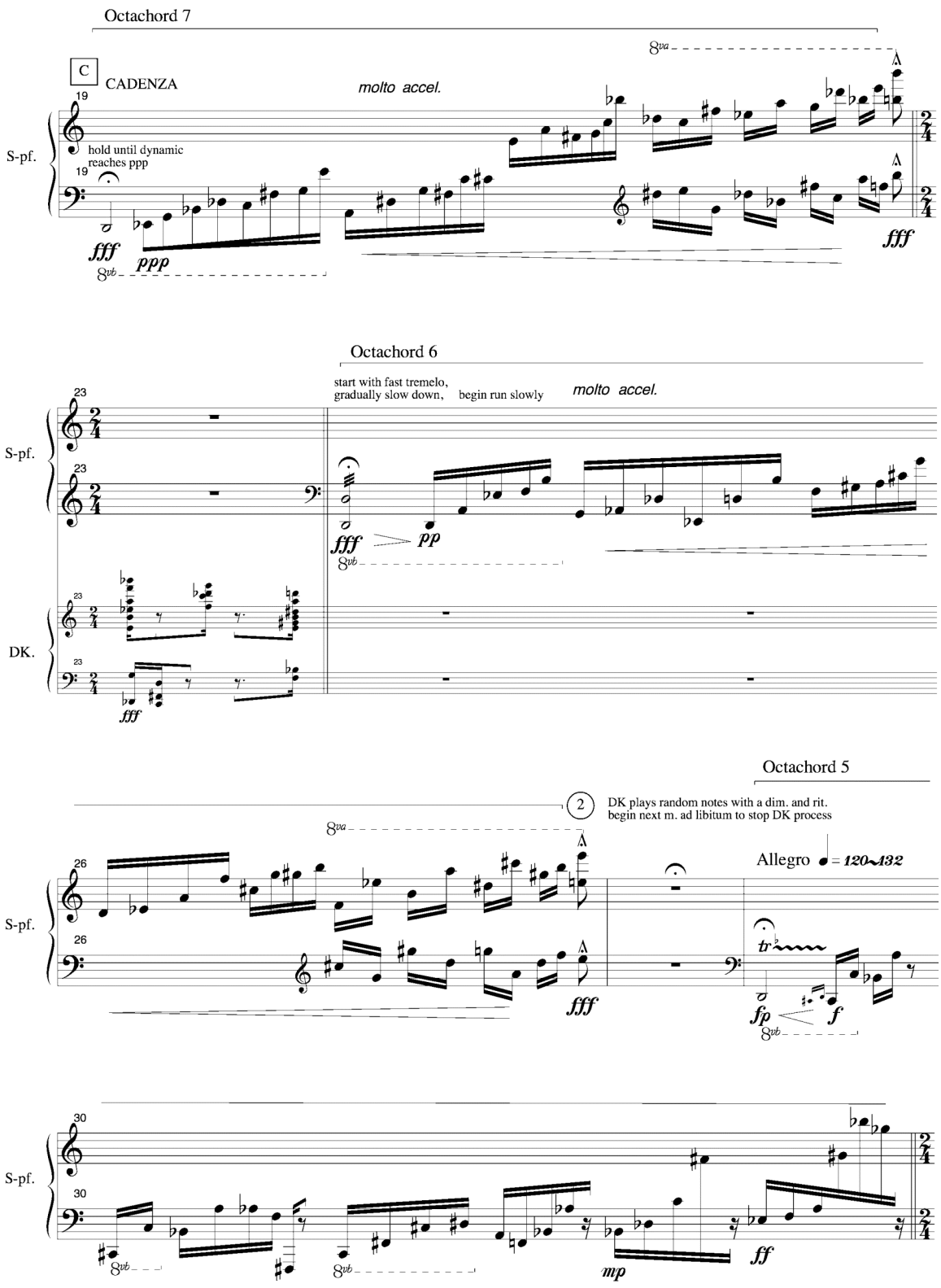

Example 10b: measure 10, trumpet and strings, Octachord 6 and complementary tetrachord

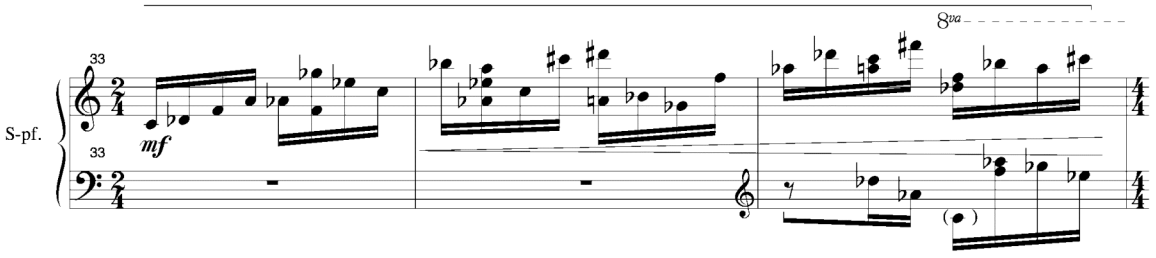



Octachords 6 and 4 are connected again in the chords at the end of the solo, this time emphasized by the entire orchestra. (See example 7.) The first chord is octachord 6. The second is its complementary tetrachord (missing an A-flat—this note is erased from the sketch). The fourth chord is octachord 4, and the third is its complementary tetrachord.

As the third part of the introduction, the piano introduction (measures 19-35) utilizes octachords in a new way. The piano plays three grandiose gestures, from the bottom of the keyboard to the top. Each gesture is constructed from the notes of a particular octachord.

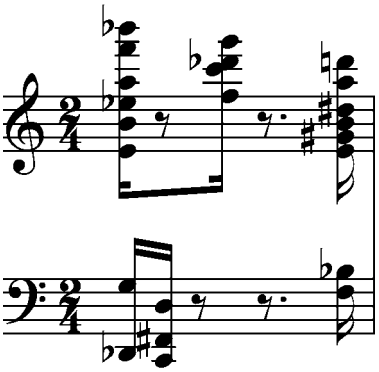
Example 11: Measures 19-35, octachordal analysis


Octachord 7
C
CADENZA
molto accel.
19
S-pf.
hold until dynamic
reaches ppp
fff
ppp
fff
Octachord 6
start with fast tremelo,
gradually slow down,
begin run slowly
molto accel.
23
S-pf.
DK.
fff
pp
fff
Octachord 5
2
DK plays random notes with a dim. and rit.
begin next m. ad libitum to stop DK process
Allegro ♩ = 120~132
26
S-pf.
fff
fp
f
30
S-pf.
mp
ff




In addition to introducing the piano to the listener, this portion of the music also introduces the Disklavier and the interactive part of the performance. Between the piano flourishes are two gestures played by the Disklavier alone.[23] These gestures occur in measures 23 and 28 and are representative of two important types of music the Disklavier provides in the piece— precomposed music and algorithmically composed music. The music in measure 23 is the same for every performance, so it is written out in the score.

Example 12: measure 23, Disklavier



Although the piano solo is very different from the trumpet solo and the orchestral opening, the Disklavier provides a connection to the previous material: measure 23 is a

[23] For a more detailed look at how the Disklavier part works, see the section entitled "Max and the Disklavier."

“piano reduction” of the orchestra’s music in measure 16. The next Disklavier flourish in measure 28 is very different, as the music is composed in real-time during performance. Every performance of this piece will result in a different version of this measure, within certain limitations. In contrast to the adjacent piano flourishes that ascend the keyboard, the Disklavier plays a descending passage that references the previous section; the algorithmically composed rhythms sound much like the rhythms of the trumpet part.

The piano part in measures 19-35 attempts to bring rhythmic steadiness to the piece, but the first two gestures end up disintegrating into the Disklavier’s reminiscent gestures. However the third piano gesture leads the listener to the next section of the piece, which provides the first consistent instance in this work of motoric rhythmic drive.

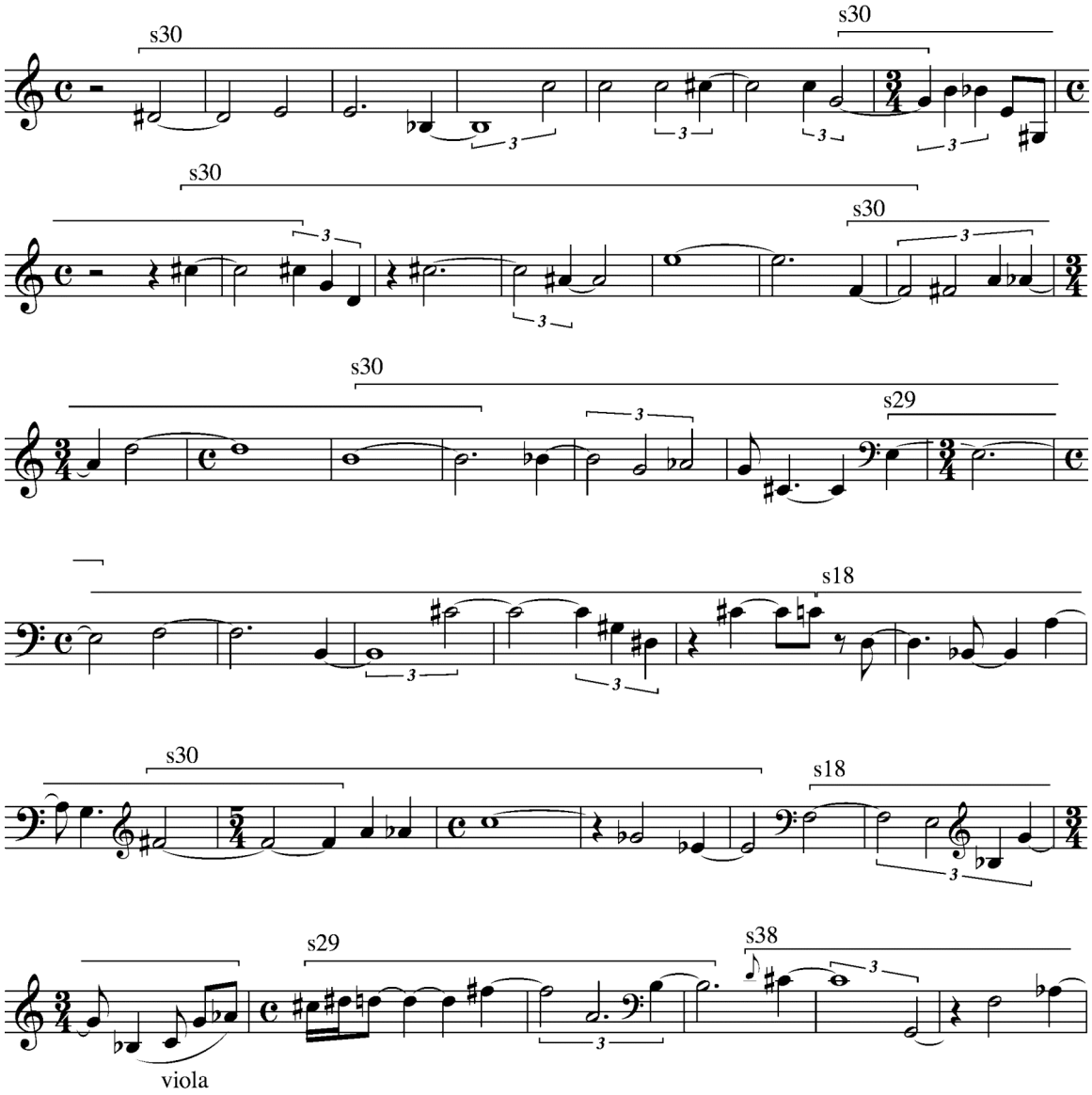
### Section A: Cello Solo

In this large solo (measures 36-138) the cellos provide the melodic material while the piano and Disklavier parts provide rhythmic energy and virtuosity. The orchestra interrupts with sporadic, short attacks but also plays gestures similar to those played by the piano and Disklavier. The section is notable for the high level of interaction between the piano and Disklavier parts, and the trading of motives between many parts.

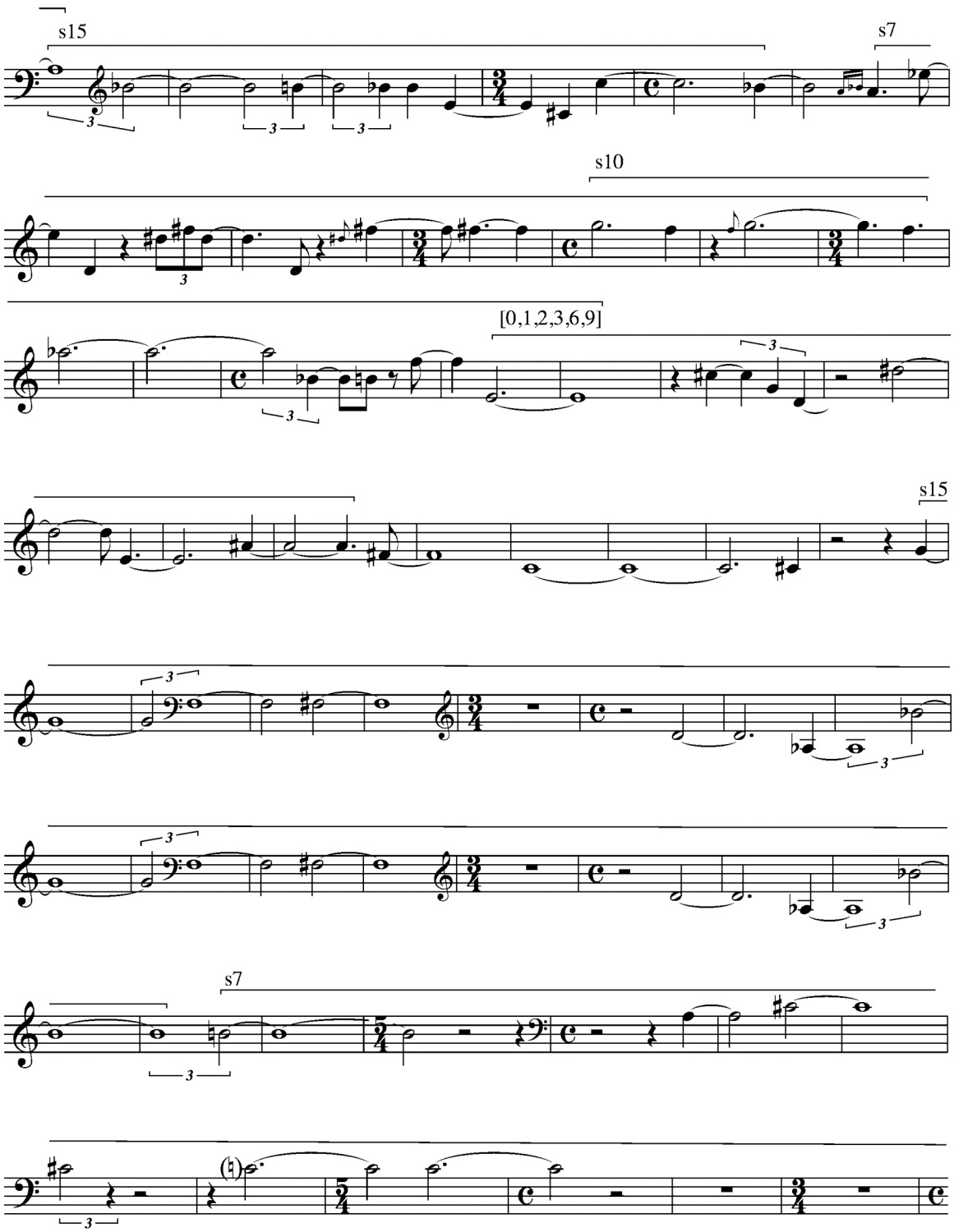
In addition to using octachords and tetrachords, based on the sketches and Precompositional Notes we see that Nelson also utilizes a set of hexachords that are derived from the octachords. The hexachords that he uses in this work are the hexachords that can be extracted from the octachords, but which still retain either or both of the original tetrachords. The cello part presents these hexachords in a linear

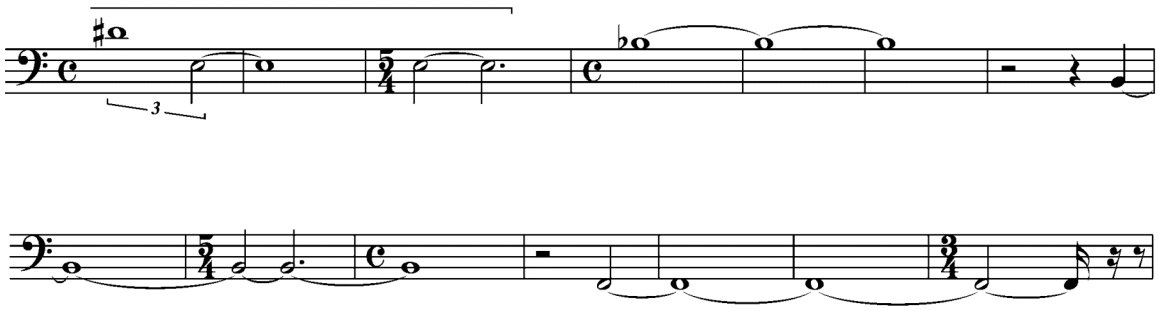
manner that is very similar to how the trumpet presented octachords in its solo. In the cello solo, adjacent hexachords often share a pivot note. In example 13, the pivot notes are found where the hexachords overlap.

Example 13: measures 36-138, hexachordal analysis[24] (See Appendix C, "Precompositional Notes/Ideas" for pitch sets,)




[24] The names of the hexachords (e.g. "s30") come from the "Precompositional Notes/Ideas" found in the appendix.

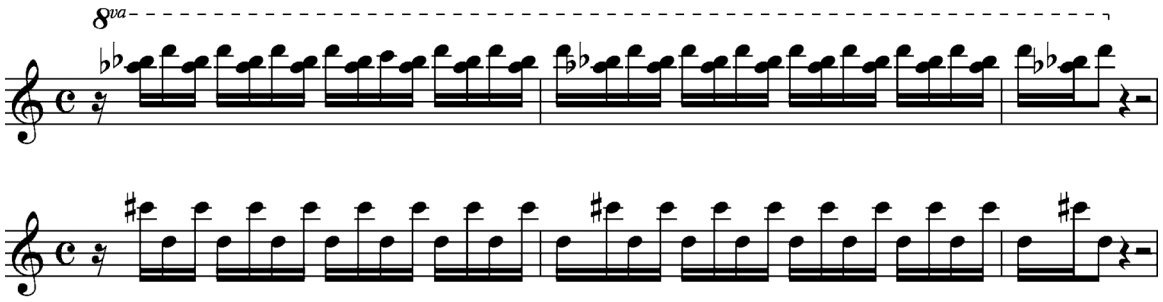

s15
s7
s10
[0,1,2,3,6,9]
s15
s7



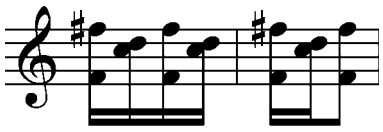
The [0,1,3,4,6,9] hexachord (s30) dominates the cello solo. This hexachord is unique in that it can be found in five of the seven octachords. In addition, the [0,1,3,4,6,9] hexachord is combinatorial with its inversion. In other words, by inverting and transposing the hexachord one can produce the complementary pitch classes to create a 12-tone aggregate. The other hexachords used in this section are found adjacent to their complementary hexachords. For example, hexachord [0,1,2,4,6,9] is found next to hexachord [0,1,3,4,6,8]. The other hexachord used, hexachord [0,1,3,6,7,9], is found by itself, but is also combinatorial by inversion, so it need not be paired with another hexachord.

The piano and Disklavier parts in this section are composed of many 16$^{th}$-note figures played at a quarter note equals 120. The rhythmic drive is often supplied by alternating 16$^{th}$-note chords in the piano part and in the Disklavier part, and occasionally in the orchestra as well.

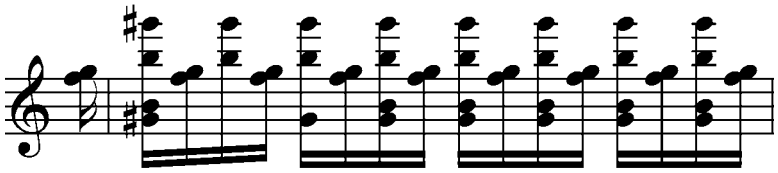
Example 14a: measure 36, piano, alternating 16$^{th}$ note chords



Example 14b: measure 42, violins, alternating 16th note chords

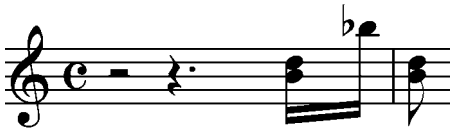


Example 14c: measure 44, alternating 16th note chords, Disklavier

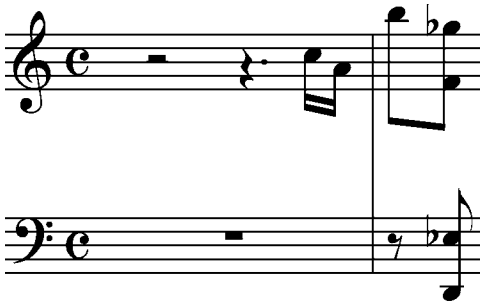


The orchestra, piano, and Disklavier parts are strongly integrated in this section. In addition to the alternating 16th note chords, other motives are traded between the parts. Often these motives are groups of 16th notes. The rhythm formed by two 16th notes followed by an eighth note is common among several parts.

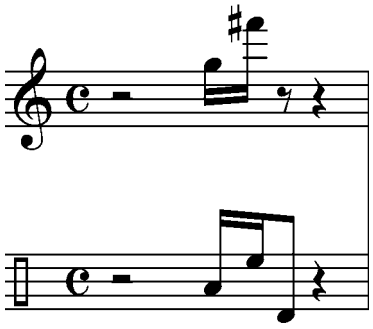
Examples15a: measures 40-41, strings



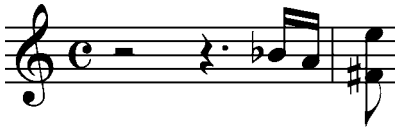
Example 15b: measures 41-42, piano



Example 15c: measure 56, percussion

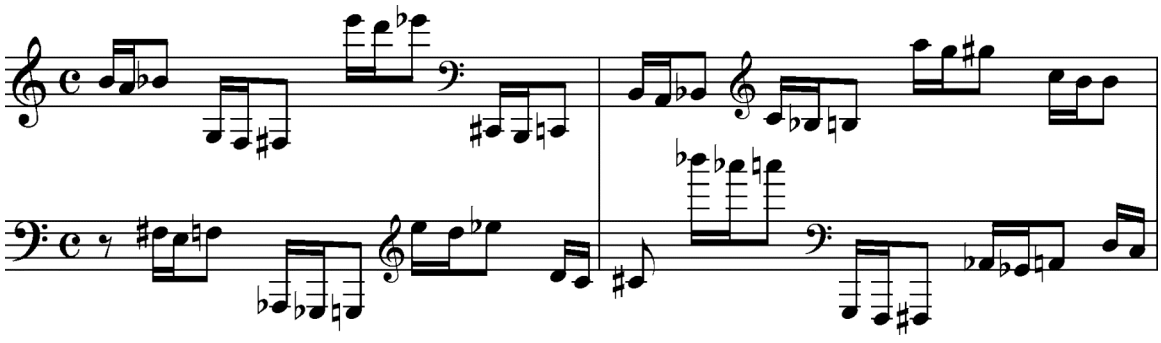


Example 15d: measure 58-59, strings



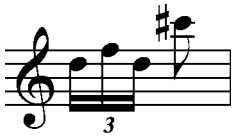
In measure 72, the Disklavier begins a canon based on this rhythm, with a new entrance on every half beat. A sample version of this part is found in Example 16.

Example 16: Disklavier, measure 72-73, sample rendering



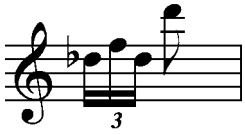
The composer has discussed how he was influenced by the way Elliott Carter would "utilize intervals as motivic constraints."[25] This process is evident in this section, where motives share particular rhythms, intervals, and contours. One such motive is a group of three 16th note triplets followed by an eighth note, presented in the piano in measures 66.

Example 17a: measure 66, piano



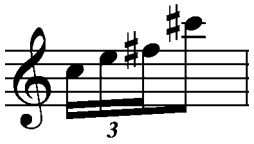
In its original version, the unique contour is formed as the first note ascends a minor third to the second note, which descends back to the first note. This is followed by a large leap upward of a major 7th. The figures in example 17 show the various incarnations of this motive.

Example 17b: measure 69, piano

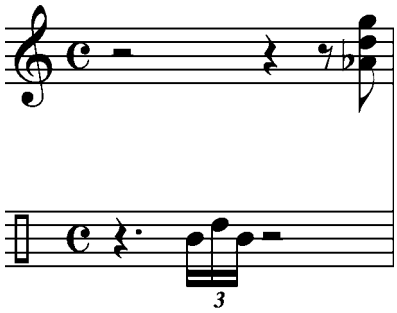


[25] Nelson, interview.

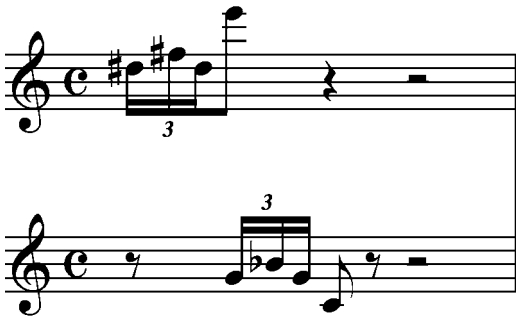
Example 17c: measure 77, piano



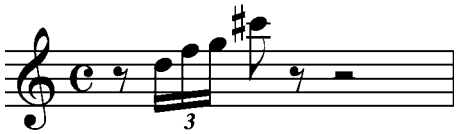
Example 17d: measure 78, percussion, finished by piano



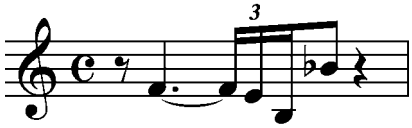
Example 17e: measure 84, piano



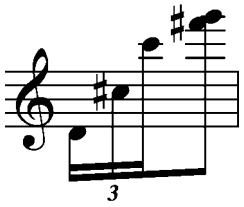
Example 17f: measure 92, oboe



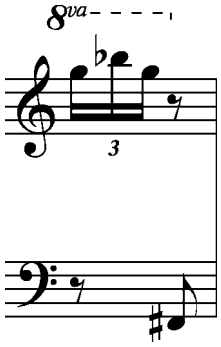
Example 17g: measure 94, piano



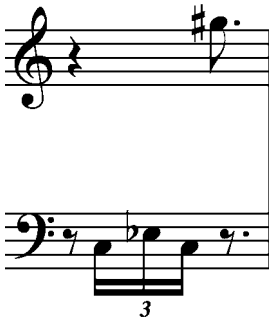
Example 17h: measure 109, piano



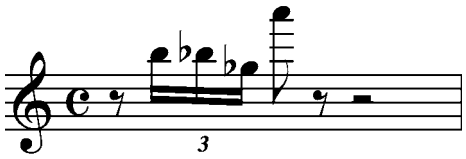
Example 17i: measure 114, piano, completed by brass



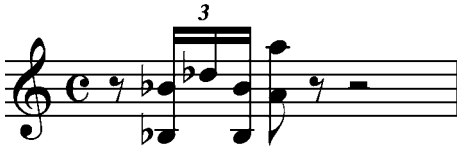

Example 17j: measure 115, piano



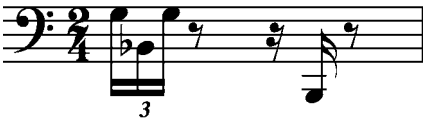
Example 17k: measure 117, flute



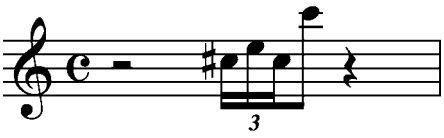
Example 17l: measure 126, piano



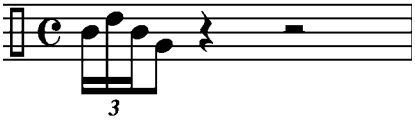
Example 17m: measure 131, piano



Example 17n: measure 134, piano

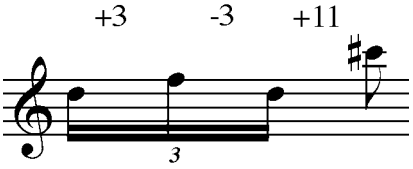


Example 17o: measure 135, percussion



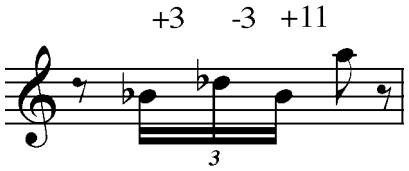
Nelson provides thus a great deal of variety in the ways in which these motives relate to the original statement in measure 66. The most similar motives are simply transpositions, as in measures 126 and 134, which are respectively heard at $T_8$ and $T_{11}$. Both of these motives retain the same ordered pitch intervals as the original.[26]

Example 18a: measure 66, piano, ordered pitch intervals

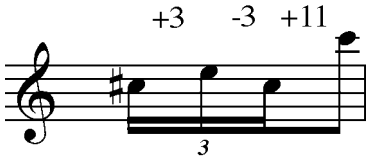



Example 18b: measure 126, piano, ordered pitch intervals

[26] See *Introduction to Post-Tonal Theory* by Joseph Straus for a complete discussion of the analytical techniques used in this portion of the dissertation.

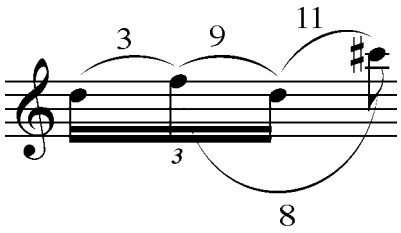



Example 18c: measure134, piano, ordered pitch intervals

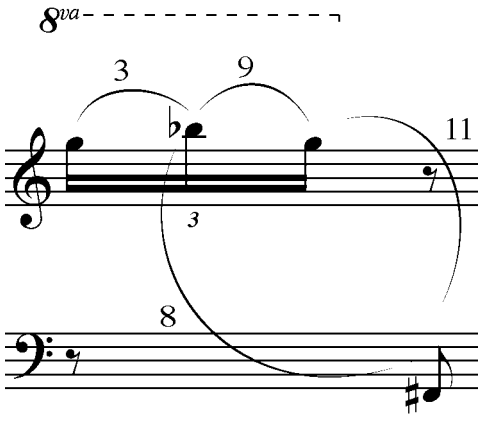



Also very similar is the motive in measure 114. This motive is begun in the piano part, but is completed by the bassoons and trombone. This is nearly an exact transposition at the $T_5$ level, except that the final note is dropped five octaves. Both motives share common ordered pitch-class intervals.

Example 19a: measure 66, piano, ordered pitch-class intervals



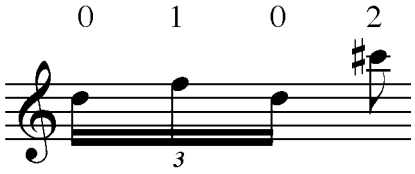

Example 19b: measure 114, piano, completed by bassoons and trombones, ordered pitch-class intervals



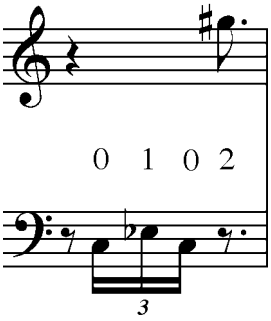

As in example 18, some of the motives in this group are of the same pitch-class set as the original. The original motive and the motives from measures 69 and 131 are built from the pitch-class set [0,1,4].

Some of the motives in this group are only similar to the original in rhythm and contour. These include those in measures 115 and 84. The contour can be described by taking a contour segment of each motive, where the lowest note is labeled “0,” the middle note “1” and the highest note “2.”

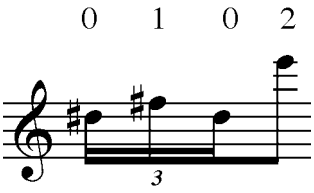
Example 20a: measure 66, piano, contour segment




Example 20b: measure 115, piano, contour segment

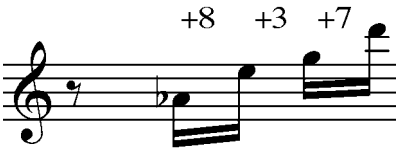



Example 20c: measure 84, piano, contour segment



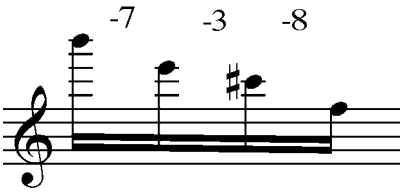

The flutes and piano share a motive in measure 61 through 70. The four-note figure is found either ascending or descending, and is composed of the four notes of the [0,1,4,6] tetrachord (one of the all-interval tetrachords used throughout this concerto). The notes are not found in normal order—they are extended to form leaps. These motives are related to each other in ways different from the previous motive, revealing an even greater variety of connections between the motives in this section. The original motive occurs in the flute in measure 61.

Example 21a: measure 61, flute, ordered pitch intervals



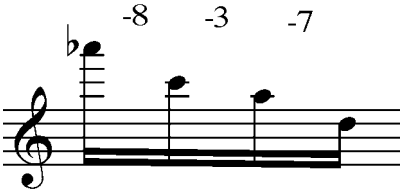
The same motive appears in the piano twice in measure 63. The first is a retrograde inversion at transposition level $T_5$.

Example 21b: measure 63, piano, ordered pitch intervals




The second is an untransposed inversion.

Example 21c: measure 63, piano, ordered pitch intervals




A similar flute motive in measure 70 has the same rhythm and is a member of the same pitch-class set as the original, [0,1,4,6].

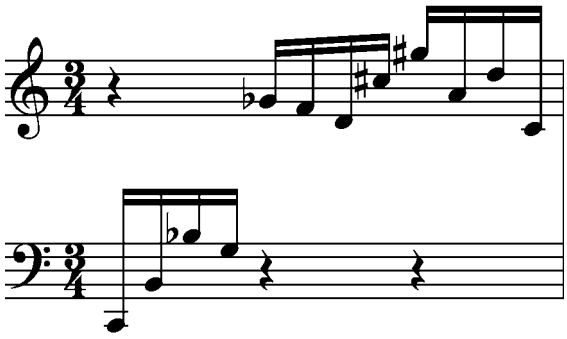
Another motive found in this section is a string of sixteenth notes containing ascending and descending major and minor 7ths and 9ths. At measure 44 and measure 109, these motives are begun in the piano, and continued in the Disklavier part. In the piano part, ascending intervals are played in the left hand and descending intervals are played in the right hand—this idiomatic writing is continued in the Disklavier part even though it is played electronically.

A final feature of this section of the work is the continuous interaction between the piano and Disklavier parts. This section contains most of the Max patches for the entire work, and provides an element of virtuosity to the concerto. The patches are controlled by algorithms, or rules for operation. Depending on how confining the rules are, the processes can yield results that are the same for every performance or that vary with each performance. In several patches, the Disklavier will play alternating 16$^{th}$-note chords with specific pitches at the performer's tempo. The only variable factor is the tempo. Harmonically, these passages often function like the precomposed passages in that they are often composed of tetrachords, octachords, and hexachords, or form these structures in combinations with other instruments or with the piano part. Much of the Disklavier's music, however, is variable for each performance. This happens when the algorithm allows for a larger degree of randomness. For example, patch 3B (measure 38) creates alternating high and low chords that descend the keyboard. These can contain any pitches, although they follow a certain contour. Passages with random notes cannot be reconciled to any harmonic formula. Other patches create events that, although different for every performance, are limited to certain intervals. These passages can be analyzed in terms of their intervals and compared to similar passages in the piano and orchestra. For example, patch 5 (measure 45) creates pairs of sixteenth notes consisting of pairs of descending and ascending major sevenths.

First Interlude

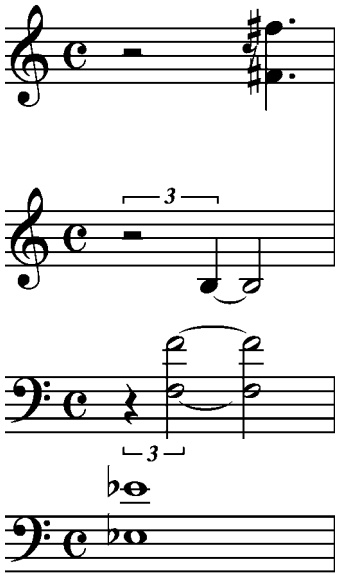
The first interlude provides a period of rest between the cello solo and the upcoming piano solo. The unity of the previous sections is rejected for ten unpredictable measures of shifting textures and dynamics. The interlude (measures 139-148) starts with an ascending series of harmonics in the strings, a percussive hit in the timbales, and a descending sweep in the wind chimes. These unserialized (and partly unpitched) gestures completely break with the tightly controlled harmonies of the previous sections. However, a series of interlocking 7ths and 9ths in 16$^{th}$-notes in the strings and brass suddenly remind the listener of the figures from measure 142.

Example 22: measure 142, strings and brass



This is immediately followed by a stacked harmony, reminiscent of the opening of the work, this time utilizing the [0,1,3,7] tetrachord.

Example 23: measure 143



Further unpitched material is found at the end of this section, with an upward glissando in the strings.

Section B: Disklavier/Piano Solo

Nelson considers himself a lyric composer.[27] In discussing his attraction to the music of Elliott Carter, he says, "I find *A Symphony of Three Orchestras* to be a very beautiful, lyric piece and in my own music I think of myself as having more lyric tendencies and have been drawn to to what I consider to be singing lines even though they might not fit into a traditional sense of melody." Also on the subject of melody and voice leading:

> I'm also very interested in voice leading aspects in my music. I tend to think about melodic design and phrase structure in very specific terms

[27] Nelson, interview.

where I'm working with harmony and also melody to create relationships that have voice leading that is fairly clear and obvious, hopefully. And, so there might be sections where some of the primary melodic pitches might be an E-flat moving to a D, in which E flat is prominent at the beginning of the phrase, and then near the conclusion of the phrase it moves to a D in that same register. I try to set up those sorts of structures and relationships so even if someone is not able to listen for the exact sets that are being played, on some sort of a level one hopefully hears that there is a linear connection between melodic and also harmonic ideas that create a more local sense of structure, a more local sense of cadence, closure, or not. Once you set up a series of expectations it's also possible to then deny that expectation so that the phrase or section sounds as though it didn't cadence when you thought that it was going to. If everything is leading up to some musical structure cadencing and then suddenly you deny the expectation, you get some sort of the post-tonal equivalent to a half cadence. However, instead of simply having full cadence, half cadence, or deceptive cadence, you've got a much more infinite variety of degrees of closure in post-tonal music.

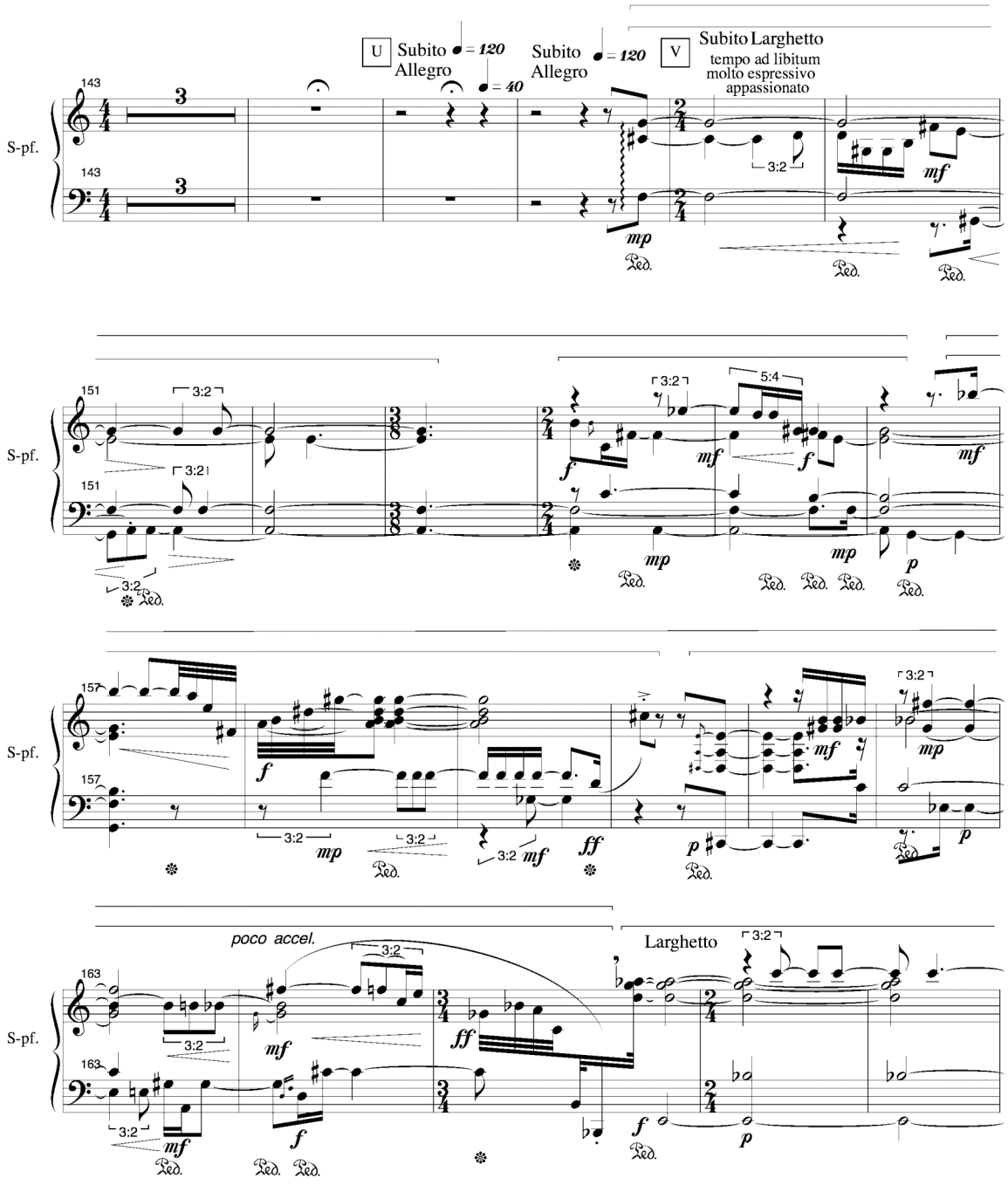
This way of thinking about phrases is evident in the piano solo, measures 149 to 217. The section is distinct in the way the melody and accompaniment are working together in a very obvious way to form phrases. It is in two parts: a freely expressive part for the piano alone (measures 149 to 175), followed by a single line in the piano,

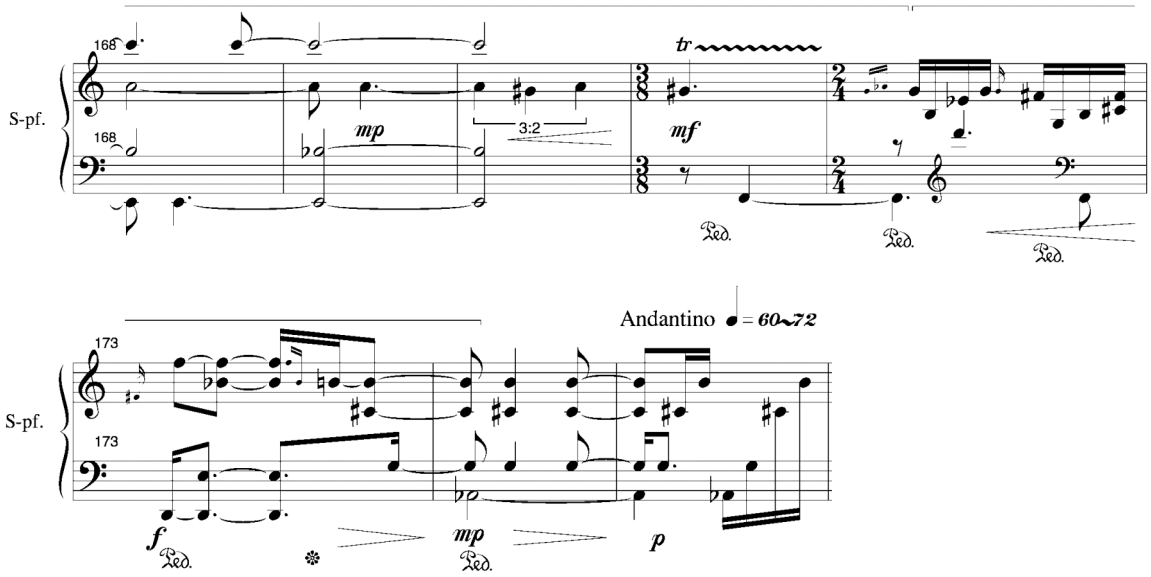
accompanied by the left hand and orchestra; in measure 180, the left hand part is taken over by the Disklavier. Although the piano has up to this point been featured as a virtuosic instrument, it is worth noting that this is the first instance in the concerto where the solo instrument has an extended melodic section. The accompaniment part is characterized by its voice leading; parts change one at a time, slowly morphing from one harmony to the next. The overall form of the piano solo is strikingly similar to that of Nelson's work for solo piano, *Fantasy and Song*, which also begins with a freely expressive section followed by a more traditional melody with accompaniment setting.

Many musical factors are working together in this section to organize the pitches into phrases. Motives are presented and developed. Phrases end in cadences. The phrases are of a suitable length for singing. They are often parallel in nature, and form antecedent-consequent relationships.[28]

Example 24: Piano solo, part 1, phrase analysis

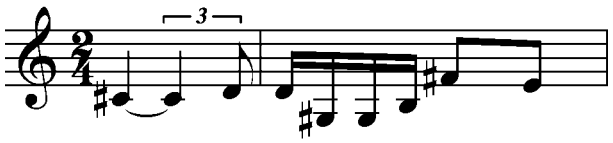
[28] Berry, Wallace, *Form in Music: an examination of traditional techniques of musical form and their applications in historical and contemporary styles*, Englewood Cliffs: Prentice-Hall, Inc., 1986, 15.


U
Subito Allegro
Subito Allegro
V
Subito Larghetto
tempo ad libitum
molto espressivo
appassionato
S-pf.
poco accel.
Larghetto

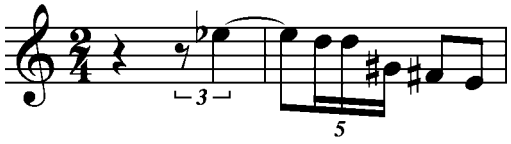



The first two phrases have an antecedent-consequent relationship. The similarities in rhythm and intervals of the main motive of these phrases show that they are parallel phrases.

Example 25a: measures 149-151, piano




Example 25b: measures 154-155, piano

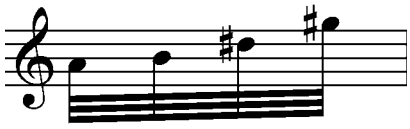



The first melody and its echo in the bass (m. 151) ascend, leaving the phrase as a question, while the melody of the consequent phrase descends, along with its bass (m.

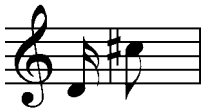
156), to provide the answer. The cadences for both of these phrases are shown by long notes in all voices, stabilizing the new harmonies completed by the motion in the bass.

The next antecedent-consequent pair (mm. 157-165) also makes use of ascending and descending gestures to provide tension and release. The first phrase ends abruptly after tension is created by the increased rhythmic motion on the tenor's repeated F#s and a crescendo. This phrase is also characterized by ascending gestures:

Example 26a: measure 158, piano

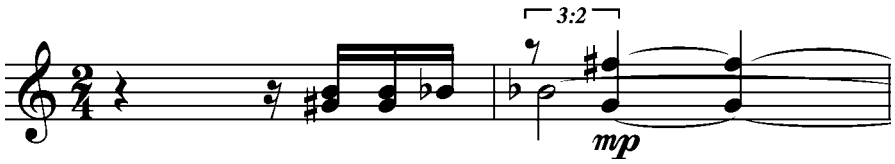


Example 26b: measure 159-160, piano

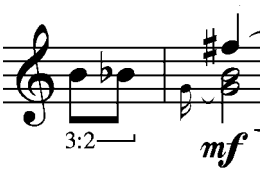


The second phrase is unified by its motivic presentation and development.

Example 27a: measures 161-162, piano, right hand motive



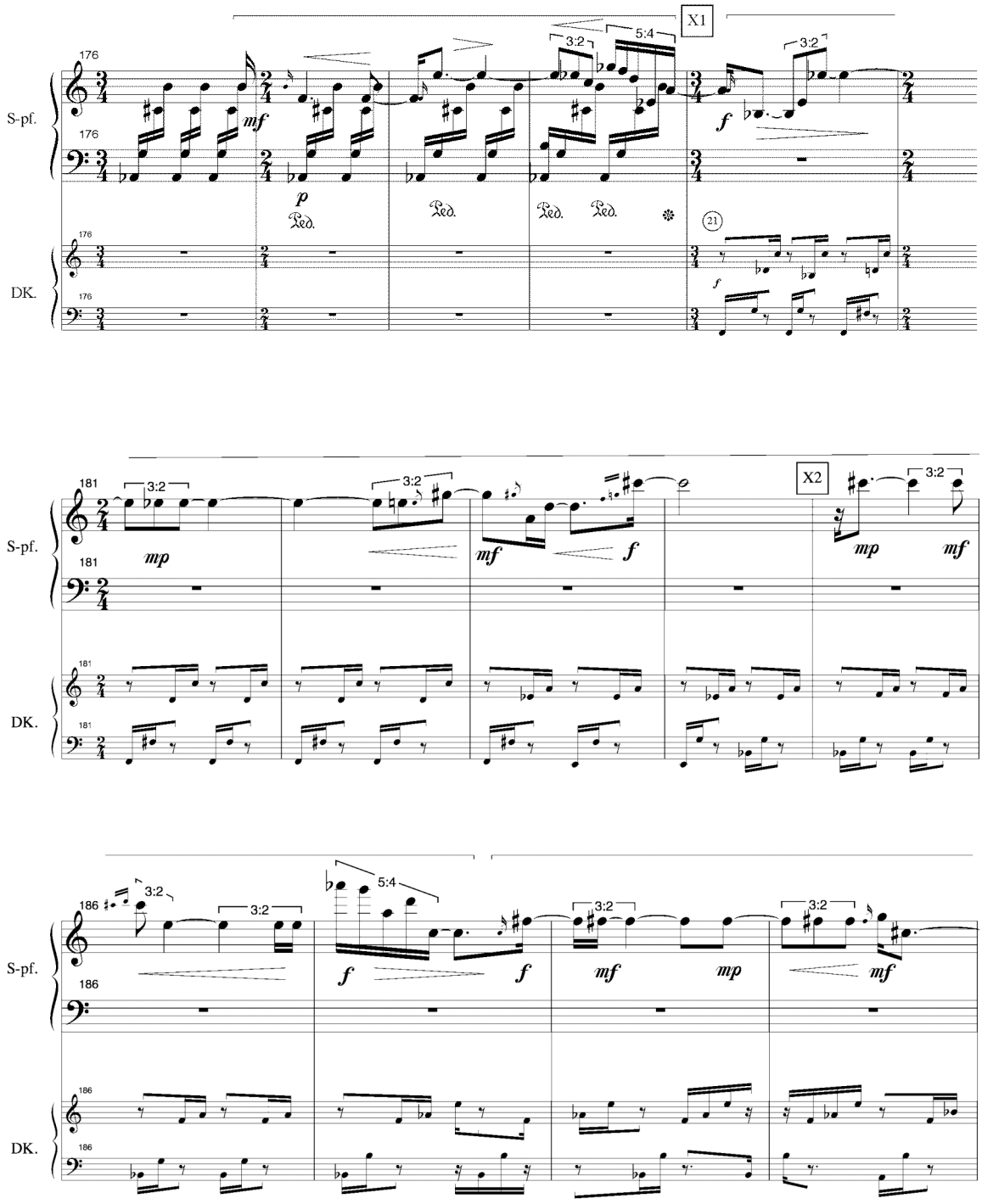

Example 27b: measures 163-164, right hand motive

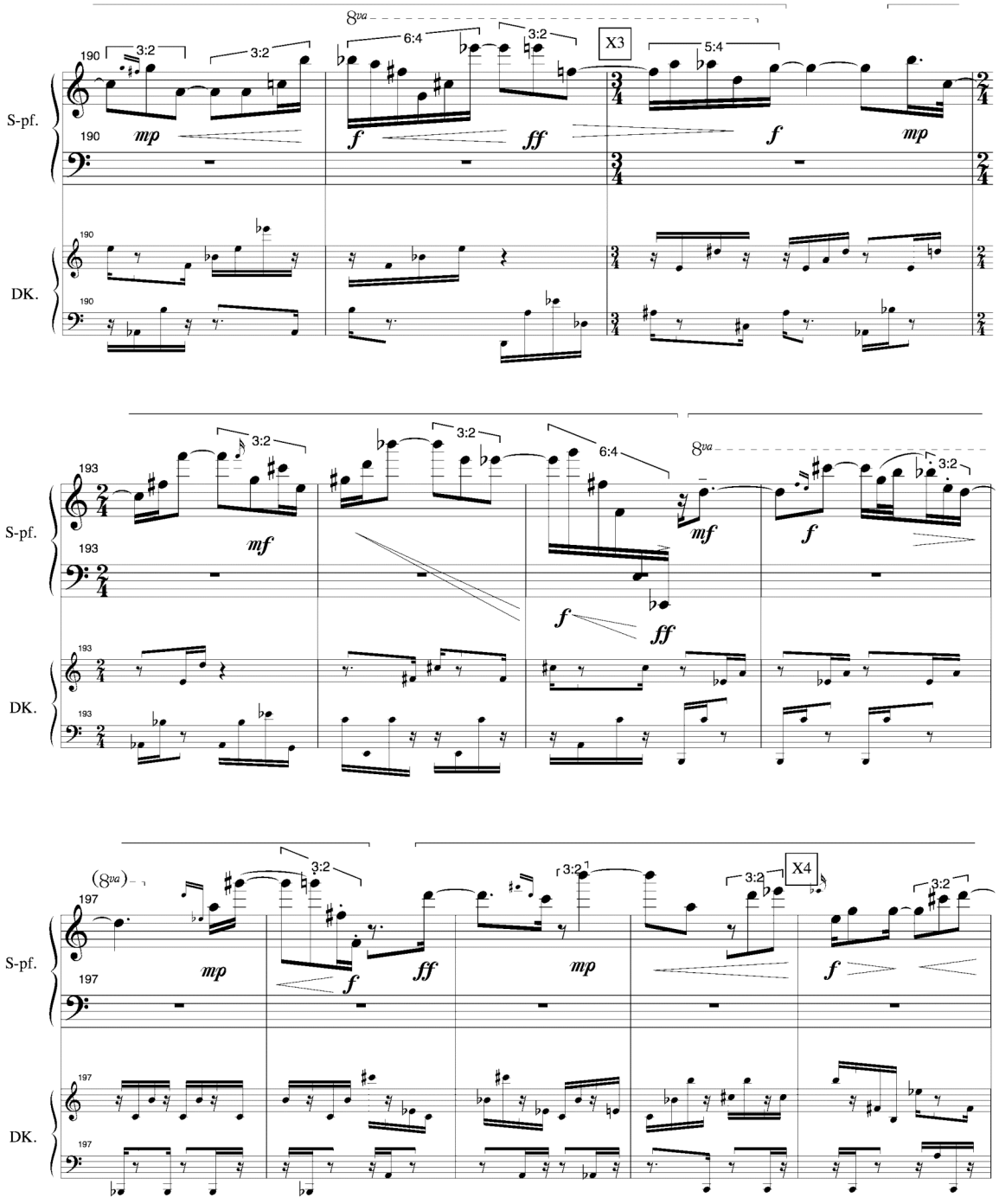


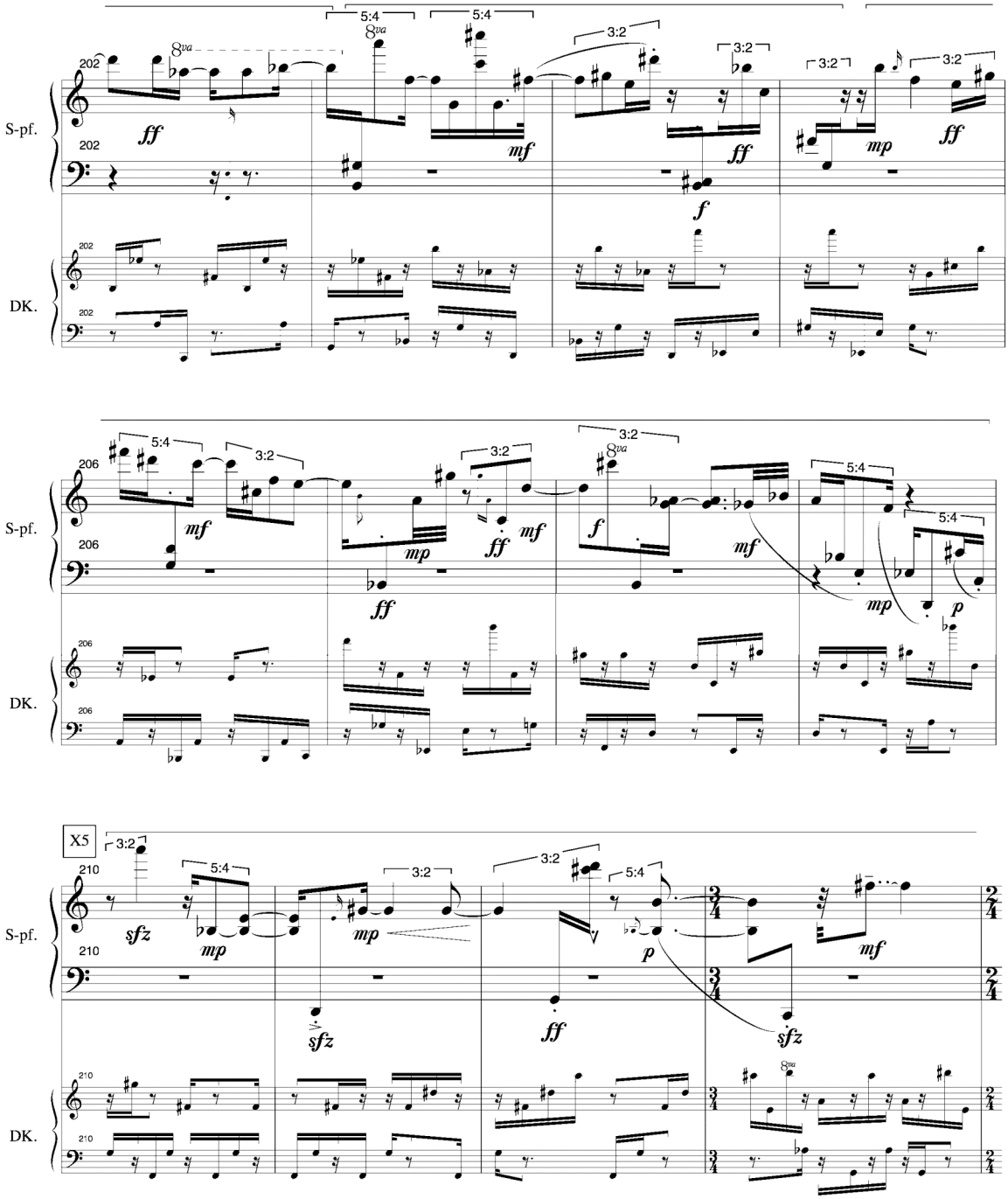

Although this phrase attempts to ascend like its predecessor, it eventually cadences with a sweep from F#5 down to B-flat2. The cadences for both of these phrases are similar. In the first two phrases of this section, the cadences are demarcated by a stabilizing of harmony. In the second phrase group, the cadences are shown by abrupt stops in motion after surges of energy—these are followed by changes of harmony, dynamics, texture, and rhythm marking the beginning of new phrases.

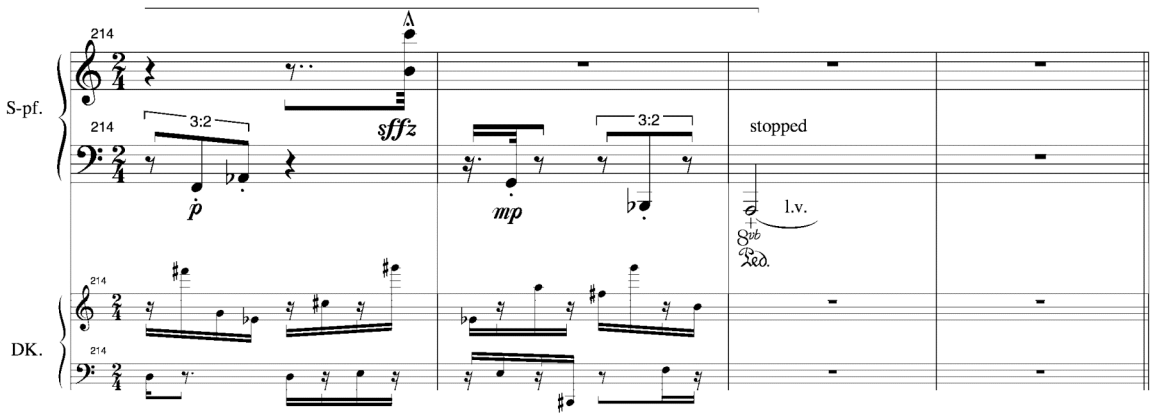
The second large part of the solo section (measures 175-217) also begins with a traditional melody and accompaniment, again with many musical elements working together to delineate phrase. However, as this section progresses the materials become more and more disjunct: the melody and accompaniment begin to travel in huge leaps, often of several octaves, the dynamic range begins to fluctuate on the micro level, and the rhythmic pattern of the accompaniment, originally presented as groups of four notes, becomes highly unpredictable, often appearing in odd-numbered groupings. As a whole, the materials move from a melody-and-accompaniment texture to a pointillistic texture, and the originally controlled materials appear to move toward entropy.

Example 28: piano solo, part 2, phrase analysis


X1
X2
S-pf.
DK.
176
181
186
3:2
5:4
21
mf
p
f
mp
Ped.


S-pf.
DK.
190
193
197
3:2
6:4
5:4
X3
X4
8va
(8va)
mp
mf
f
ff


S-pf.
DK.
202
206
210
X5
5:4
3:2
8va
ff
mf
f
mp
p
sfz




In the second part of the piano solo, the rhythm and harmony of the accompaniment play a greater role in the establishment of phrase groups. As an example, in measure 195, one phrase ends and the other begins. Here, the melody comes to an abrupt end, and is followed by a sudden change in dynamics and rhythms. In conjunction with this, and creating further emphasis on the demarcation of the new phrase, is the accompaniment material in the Disklavier. As the new phrase begins, the rhythm and harmony in the Disklavier part interrupt the previously established pattern of four-note groups (E-C-F#-C#) before the final C# is played; with the new phrase comes a new pattern (B-C-E-flat-A).

## Second Interlude

The second interlude provides immediate contrast with the solo section at measure 218. Three general musical ideas comprise the section's opening material: muted repeated notes in the piano and Disklavier effects, 16$^{th}$ notes in the piano and percussion, and arpeggios in the piano. These gestures are heard three times in order

of presentation (except that the third gesture is not played the last time). Octachords 4 and 6 provide most of the pitch material for these figures, harmonically reminiscent of the trumpet solo. However, random notes in the Disklavier and the use of unpitched percussion link this interlude with the previous interlude in its departure from serialized harmonies. The overall effect of the first part of this interlude is also similar to the first interlude, as it contrasts static material with sudden 16$^{th}$ note gestures. The abrupt changes of texture in this interlude contrast with the consistent texture of the piano solo.

The second part of the interlude contains static music in the orchestra (harmonics on pitches A-flat and B-flat), and harmonics produced in the piano.

## Section C: Algorithmic Section

Algorithmic composition is an important feature in the music produced by the Disklavier, but in section C it is also used to generate the orchestra part. A computer composed much of the music in the orchestra from measures 262-322 based on algorithms chosen by the composer. It is the only such section in the concerto. Although the orchestra parts in this section were created before the performance and therefore are the same for every performance, they were created using the same types of processes used in this section to create the Disklavier part, which is composed during the performance. Both the orchestra and Disklavier parts are created using a Max patch that generates motives, trills, dyads, and repeated notes.

Although the computer program generated the orchestra part in a relatively random way, the composer was able to choose from the music that was created, rather than allow the program to decide exactly what will be played. The sketches for this

section contain the original computer-generated part. However, this sketch shows that the composer crossed out unwanted passages and added new material to shape the section. The program was not used for decisions on orchestration, so while a relatively random process created the music, the way in which it is orchestrated gives the music much of its shape. As the section begins, the motives are distributed to particular instrument groups. The trills and motives are found in the winds, repeated notes in the brass, and dyads in the strings (played as double stops); the figures are idiomatic to their respective instrument groups. As the section progresses, these figures make their way into the "wrong" parts: we begin to find motives and dyads in the brass, dyads and repeated notes in the winds, and repeated notes and trills in the strings. It was the composer's hope that this section, although algorithmically generated, still would sound integrated with the rest of the work, and this was achieved to considerable effect. The connections between the orchestra, Disklavier, and piano make the music here quite similar to section A, the cello solo. In section C, the Disklavier, piano, and orchestra again trade similar $16^{th}$ note figures at the performer's tempo, the tempo is the same as for section A, and rhythmic drive is a prominent feature. Aside from the absence of a cello solo, these two sections have much in common, and perhaps the second could be considered recapitulatory of the first. Also, along with the sketch for the algorithmic part, there is another sketch outlining the harmonic underpinning found in the long held notes in the strings, an accompaniment feature found throughout this concerto, which helps to further integrate this section with the rest of the concerto. The harmonies here are built primarily on the two all-interval tetrachords.

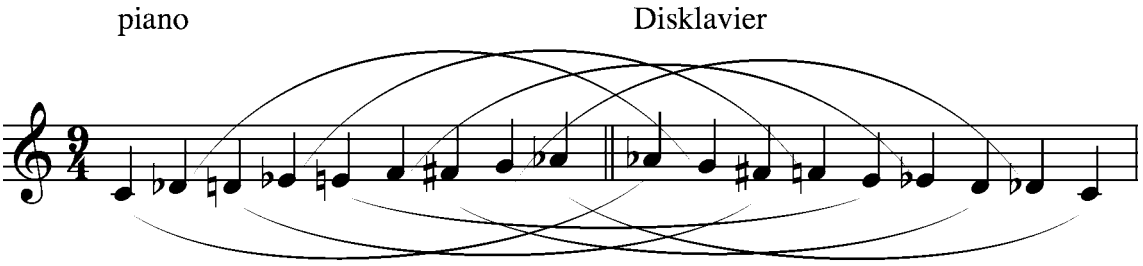
## Cadenza

Nelson has mentioned that in a typical concerto, the performer and the orchestra are presented as two opposing entities, but in this interactive concerto the conflict also exists between the performer and the Disklavier.[29] With the orchestra part stripped away, this conflict is evident in the Cadenza, which features the Disklavier in various canons with a virtuosic piano part. The first canon takes every note in the piano and inverts it over the A-flat below middle C, with a two second delay. The second canon begins at measure 327 and plays the piano part an octave and a half lower than written, with a half-second delay. From this canon's entrance, both canons function simultaneously until the trills in measure 336, when the first canon drops out. The second canon stops in measure 340, where the third canon begins. The third canon inverts the piano part over the E above middle C and is delayed by 125 milliseconds.

One cannot analyze the harmony of the by simply looking at the score. The notes in the Disklavier must also be taken in to account. In this section in particular, Nelson takes advantage of the canons in order to create octaves. For example, the third canon inverts every note in the piano part over the E above middle C. So, every pitch is paired with another pitch, e.g., if a middle C is played in the piano, which is four half-steps below the point of inversion, the next higher A-flat will be played by the Disklavier.

Example 29: third canon, possible notes in piano, respective canonic notes in Disklavier

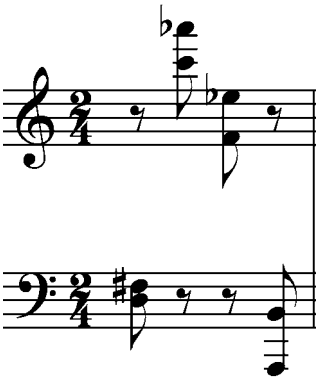
[29] conversation w/composer



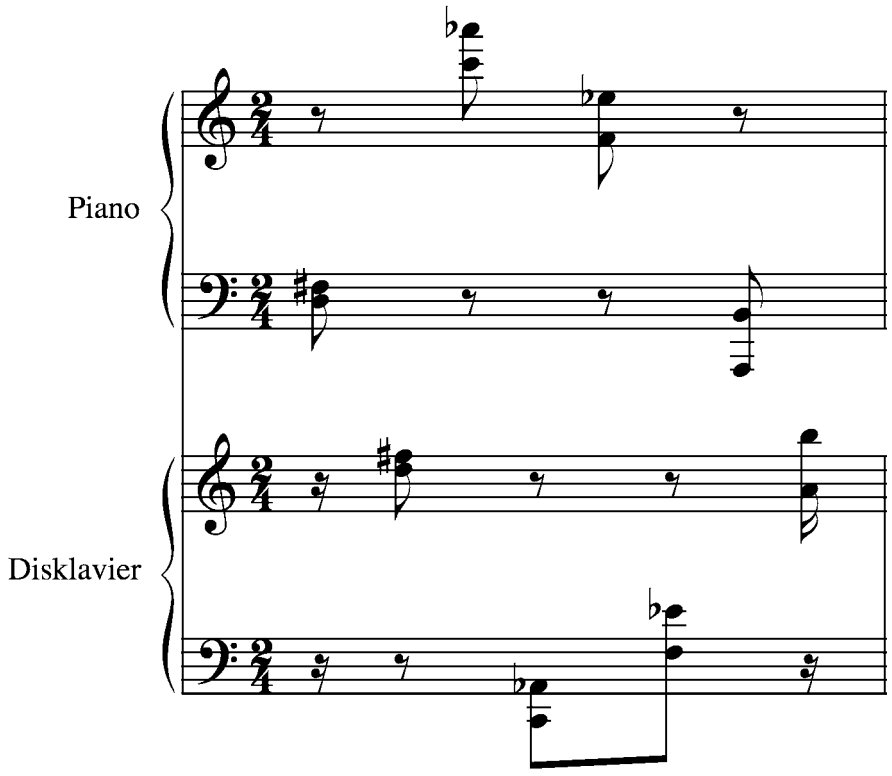

Every pitch is paired with another, except for E and B-flat. E is inverted as E, and B-flat is inverted as B-flat. Nelson has mentioned that prior to composing the concerto he would often try to avoid octaves, but that in certain places in this work he was trying to "reconcile (his) relationship with octaves..." [30] In the cadenza, octaves are emphasized. For example, in the third canon, E's and B-flats are heard with great frequency, as these pitches will produce octaves with the canon (except for the E above middle C, which produces a unison). Another way of emphasizing pitches through octaves is heard in measure 349. The four dyads in this measure altogether form octachord 7. This important harmony is emphasized by the fact that the pitches in these dyads form octaves with the canon.

Example 30a: measure 349, piano

[30] Nelson, interview.



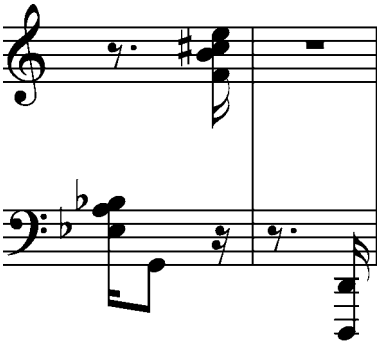
Example 30b: measure 349, piano and Disklavier




The various gestures in the cadenza are often similar to previous gestures found in the concerto, hearkening back to the tradition of improvising a cadenza based on themes from the concerto. After its opening C#, the piano plays the orchestra's rhythm

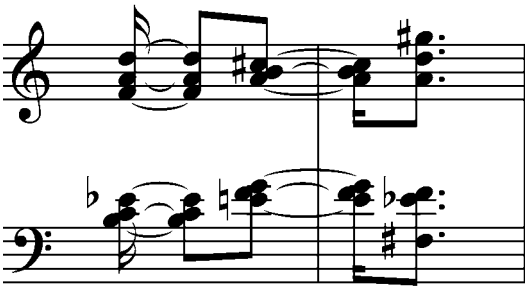
from measure 18 (see example7), which the Disklavier had echoed in measure 23 (see example 12).

Example 31: measures 323-324

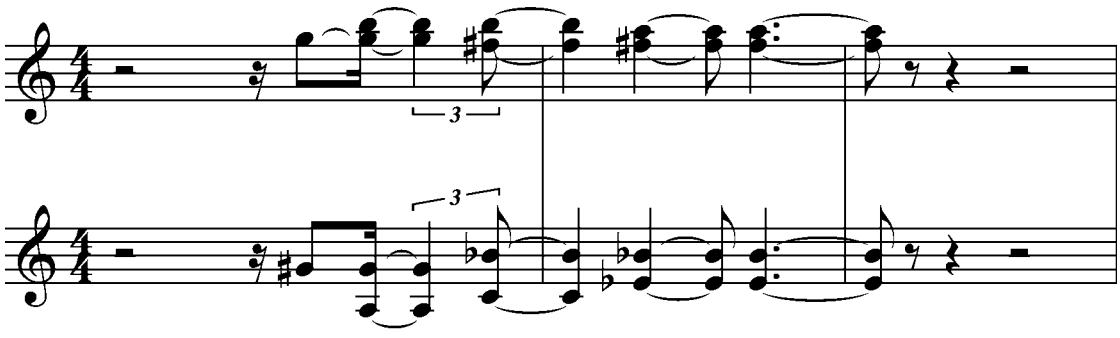


Chorale-like chords in measures 326 through 327, marked *cantabile*, sound like chords similar to those found in the piano in mm. 60 through 61, also marked *cantabile*.

Example 32a: measures 326-327, piano

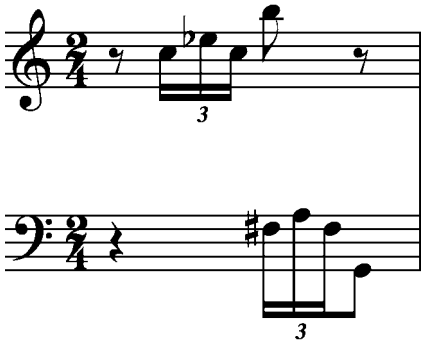


Example 32b: measures 60-61, piano



The important motive from measure 66 heard throughout the cello solo (example 17) is found in m. 333 in an exact transposition. It is found in a form similar to the motive's reiteration in m. 84 (example 17e).

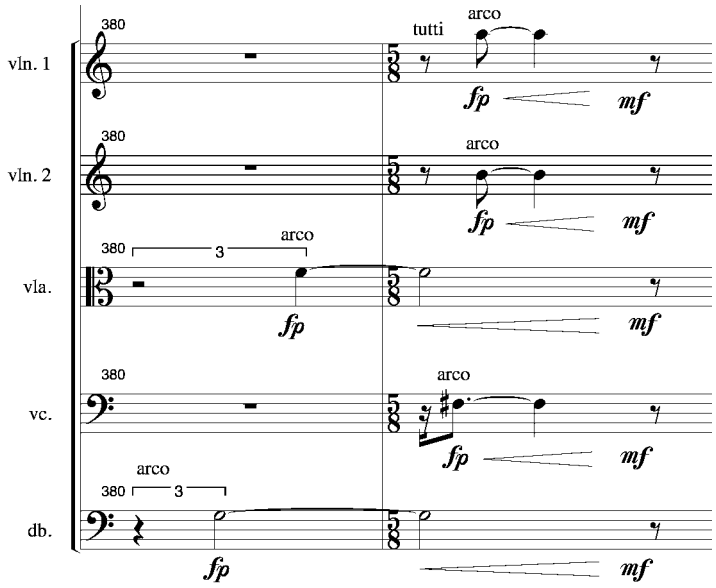
Example 33: measure 333, piano



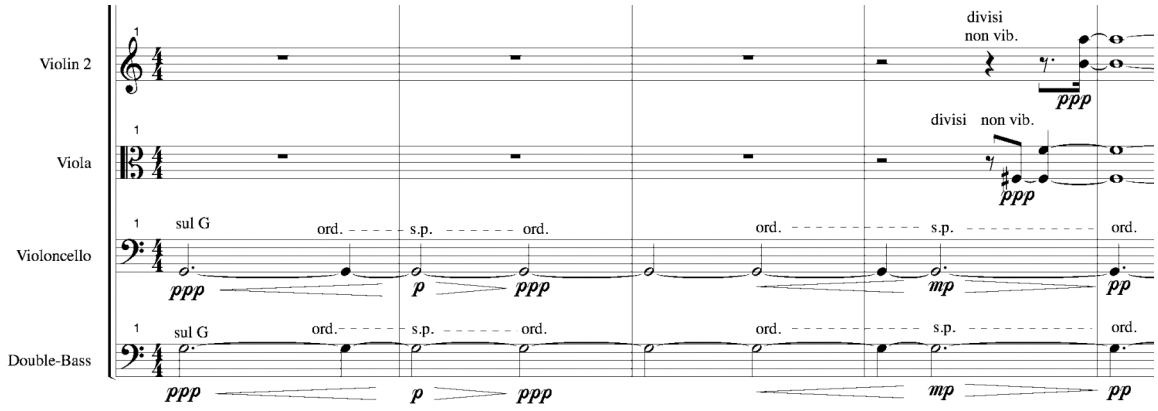
Coda

The coda continues the referential process in measures 376 to the end of the concerto. In measures 380 to 381, the first five notes of the opening chord are heard with similar orchestration.

Example 34a: measures 380-381, strings

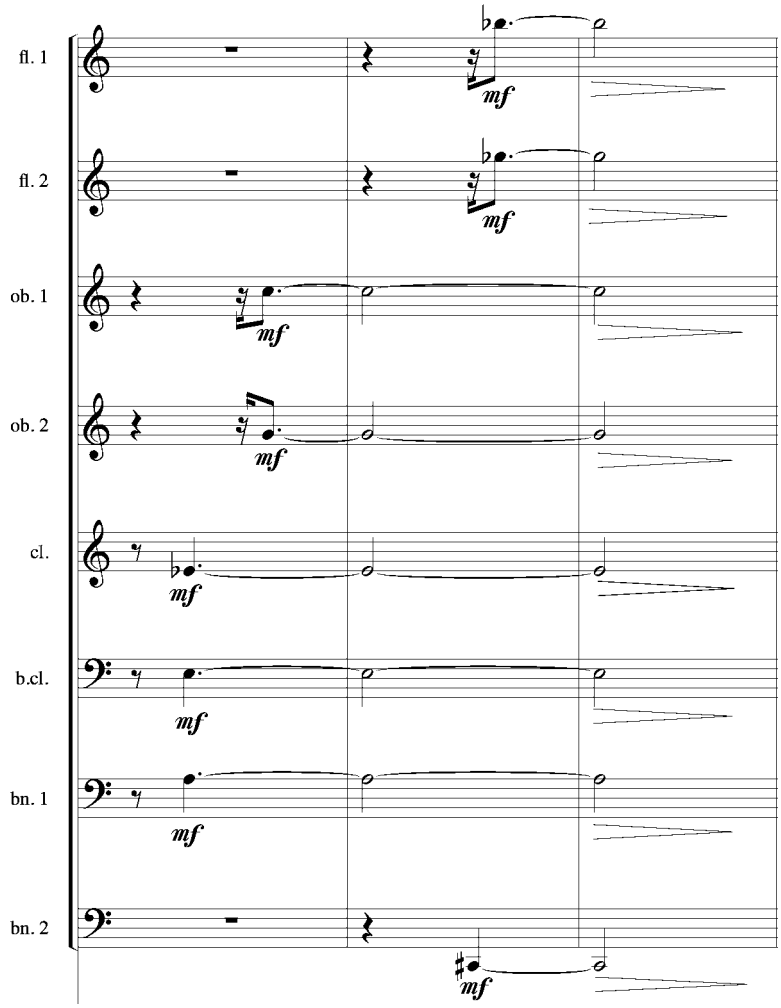



Example 34b: measures 1-5, strings

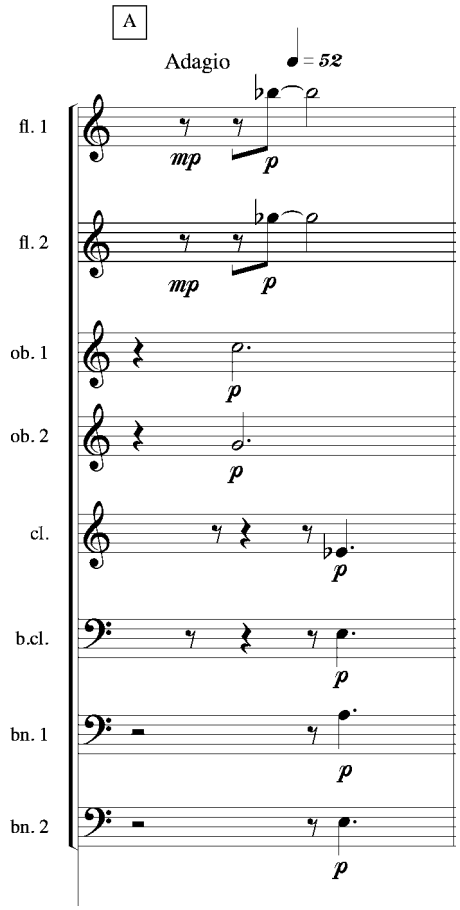



In measure 382 to 383, the orchestra replays octachord 7 from measure 8, also with a similar orchestration featuring the winds.

Example 35a, measures 382-383, winds




Example 35b: measures 7-8, winds and brass




An Alternative Formal Approach

Nelson's outline of the formal structure separates the concerto into eight sections. However, I believe this concerto can be heard as a ternary form. In *Fantasies and Flourishes*, sections A and C are both played at 120 beats per minute, contain many 16th-note figures, and contain similar types of interaction between the parts. Between these two is a melodic section in the piano. Framed by the two interludes, the B section becomes a ternary form nested within the larger ternary form of the entire concerto. This one-movement model places the Cadenza in its usual position near (or as perhaps as part of) the coda.

Example 36: Large-scale form

Introduction, measures 1-35

A, measures 36-138

B, measures 139-262

A, measures 263-322

Cadenza and coda, 322-392

# CHAPTER III

# PERFORMING *FANTASIES AND FLOURISHES*

## The Piano Part

As discussed in the section “Form in Fantasies and Flourishes,” Nelson uses certain combinations of musical materials to delineate form. The result is several contrasting sections, of which each requires a different performance approach.

Some passages require a relatively traditional performance approach. For example in the piano solo section, the performer should shape the musical phrases with expressive devices such as dynamics, tone, and rubato to highlight melodic contour, motivic repetition and development, and phrase closure, much like in a romantic era piano work.

Other parts of the score call for a contemporary approach to the instrument through the use of extended techniques. The performer is asked to pluck strings, swipe strings with a credit card, and damp strings, and must be able to develop techniques to

quickly and easily perform these maneuvers. The strings should be plucked using a guitar pick or a credit card to project the sound over the orchestra. The score indicates that a fingernail or credit card may be used for swiping the strings, but for the same reason, the credit card is preferred. Standing at the keyboard, the performer should swipe the string quickly, away from the body. Damping the strings is intended to create harmonics. The performer will first damp a string, and then play the note on the keyboard that corresponds to the damped string. The correct spot on the string (somewhere between the pins and the dampers) needs to be found in order to produce a harmonic that is as resonant as possible. The right amount of pressure is critical; if there is too much or not enough pressure on the string, the desired effect will not be produced.

There are certain things a pianist can do to prepare for a performance that involves extended techniques. One must practice on a grand piano, hopefully a piano similar to the instrument used in the performance. It is helpful to label the strings with the names of the pitches to be used taped to their respective dampers. The pianist must be aware of the location of the crossbar—this is different in many makes and models of piano. The performer may choose to pluck, damp, or swipe the string in front of or behind the crossbar. The choreography of the motions should be practiced. It can be complicated to stand up, pick up a credit card with the right hand, find the correct string with the left hand and damp the string in the correct spot, play a note on the piano with the right hand, and swipe the string with right hand all in one motion (as in measure 58). It is often necessary to notate in the piano part when and in what order these actions should occur.

## Playing with the Disklavier

An ideal performance of this concerto is one where the interaction between the pianist and Disklavier occurs without any outside help from a technician, with the exception that the technician must open the first gate of the Max patch. In many interactive works, the gates are actually being opened by a technician or by the performer through non-musical means, such as a pedal attached to the computer. In this work, the program should run by itself. All processes, triggers, and opening and closing of gates occur as the result of the actions of the performance.

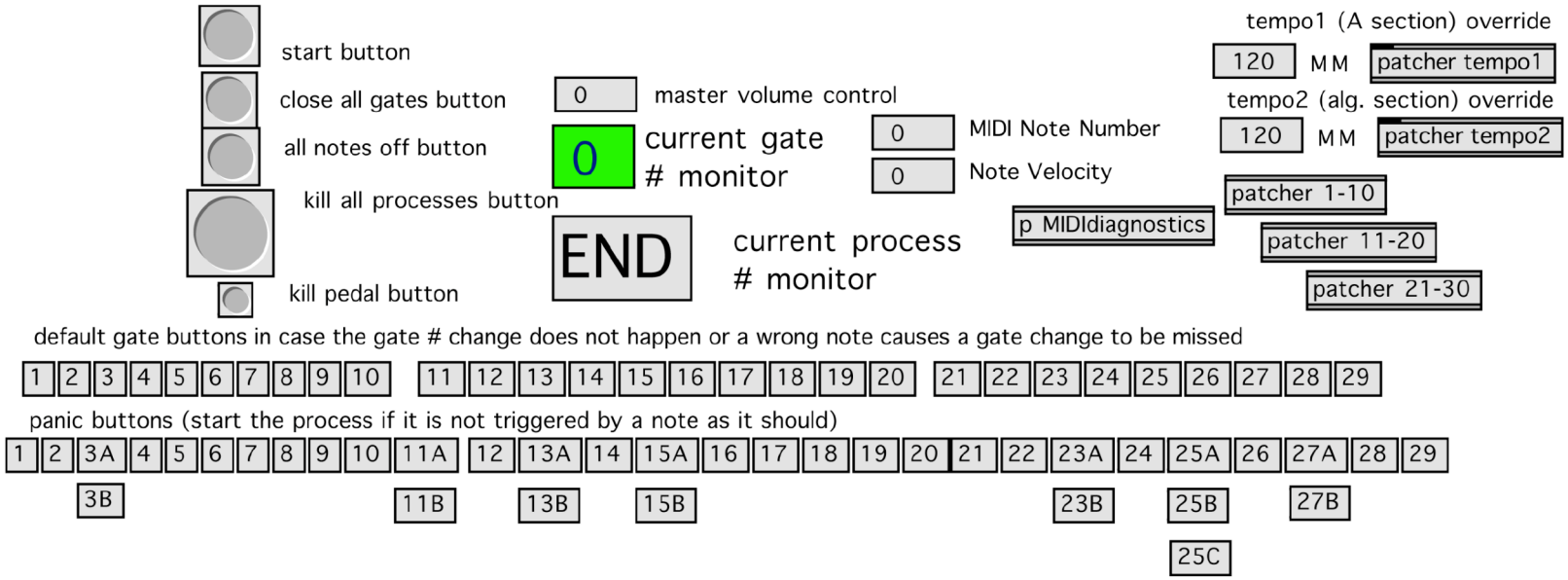
However, as with any computer program, sometimes there are unexpected results. Problems in performance can occur if the performer does not play a trigger, plays a trigger at the wrong time, or plays a section at the wrong tempo. Problems can also occur if there is an error in one of the Max patches. Also, sometimes there are simply unexplainable errors, either in the Disklavier or in the program, that cannot be determined. This can be frustrating in a performance setting, but luckily the composer has developed several failsafes that allow for the performance to continue if any of these problems occurs.

First, it is necessary to have a technician who is familiar with Max oversee the performance.[31] The technician can view important information about the processes taking place during a performance from a computer monitor showing the Max patches for the concerto. The opening screen of the program is called the Graphic User

[31] I was privileged to have the composer present to oversee the electronics in my performance of the concerto.

Interface, or GUI (pronounced “gooey”). The GUI gives the technician information about the processes taking place, and a certain amount of control over those processes.

Example 37: Graphic User Interface for *Fantasies and Flourishes*


start button
close all gates button
all notes off button
kill all processes button
kill pedal button
0
master volume control
0
current gate
# monitor
END
current process
# monitor
0
MIDI Note Number
0
Note Velocity
p MIDIdiagnostics
tempo1 (A section) override
120
MM
patcher tempo1
tempo2 (alg. section) override
120
MM
patcher tempo2
patcher 1-10
patcher 11-20
patcher 21-30
default gate buttons in case the gate # change does not happen or a wrong note causes a gate change to be missed
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
panic buttons (start the process if it is not triggered by a note as it should)
1 2 3A 4 5 6 7 8 9 10 11A 12 13A 14 15A 16 17 18 19 20 21 22 23A 24 25A 26 27A 28 29
3B
11B
13B
15B
23B
25B
25C
27B

The GUI reveals information about the velocity (see 'Note Velocity" on the GUI) and pitch ("MIDI Note Number") of the note currently being played by the Disklavier. It also tells the technician which gate is open ("current gate # monitor") and which process is taking place ("current process # monitor"). The technician must start the performance by opening gate 1 with the "start button." If a note on the Disklavier gets stuck, or if the Disklavier plays the wrong music "all notes off" button or the "kill all processes" button can be used. If the pedal gets stuck, the technician can use the "kill pedal button." Also, the volume of the Disklavier's music can be controlled with the "master volume control". If the tempo of the Disklavier part is incorrect in the A section (measures 36 through 138) or in the algorithmic section (measures 261-318) the technician can change the tempo from the GUI ("tempo 1 override" and "tempo 2 override"). Most importantly, the technician can open any gate ("default gate buttons...") and start any algorithm or sequence ("panic buttons") from the GUI.

In my performance, every patch worked well except for patch 21, which had also been problematic during rehearsal. During the performance, the patch did not trigger, even though all the correct notes were played. In this instance, it was necessary for the composer to start the patch manually by pressing panic button number 21. Although the Disklavier did not enter on time, the button was pressed at the beginning of the next measure at exactly the right time so that the four-note rhythmic pattern remained on the beat. Also, for an unexplained reason, the Disklavier often played a D above middle C (MIDI note 62), although this was not indicated in the program. The "all notes off" button was used to remedy the problem.

Failsafes are built into the program so that many problems take care of themselves without the aid of the technician. For example, in a number of patches the events are triggered by any note within a certain range of pitches, rather than by a single pitch; this insures that, especially in the event of a large leap, the trigger will still work. There are also failsafes regarding tempo. The Disklavier often plays its music based on the tempo of the piano part. The patches for this music will limit the range of tempo at which the Disklavier will play its passages. The patch will allow the pianist to set the tempo, but if the pianist's tempo is far too fast or slow, or if the program incorrectly reads the performer's tempo, the Disklavier will not play at these extreme tempos.

The Disklavier acts as a mechanical duet partner. It takes much practice to get comfortable playing on a piano that is also playing by itself. Luckily, the composer wrote the program in such a way that, for the most part, the Disklavier and the pianist play in different ranges of the piano.

## Playing with Orchestra

There are many differences between performing *Fantasies and Flourishes* and performing a standard concerto. It is not common practice for performers to memorize complex contemporary scores. Although it is not necessary for the piano part to be completely memorized, the score should only be used as a reference that a performer glances at to find starting pitches for figures. It is necessary to watch the conductor as much as possible because of the way the music is constructed. The piece is written using standard time signatures that stay relatively constant throughout the work.

However, the rhythms in the orchestra part do not represent the characteristic beat patterns of those time signatures. The time signatures are there for ease of reading only. Different instruments may in actuality be playing several tempos at once. The beat cannot be perceived aurally in such an obvious way as in a concerto by Mozart or Brahms. Instead, the performer must watch the conductor frequently to see where the beat is.

The pianist and conductor are responsible for setting tempos that will work best with the Disklavier. In the event that the Disklavier plays a passage at an incorrect tempo, or in the event that the conductor is not following the tempo of the Disklavier, the performer must stay with the conductor. The Disklavier will eventually move on to a new patch where the music will get back on track, but if the performer and conductor become separated, it is extremely difficult to get back together. The pianist, however, can help the situation by writing orchestra cues in the piano part. These cues must come from audible parts; percussion figures are most helpful here.

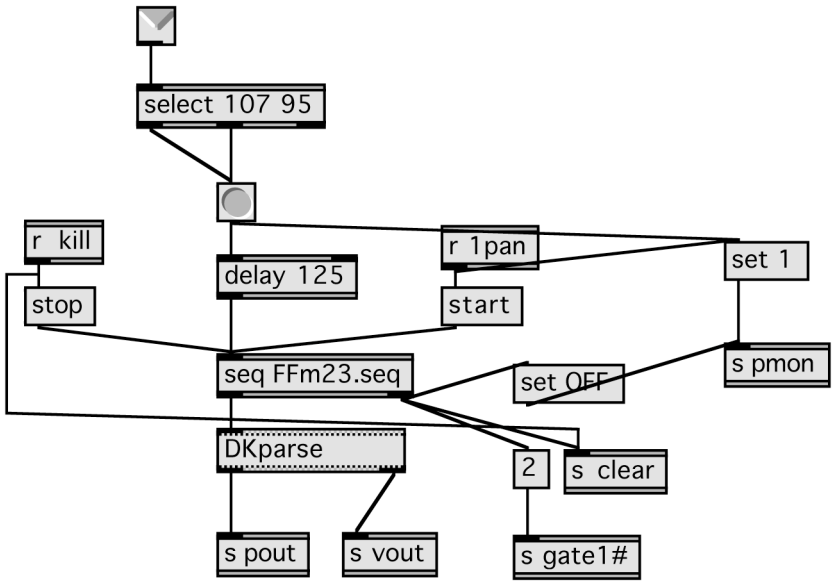
# CHAPTER IV

# MAX AND THE DISKLAVIER

## Triggers

A Max patch works much like a flow chart. Information in a Max patch is sent from the top to the bottom.

Example 38: Patch 1

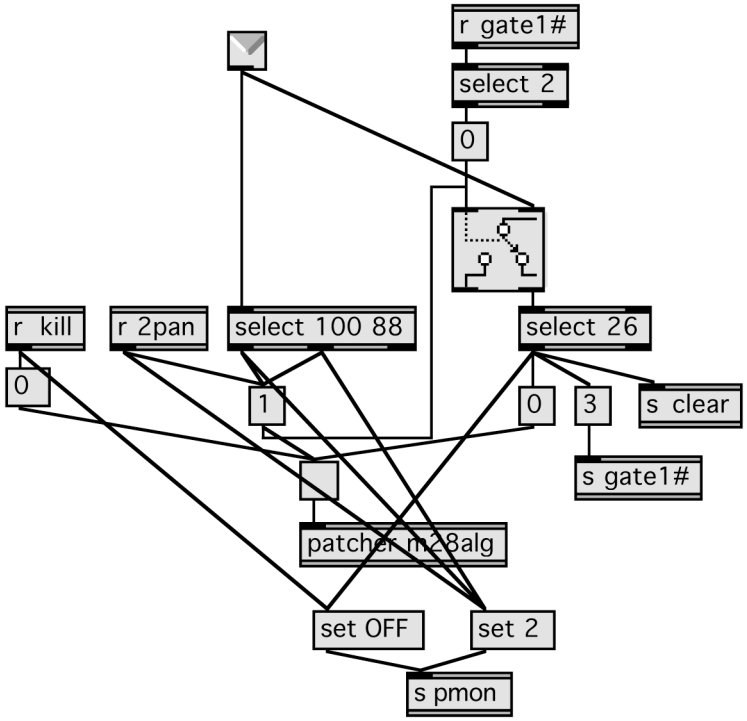



Patch 1 begins at the small square box at the top of the patch (the *inlet* object). Directly below this is a box containing the word "select." This box is the *select* object. The *select* object will not allow the patch to do anything until it receives certain information. In this case, that information is the numbers 107 and 95, which are the MIDI pitch numbers for the highest two Bs on the piano.[32] This particular *select* object tells the rest of the patch not to run until the pianist plays the high Bs.

The triggers in Nelson's patches generally do one of two things: start the patch, or stop the patch and tell program to open the next gate.

Example 39: Patch 2

[32] MIDI numbers are used in Max for pitch and velocity information. A MIDI value of 60 denotes Middle C; 61 the adjacent C#, etc. Velocity (volume) is measured from MIDI value 0 (lowest) to 127 (highest).




There are two *select* objects in patch 2. The one on the left contains the numbers 100 and 88. In *Fantasies and Flourishes*, the patch numbers are often printed in the pianist's part near where the Disklavier's music should begin. Looking at the score next to patch 2 (measure 28), we see that these correspond to the pitches in the right hand (See the encircled number "2" in the third system of example 11.) If the *select* object in a particular patch contains numbers that correspond to any of the pianist's notes near the respective patch number in the score, then it is very likely that these notes are the triggers. The *select* 100 88 object is connected to a *patcher* object. In the patches for this piece, *patcher* objects contain the information for what the Disklavier is to play. The other select object, containing the number "26", corresponds to the low D in measure 29 (see example 11). The "select 26" object also sends information to the number "0" before it is connected to the patcher object. This turns off

the patcher object. The two triggers in this patch are representative of the two types of trigger found in this work: the “on trigger” (high octave E’s) and the “off trigger” (low D).

The following is a table constructed by the author that shows pitch and measure information for every trigger in the concerto. It will help a performer to know exactly which notes in the piece must be played in order for the Disklavier to work.

Table 1: Triggers in *Fantasies and Flourishes*

| Patch | triggers | measure | triggers | measure | Off triggers | measure |
|---|---|---|---|---|---|---|
| 1 | 107;95 | 22 | | | | |
| 2 | 100;88 | 27 | | | 26 | 24 |
| 3A | 61 | 33 | 98 | 36 | | |
| 3B | 95;84 | 38 | | | 72;69;83;38;51 | 41-42 |
| 4 | 92;56 | 43 | | | 84;95;76 | 44-45 |
| 5 | 81;92 | 45 | | | 62 | 45 |
| 6 | 35;42 | 46 | | | | |
| 7 | 39;50;72 | 48 | | | 26;82 | 49 |
| 8 | 34;54 | 50;51 | | | 92;93 | 52 |
| 9 | 54;49;60 | 55 | | | 91;103;73 | 56 |
| 10 | 72;52 | 56 | | | | |
| 11A | <41 (29) | 64 | | | | |
| 11B | 60;52;73 | 65 | | | 94;77;85 | 66 |
| 12 | <61 (40) | 70 | | | | |
| 13A | 73;85 | 72 | | | | |
| 13B | 99;90;92 | 76 | | | | |
| 14 | 108 | 81 | <86 (69) | 81 | 62;75;78;67 | 83-84 |
| 15A | 23;35 | 89 | | | | |
| 15B | 68;73;79 | 90 | | | | |
| 15C | 77 | 91 | | | 84;90 | 96 |
| 16 | 37;25 | 103 | 63;64 | 103-104 | 48;52 | 106 |
| 17 | 59;71;83 | 107 | | | 36;24 | 109 |
| 18 | 86;81 | 108 | | | 37;84 | 111 |
| 19 | 84;61 | 117 | | | <48 (36) | 120 |
| 20 | 73;69;81 | 126 | | | <85 (39;40) | 129 |
| 21 | 44 | 174--176 | 78;69 | 180 | | |
| 22 | 21 | 218 | | | 24;25;26;27 | 221 |
| 23A | 61;68 | 224 | | | | |
| 23B | 64;70 | 225 | | | 21 | 227 |
| 24 | starts | automatically | | | 96 | 231 |
| 25A | 70;96 | 223 | | | | |
| 25B | 69;79 | 233 | | | | |
| 25C | starts | automatically | | | 27 | 236 |
| 26 | 52 | 262-263 | | | 84;96 | 319 |
| 27A | 37;49 | 322 | | | >98 (99;100) | 336 |
| 27B | >87 (91) | 328 | | | <29 (21) | 340 |
| 28 | starts | automatically | 49 | 371-375 | 56;32;38;26 | 376 |
| 29 | 97 | 390-392 | | | | |

## Types of Patches

In *Fantasies and Flourishes*, the Disklavier's music can, in general, be divided into two categories: precomposed music, and music that is composed in real time during the performance. Precomposed music will be indicated by the presence in the patch of the *seq* object. (See example 38, "seq FFm23.seq".) This object contains exact information about the pitches, dynamics, and rhythms, and lengths of the notes to be played. These are always notated in the Disklavier part, as they will be the same for every performance. (See example 12). Algorithmically composed passages will be indicated by "patcher" objects that are labeled with measure number information, followed by the abbreviation "alg". For example, the object labeled "patcher m28alg" in example 38 indicates that this object contains the rules for determining what the Disklavier plays in measure 28.

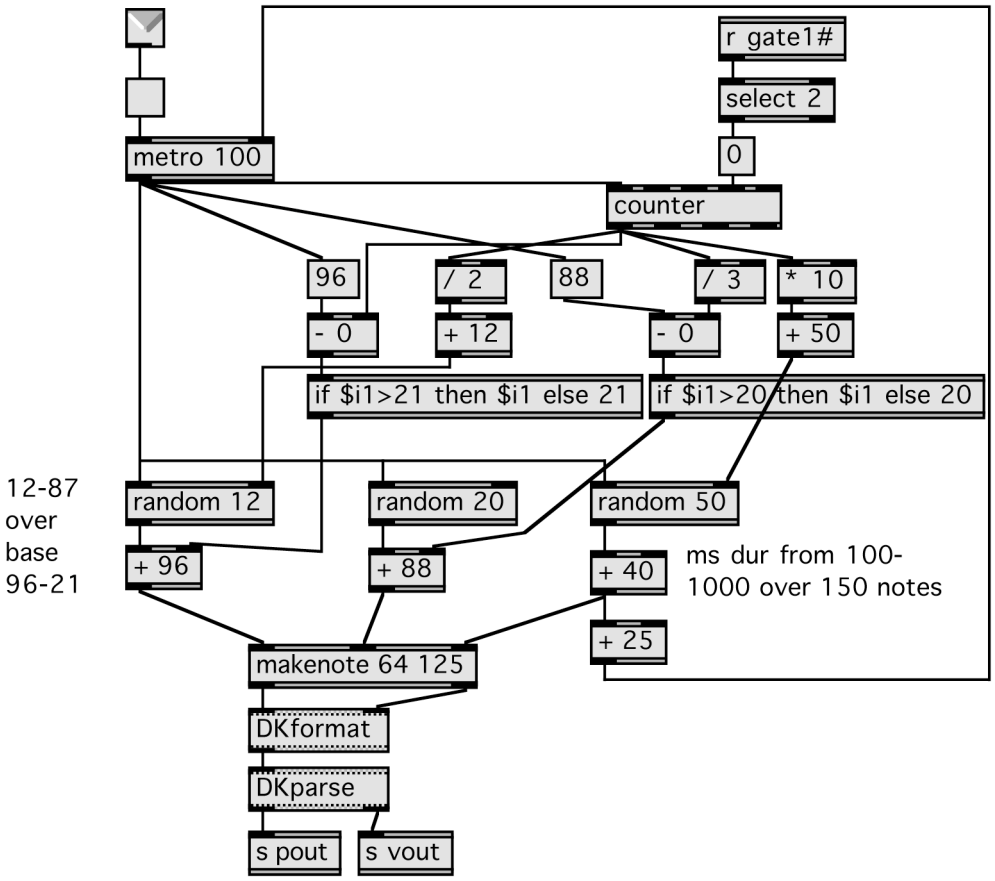
Algorithmic processes can be very predictable or very random, depending on the relative strictness of the rules used to create these processes. If the rules are very strict, the patch will compose the same music for every performance. These types of algorithms are very similar to sequences. In this composition, the music they produce is predictable, so it is written out in the score. Less strict rules will result in music that is different for every performance. This music is not written out in the Disklavier part of the score. Instead, in these places in the score, Nelson gives brief descriptions of what the Disklavier will play, for example: "DK plays random notes with a dim. and rit. begin next measure ad libitum to stop DK process."

One of the problems of analyzing electronic music is that there is no score. Jean-Claude Risset states that for this reason, there are "few analyses of electronic works," and that "music for tape has been neglected by musicology."[33] Risset suggests that the music synthesis programs (such as Max) are the scores, and that analysts must be "somewhat knowledgeable in computer techniques of music." Furthermore, it is difficult to analyze music composed in real time because an analysis of that music will only be useful in reference to a particular performance. To analyze the algorithmically composed Disklavier music, it is necessary to understand the processes used to create it. Often, a simple compositional process will result in complex music—to understand algorithmically composed music it is much easier and more useful to analyze the processes used to create the music than to analyze the music itself.

The music from patch 2 is based on an algorithm with less strict rules, and results in different music for every performance. In patch 2, we see that after the triggers are played, information is sent to the object labeled "patcher m28alg." This box is really a form of shorthand for another patch within patch 2 called a "subpatch." Clicking on the "patcher m28alg" box will take the user to a page showing this subpatch.

Example 40: Patch 2, "patcher m28alg" (subpatch)

[33] Risset, Jean-Claude, "Problems of analysis: some keys for my first digital works: *Little Boy* and *Mutations*," in *Analyse en Musique Electroacoustique*, eds. Françoise Barrière, Gerald Bennett. Bourges Ledex, France: Diffussion: Editions MNE MOSYNE, 1977, 360.




This subpatch contains the rules that control what the Disklavier plays after gate 2 is opened and its “on triggers” are played. In this patch, the Disklavier produces one note at a time. As the patch runs, the values of the pitch, velocity, and note length of the successive notes change. There is also a direct relationship between the time the patch runs and the possible range of pitches produced. There is an inverse relationship between time and both the pitch values and the volume. As the patch progresses, the possible note lengths are drawn from a wider range; this range includes generally greater note lengths. The patch creates a process where there is a succession of notes that generally get lower in pitch, softer in dynamic, and slower.

Below is a brief discussion of the remaining patches that are variable between performances, in order to help the performer prepare for performance with the Disklavier. Measure numbers for the patches can be found in the chart on page 68.

- In measure 48 in the score, the only information we have is “DK continues to next pf. entrance.” The algorithm for patch 7 causes the Disklavier to play 6 pitches (39, 46, 50, 72, 78, and 85). Each of these pitches is repeated several times, but they all make a ritardando at different speeds.
- In patch 8, as the piano plays an ascending scale, the Disklavier plays two simultaneous ascending gestures.
- Patch 9 creates alternating notes, where the 1st, 3rd, 5th, etc. notes will descend, while the 2nd, 4th, etc. notes will ascend.
- Patch 10 creates a 13-note ascending arpeggio that decreases in volume.
- Patch 11 waits for any note below 41, which is the low F in measure 64. This safeguard is in place in the event that the pianist misses the leap. The first algorithm in patch 11A sets up a pattern of alternating notes, as written in the score, and Patch 11B takes that pattern as the basis for an algorithm. As the algorithm for patch 11B continues, the notes begin to ascend. Also, the leaps in the “right hand” part become wider, as do the leaps in the “left hand” part.
- The algorithms for Patch13A create motives consisting of two sixteenth notes and an eighth note, based on the piano part in measure 72. The first note of each motive is random. The second note is a whole step higher than the first, and the third is a half step lower than the second.

These motives are triggered every half beat. Patch 13B creates a cluster of the lowest seven notes on the piano.

- Patch 14a creates two simultaneous series of 16th-note triplets. One series plays any Bs or C#s, while the other plays any Gs or A-flats. Patch 14b plays the same processes, but both processes get gradually slower; the B/C# process slows more gradually than the G/A-flat process. With patch 14c, the process begins to include any note on the Disklavier.
- Patch 16 causes every note from the D# trill to generate a random pitch from MIDI note numbers 65 to 108.
- Patch 18 creates sixteenth notes at the performer's tempo. A process similar to what was happening in the piano part is continued; pairs of notes are played that alternately ascend or descend. The pairs are in intervals of minor sevenths, major sevenths, minor ninths, or major ninths, and these pairs gradually descend the Disklavier.
- Patch 19 creates C#s at MIDI note numbers 73, 85, and 97. The time between attacks is a random number between 75 and 300 ms.
- Patch 20 creates a random series of clusters. Each cluster is chromatic, spans a tritone, could be found anywhere on the keyboard, and could be anywhere from 70 milliseconds to about 700 milliseconds in length. After a delay of 1 second after the triggers are played, the patch will wait for any pitch below note 85 (which will be the low D# and E in measure 129), after which the patch will wait 40 seconds before opening gate 21.

- Patch 21 is a sequence, exactly as notated in the Disklavier part in the score from measures 180 to 215. This patch listens for repetitions of note 44, the A-flats in measures 174 through 179. The patch reads the distance in time between the fifth and sixth A-flats (from beat three of measure 176 to beat one of measure 177), and sets this as the tempo of the following section. This tempo information is sent to the sequence, which is played at the same rate of speed. If the performer's tempo is greater than 75 beats/minute, the sequence will play at 75; if the performer's tempo is lower than 45, the sequence will play at 45. This provides a failsafe in the event the computer misreads the performer's tempo, or if the performer plays the passage at an unreasonable tempo.
- For every pitch played by the piano in measure 218 (patch 22), the Disklavier plays another pitch; as the notes in the piano part get faster, the notes in the Disklavier part get faster and louder; as the piano notes get slower, the Disklavier notes get slower and softer.
- Patch 23 causes the Disklavier to play F#s with random durations. Patch 23A produces pitches 66, 78, and 102, while patch 23B produces the same pitches, as well as pitches 42 and 54.
- For patch 24, the Disklavier plays random notes in the lowest octave and a half of the piano. They are played with an accelerando followed by a ritardando.
- Patches 25A and B are similar to patch 23. Patch 27A plays random F#s (54, 90, and 102). 27B plays random Fs and Gs (101, 103, 65, 55, and

43). 25C plays repeated low C#s, as notated in the score; in addition to the score's notation, they are also played with a crescendo and diminuendo.

- Patch 26 plays random repeated notes, dyads, motives, and trills at a tempo set by the performer in measures 262-263. This large-scale algorithmic process continues for 55 measures.
- The piano cadenza, starting from measure 322, is accompanied by various canons on the Disklavier. The first, as described by patch 27A, takes every note in the piano and inverts it over note 56, with a two second delay. The second canon, patch 27B at measure 327, plays the piano part an octave and a half lower than written, with a half second delay. From this canon's entrance, both canons are happening at the same time until the trills in measure 336, when the first canon drops out. Patch 28A stops in measure 340.
- The canon in patch 28 is inverted over note 64 and is delayed by 125 milliseconds. (If the performer plays the following passage at a quarter note equals 120, then this is a canon at the 16$^{th}$ note—however, in the score the composer indicates the passage should be played "as fast as possible" which could be considerably faster than 120.). After the tremolo has played between 20 and 25 repetitions of note 49, patch 28 waits for notes 56, 32, 38, and 26 (A-flats and Ds in measure 376) to turn off.
- Patch 29 triggers three processes: a descending chromatic scale with decrescendo, an ascending chromatic scale with a decrescendo, and

repetitions of pitches 60 and 70, also with a decrescendo. These all occur after the “end” of the concerto.

## CONCLUSION

*Fantasies and Flourishes* is a work of great diversity that is presented in a context of unity. The composer extracts a rich palette of colors from a small set of harmonic building blocks and develops motives with a seemingly endless variety of manipulation. In addition to its importance as the first concerto for interactive Disklavier and orchestra, *Fantasies and Flourishes* possesses lyric beauty, conversational interactions, and a challenging yet rewarding Disklavier part that make it a much worthwhile piece to learn and perform.

## APPENDIX A: INTERVIEW WITH JON CHRISTOPHER NELSON

Marosek: First, I was wondering how your process of composing acoustic music is similar to your process of writing electronic music, or different?

Nelson: The process is, I would say, generally very much the same...well certainly very similar. I mean you're still essentially dealing with putting sound together in some sort of temporal domain. I like to think of composing electronic music and using the computer as just another instrument that the composer is writing for. However, having said that, it's an instrument that doesn't have the same sorts of physical constraints that help to mandate or at least limit the range of possibilities of what the instrument can do, which, on the one hand, creates all sorts of additional possibilities. On the other hand, composing with a computer can end up involving some degree of computer programming. If you use computer software that does just one little tiny thing the software can often be very easy to use as a result of the very limited set of tasks that it can perform— you don't have that many options. Alternatively, if you're working with software that is very open-ended or flexible and can do pretty much anything you want it to do then it can be difficult and unwieldy to sort out how to not only program the software but also provide your own constraints and limit it so that you can get it to do what you want to do. It can be a difficult balancing act to be able to use the computer to create sounds and perform digital signal processing tasks that are interesting and unique while not letting the software programming consume all of your time.

In reflecting on this question within the context of this particular piece, I would also like to say that my process of composing acoustic as opposed to electronic music has changed over the years. I always loved synthesizer sounds and thought that the potential of synthesizers was really intriguing and interesting. When I first began composing electronic music (in 1982), I initially began approaching writing electronic music in the exact same manner that I approached writing acoustic music, thinking of discrete pitches, note events and gestures, etc. I think that it took me a few years to sort out that maybe this pitch-centric/traditional-centric approach was perhaps too limiting and wasn't necessarily the best use of the technology. In order to create some sort of very pitch-based, note-oriented music phrases or gestures in the same way that one might think of phrases and gestures with acoustic instruments was a very complicated, difficult and arduous task to achieve through electronic means—and perhaps this was not the best use of the medium nor did it capitalize on some of the unique possibilities that electronic music offers to composers. As I have worked much more extensively in computer music I am drawn more to the possibilities that digital signal processing and sample manipulation provides for composers. I think the possibilities are perhaps better suited towards dealing with sonic transformations of material and other operations that are perhaps more timbrally based and not as focused on creating a series of pitches with discrete notes that have some emotive arch shape within them. I guess that one could say that although my initial thinking about composing computer music was very similar to my ideas about structure and form in acoustic music, these ideals have expanded to include a much more broad repertoire of

electronic tools and techniques that are not possible in the acoustic domain. Having said this, I would still contend that the actual compositional process is still the same.

Although I would think compositionally in the same way, it took a long time for me to begin to try to sort out how to combine two incredibly different sets of compositional techniques.

Marosek: Well, even early electronic instruments were, sort of, doing the same thing.

Nelson: You mean trying to model an acoustic instrument?

Marosek: Yes, trying to imitate an acoustic instrument. But, I guess in this particular piece, none of the signal processing was available, so we're stuck with pitches, and I'm curious as to how writing the Disklavier and the interactive part could be reconciled with writing for the orchestra and writing for the piano part itself. Are they layered, completely separate, or do you find that you're thinking about them similarly?

Nelson: I find that for this particular piece I was thinking about them similarly. In my other electroacoustic works I would say the vast majority of what I do with the electronic music and my primary interests have been fixed media, whether it's multi-channel tape, two-channel tape, audio that goes with video, something that's set. Almost all of my other works that incorporate acoustic instruments with the electronics are works that have a tape that's being played back and the instrumentalist is expected to know the tape part well enough that they can follow along at the same time. These works are all

composed using different tricks that I incorporate in order to hopefully allow the performer enough flexibility so that they could get a little bit ahead, a little bit behind, and then at certain points be able to get synchronized again and have it all sound somewhat fluid. With a little luck it hopefully even sounds somewhat spontaneous and not all fixed. But *Fantasies and Flourishes* is different because it incorporates MIDI and the electronics are driving an acoustic instrument, so in terms of my thinking about this piece, it's a bit different, there are different constraints.

On the one hand you've got the same sort of physical constraints with the instrument so I know that electronically I'm only going to be able to create sound that is acoustic sound, so that creates one set of constraints that makes it much more akin to just writing an acoustic piece. This also creates constraints that are markedly different than the constraints of manipulating sound via digital signal processing for a fixed media piece. Now, in terms of writing the piece and in terms of thinking about how to compose something that incorporates this instrument that has these possibilities, then I also had another whole set of constraints which primarily includes Max, which was in its pre-MSP days before the personal computers were even fast enough to process and generate real-time digital audio. I also had to deal with the computer being able to analyze the MIDI information that was being generated by the piano and also understand that there is going to be at least a minimal delay time before the computer can respond and do something else. So, I was certainly very aware of those constraints while I was in the process of composing the piece, but it's really an acoustic piece so I would say my thinking for this piece is probably more firmly rooted in the acoustic domain than my other electroacoustic pieces.

Even so, this work does exhibit some of the same sorts of preoccupations that I have in some other compositions for instrument and tape. In a piece of mine for cello and tape, for example, I was very interested in utilizing a bunch of sampled cello sounds so that I could then manipulate those cello sounds and create aural illusions in which the listener might wonder 'Is that the tape that's sounding or is that the live performer?' You can play this sort of trick a little bit with the Disklavier, where you can play a whole bunch of notes and hopefully have the listener not quite know 'Is that the performer really playing all those notes, or is that the mechanical instrument doing some of it, or is it just the mechanical instrument doing all of it?' In this work, I can play a little bit with that fuzzy relationship but not quite to the same extent. I can't take a piano timbre and then transform it, when I'm limited to using MIDI and limiting to having that control an acoustic instrument that again has acoustic limitations and or possibilities.

Marosek: I guess this maybe gets a little bit into the fourth question; maybe we'll skip ahead to that. In his lecture at the University of North Texas, Miller Puckette discussed the dangers of using his own program because he said it can perhaps lead composers in certain compositional directions, and he was really worried that composers were making compositional choices because his program sort of forced them into those boxes. I was wondering if you found the program limiting, and (what I guess you just said was that you found it limiting in a good way, maybe) and how did Max influence your compositional choices for this piece?

Nelson: Any computer program is going to be limiting, so whether I'm using Max, Max/MSP, Csound, Soundhack, ProTools for mixing, etc., any software is going to have clearly defined possibilities and constraint. However, I don't see that as being that much different than approaching an acoustic composition and saying 'Ok, I'm going to write this piece for string quartet (certain acoustic and physical constraints and possibilities) and it will be based upon a collection of six septachords that all exhibit the same interval vectors (another set of limitations and possibilities) and it will fit into a strange cross between a rondo and sonata form (yet another set of constraints). Or perhaps you decide that you will compose a 12-tone piece, or a work that's in a romantic style using highly chromatic yet tonal harmonic language. I think anytime we're composing a piece, in order to create something that is consistent and coherent, we have to create some sort of limits and parameters within which we're going to work. Even if you're John Zorn and writing cartoon music in which the parameters within which you're working mandate that you change stylistic ideas as frequently as possible and create as many interruptions as possible, this still creates a consistent unifying element (in this case, the consistent element is the dramatic stylistic and temporal inconsistencies) that enables the listener to hear all these interruptions within the larger context and somehow make sense of it all because there's a certain consistency of inconsistency; to some this may seem like a bizarre way of thinking about compositional constraints but I think it makes sense to me in the way I understand things and can attempt to intuit and perceive music. So, if I'm writing a piece that is for the flute I've got certain constraints: certain things it can do, things it can't do. If I'm writing an interactive Disklavier concerto that incorporates Max to handle the MIDI there are certain things it

can do and certain things it can't do. So, yes, this influences the set of possibilities and the sets of choices that I'm going to make but at the same time it's a flexible enough language that I can obtain the results I desire. Certainly, MAX provides a multitude of possibilities. Within that larger set of possibilities of the programming language I then narrow down my choices into a more consistent set of possibilities that in my mind worked well with the other sort of theoretical constraints that I had set up for the acoustic portion of the work. So yes the programming environment is limiting, yes there are certain possibilities, and when one works with any programming language for a certain period of time I think that you can't help but be influenced by the tools that you're using. Nonetheless, most of us (hopefully) are at least aware of what the constraints are and then can push the boundaries as we explore the possibilities, working within those constraints to still create music. So I don't share Miller's concern. I don't worry about this and am convinced that my compositional voice still shines through regardless of the programming (or other) constraints. Having said this, the process of composing anything with any software inevitably will create roadblocks that you run up against and prompt you to say 'I wish I could have done this or that.'

Marosek: I think the phrase he used was 'mind control' talking about computer programs that can lock you into a certain way of thinking...it's very strange...

Nelson: Well, it's in a way very true. But the same question has to be asked regarding other audio programming languages like Csound or SuperCollider. One can even extend the same question to writing for the oboe, for example. Although these all

exhibit differences I don't think I would go so far as to say that they provide a form of mind control. I would, however, say that it is the job of composers to know what the possibilities and the limitations are, and then depending upon what I want to do, use the tool that best meets my needs and desires for what I want to compose and what I want to achieve as an end result. So, you can think of it as putting yourself in a box, but I like to think of it more as asking the question, 'what can I do with this box that might be different that might not have been done before or that someone maybe hasn't thought of?' I think that whenever we're composing anything we have certain constraints that we try to work within and we're trying to express ourselves despite those constraints and sometimes we can put incredible constraints on ourselves but still come up with something that uniquely sounds true to yourself. Just as sort of a case and point, Donald Martino's has composed a couple of piano pieces that are 12-tone compositions but there are several passages that sound just like Chopin. This can help to demonstrate that you can work within your systems while seeing just how far you can take them to do something unexpected or unique. I think that most composers often try to see how far they can push their various constraints to bend the perverbial precompositional box that they have created for themselves. I'm not sure that I do this so much with Max in this particular work since it was my first interactive composition other than a collaborative gallery installation and I had very little time to do the actual programming (close to all of the Max programming took place in the short span of an intensive sleepless week). For better or worse, what I could do easily with Max influenced some my compositional choices.

Marosek: I didn't know that this was your first interactive Max composition.

Nelson: Well, I had dabbled with Max, and done some little projects but I hadn't actually written a piece that used the software prior to *Fantasies and Flourishes*. So, you throw all those different things into a box and then realize that I found myself with one week before the rehearsals and still had not done the programming, or at least not done the majority of the programming, then it does create perhaps a bit more of a limited set of constraints...

Marosek: But I assume you had a general idea of what you wanted the Disklavier to do in those passages...

Nelson: Yes, I knew enough about what Max could do so I had a very good idea of what I wanted to have occur in the Disklavier part and how it would be triggered by the performer.

Marosek: Should I assume the rest of the piece was constructed and parts were written and everything and there were just these parts missing for the Disklavier?

Nelson: I can explain the process a little bit. I had the great luxury of getting a Guggenheim Fellowship and so I spent the first seven months of that fellowship in Sweden working in their national electronic music studios in Stockholm where I

composed a piece for voice and tape called *They Wash Their Ambassadors in Citrus and Fennel* for Joan LaBarbara. While I was working on that piece it consumed most of my time. However, on the subway rides to and from the studios I spent most of my time sketching the Disklavier concerto. I also spent a certain amount of time learning Max beginning in 1989-90 and immersed myself in Max while I was in Sweden in 1994 since I also worked extensively with Max for the piece for Joan LaBarbara. For this work I used Max to generate lots of score data to drive granular synthesis Csound instruments. I was using Max as a front end to generate a bunch of text data that could then be used in Csound to granulate these sound files. So I was working fairly extensively in Max and figuring out what the possibilities were in terms of MIDI manipulation while I was composing the acoustic score. I was, I think, cognizant of what the possibilities were with Max, or at least some of the possibilities that I had discovered at that point and time. While I was composing I would also jot down rather elaborate notes to myself about what I would have the Disklavier do or the various algorithms I would create. Then once I had returned from Sweden I had from January until May to finish composing the piece. Creating the score and parts took me until one week before the first rehearsal so then I faced the unforgiving task of writing all of the Max code in one week.

Marosek: This was of ’94, ’95?

Nelson: 1995—so when I returned from Sweden in January I did develop the Max patches that were used to generate the algorithmic section of the orchestral portion of

the piece, so it's maybe not entirely reasonable or fair to say that I programmed the whole composition in a week. Nonetheless, actually sitting down and programming all of the interactive Disklavier algorithm was done in a week---one very long week with far too little sleep.

Marosek: I would like to continue the discussion with more about the electronics, then. How aware were you of other interactive Disklavier music, in particular the music of Jean-Claude Risset, prior to writing *Fantasies and Flourishes*? I mean, clearly he's the one who sort of started this whole thing.

Nelson: I was technical assistant for Jean-Claude Risset when he was at MIT working on a commission. I was involved, however, with him primarily to provide feedback for him regarding Csound, though for his commission he ended up writing one of his Disklavier works.

Marosek: Was this the *Eight Prelude*s?

Nelson: Yes, his first Disklavier work. He came to MIT on several different occasions and while he was working on his Disklavier work I was not directly involved in that composition. My involvement was very ancillary and I only met with him about half a dozen times to provide feedback on some different Csound things that he was working with. As a result, I didn't really deal with the Max side of things with him at all.

Marosek: So, Scott Van Duyne was working with him...

Nelson: Yes. At that time I knew what Max was and had played with some of the pre-release versions of the software, but I wasn't that interested in working with MIDI at that time. I think I still have the pre-release, early Beta versions of Max somewhere...

Marosek: Patcher, it was called, I think...

Nelson: Yes. So I knew that Jean-Claude was working on the Disklavier work. I heard the premiere performances at MIT and found the work to be really interesting. At that point and time was not that really that interested in writing for Disklavier myself because I thought it would be impractical since I would not have access to the instrument. Later, when I had become more interested and wanted to compose something for the Disklavier I did get in touch with Jean-Claude and managed to get this set of patches called DKompose that he had been designed for the Disklavier with the assistance of Scott Van Duyne. Returning to your original question, I was familiar with the Risset pieces, had heard them on several occasions and they were influential in the way I was thinking about what one might be able to do with these instruments. I think I had also heard several pieces by other composers that included the Disklavier since there was quite a bit of interest in the instrument in the computer music community.

Marosek: And did you check out any of the Max patches or the scores...

Nelson: No, I didn't see the scores or the specific patches for them, just the DKompose collection of patches that helped to interface Max with the Disklavier. The patches helped resolve some of the timing delays that one encountered when using the Disklavier in an interactive capacity.

Marosek: So your Max patches are totally your own usage of the program?

Nelson: Yes, though I do use several of the DKompose objects in the patch to help facilitiate the patch performance with the Disklavier.

Marosek: But you didn't look at the structures of the Risset composition patches.

Nelson: No. In addition to the DKompose patches I also looked a bit at Karlheinz Essl's RTC (Real Time Composition) collection of Max patches. This is a series of objects that he wrote in Max that were specifically designed to provide algorithmic composition tools. I utilized several of those patches as well, just because it was a lot quicker and simpler than building my own patches that would do the same thing. This highlights one nice thing about the Max community, which is that many Max programmers make their patches available for others to use. This helps creative artists to get more done when they do not have to reinvent the wheel each time they use a programming language such as Max.

Marosek: I want to move now to the all-interval tetrachords and Elliott Carter's influence. You mentioned that Elliott Carter is an influence on this work, and in particular his *A Symphony of Three Orchestras*. What about that particular work interested you, and how did this influence the composition of *Fantasies and Flourishes*?

Nelson: Well I find *A Symphony of Three Orchestras* to be a very beautiful, lyric kind of a piece and in my own music I think of myself as having more lyric tendencies. I have been drawn to singing lines, even though admittedly my sense of a singing line might not fit into a traditional sense of melody that everyone else considers to be lyric.

Marosek: Of course. There's the trumpet solo and the cello solo...

Nelson: Precisely. My use of the trumpet solo is very much a nod of acknowledgement to the trumpet solo at the beginning of *A Symphony of Three Orchestras*. In terms of dealing with a large symphonic kind of a texture, I'm particularly drawn to this work of Carter's. I find it to be an incredibly beautiful piece. I had also spent a lot of time immersed in Elliott Carter's *Penthode*, and had done some fairly intensive analysis of some of his chamber music.

Marosek: In particular?

Nelson: *Enchanted Preludes* and *Riconnascenza* and a number of other Carter pieces. He has a collection of three short orchestral works that were written for three different

occasions, they're just grouped together, and one of them features a trombone solo that's a fairly short piece but quite lovely trombone solo. Anyway, I was very familiar with a lot of his music. Having spent time looking at *Penthode*, I was very much intrigued by the way he dealt with both temporal matters as well as harmonic issues. So, in terms of vertical sonorities I was looking at his twelve-tone all-interval symmetrical chords, was examining the manner in which he would utilize intervals as motivic constraints, and also looking at different harmonic constraints that he uses in a linear fashion as well. So, in terms of how this influenced *Fantasies and Flourishes* I would say that all my research in Carter and all my analyses of his various pieces influenced the way I was thinking about this piece. I wanted to see what I could do in terms of integrating some of these all-interval twelve-tone harmonies in my own music but more than that I also became intrigued with Carter's longstanding interest in the two all-interval tetrachords. I wanted to use those two and look at all the different possible ways I could combine those two chords, either with themselves or with each other to create octachords in an effort to come up with a defining harmonic palette that I was going to work with. On the one hand I was influenced by him but I didn't want to do exactly the same thing, of course...

Marosek: Sure, well Carter will sometimes go systematically through the material he's using--hexachords, octachords, etc.— through the first, the second, the third through a piece. Now do you do anything that systematic?

Nelson: No,... Well, there's a bunch of things that I was trying to explore and trying to work with within this piece. One was that I had written one other orchestral work, sort of a little overture of sorts prior to this, and I wasn't really happy with the way I had written it. It didn't feel terrible practical to me. There were many aspects of the piece that I liked but other aspects of it that I thought were not as successful as I would have liked, so I really wanted to see if I could do what I would think of myself as a better job of writing for the orchestra, to write something that could be performed with not too many rehearsals but at the same time was going to get the results that I was looking for. Actually I had also written several chamber orchestra pieces before this as well and both of them were technically challenging in ways that are almost insurmountable for an orchestra to overcome. It is unfortunate that there is not an infinite amount of rehearsal time. I was trying to look more realistically in the world in which we live and sort out how to address those concerns and still come up with an orchestral work that I was very comfortable with. I was very intrigued by a lot Carter's ideas, but at this point in time I was feeling more like I wanted to move on and explore other things, so in a way this is a nod and a wave goodbye to Carter. Although I had been intrigued by twelve-tone all-interval symmetrical chords in some of my music prior to this work, this piece provided me with an opportunity to look more closely at these octachords that were generated by these all-interval tetrachords. Once I generated this harmonic material that I wanted to work with and created this set, then I spent a fair bit of time analyzing what the possibilities were, looking at these constraints, trying to determine how I could use these to structure things and then I would select certain octachords that I would utilize in certain sections as a means of providing a slightly different harmonic language in what I

perceive of as being different sections of the piece. Even though it's all still very highly related and integrated, I wanted to have things that would provide demarcation, provide a possibility of perhaps greater contrast than something that is what you might get with a succession of twelve-tone all-interval chords where you've got every single pitch and a register that's exactly the same even though it's moving around between different bottom and top pitches. Those Carteresque harmonies just felt a little less colorful than what I was looking for in this piece.

Marosek: Is there any significance to the particular hexachords that you chose?

Nelson: Well, it's primarily octachords and then the hexachords would be subsets of those octachords, so basically the octachords are the primary building blocks of the composition, which are themselves derived from an even more primary base of the two all-interval tetrachords. The octachords create a sort of meta-family of octachords. At this point in time I was interested in looking at the various ways that one could still have chromatic saturation in pieces and cycle through all twelve pitch classes on a fairly regular basis. So I was still very intrigued by set theoretical kinds of concerns, and in a way, some vestiges of twelve-tone concerns that I had worked with a lot in graduate school. So, in looking at subsets of these octachords, it makes a great deal of sense to look at hexachords, when it's possible to have hexachords that are combinatorial with other hexachords so you can have complimentary hexachords to assist in creating 12-tone saturation. At the same time, everything still emanated from these primary octachords and tetrachords.

Marosek: So are there large sections of the work that are only working within particular octachords then?

Nelson: Yes, and I think you might have copies of some of the sketches that show how they were implemented.

Marosek: I have those right here. The sketches?

Nelson: Yes, if you have your copy handy it will be easier than my digging around to find mine.

Marosek: Let's look a bit at the cello solo…

Nelson: If you are looking at the cello solo every so often you'll see material that appears to be hexachordally based. If I recall correctly, I think that the solo line might be a series of hexachords, many of which create octachords when they overlap with adjacent pitches from the preceding and following hexachords.

Marosek: And how about the first page of the sort of short score?

Nelson: Yes, I think that this sketch would be one of the subway sketches. At various points and times in these sketches you'll see different octachords written above the music…

Marosek: Like each of the three piano gestures...

Nelson: Yes, each of these three gestures has it's own octachord. This is my way of presenting preliminary material, and I wouldn't even be surprised if this might also introduce the order in which I'm presenting these different octachords in different sections of the piece. I may still be able to find some sketches I have that included a listing of the different octachords for the different sections.

Marosek: This (written sketches) is earlier than this (short score), I believe, I mean this is very preliminary. Some of this isn't even that accurate to the final score.

Nelson: Well, I think somewhere buried in my files I might have a precompositional sketch that did actually kind of go through and provide an outline of all the different octachords that I was using through the various sections of the work. As a result, I'm not sure if this sketch is one in which I was working out the octachords, or if these little annotated numbers—one, two, three, four, five, six, seven—actually have a direct correlation with a different section of the …

Marosek: We're looking at the pages that have all of the different hexachords written out, hand-written.

Nelson: This may just be some of my preliminary, precompositional work in determining what the different hexachordal possibilities are within these octachords. Nonetheless, some of the clues are here in this initial, very rough first draft of a short score. Throughout this sketch you can find different little octachords or hexachords jotted down. There are probably enough of these notes to enable you to trace the octachord use though the composition.

Marosek: I think that brings up a difficult question for me, which is finding how the compositional process of using octachords relates sort of on the back end to what you hear and what you perceive, and how you analyze the piece.

Nelson: I think there might be some people like Milton Babbitt who would actually be able to hear what octachords you were working with and hear all the pitch relations that you're constructing. I don't have the good fortune (or the curse) to have perfect pitch. I think playing the trumpet, a B-flat instrument, was bound to mess that up for me at an early age. Nonetheless, as I'm composing I'm fairly cognizant of what types of pitch structures and relationships I'm trying to create. I am also careful in terms of selecting different octachords or different hexachords for different sections of the piece. I suspect that I had put things together in certain families where they would have shared interval vectors for example, where you've got the same intervallic possibilities, and other

sections that might have other different intervallic possibilities. In this manner I might select hexachords that have interval vectors that emphasize minor seconds and major sevenths in a specific section of the work.

Marosek: Are you referring to a specific section of the work now?

Nelson: No, this is just an example. Since I wrote this composition more than ten years ago, I no longer recall the exact details of different sections without going back and reviewing the score and my sketches. There might be sections of the piece that emphasize more chromatic sets and others which emphasize more pseudo-tonal sorts of intervals. So, I do tend to structure things in that kind of a way where I'll look at interval vectors, evaluating the different possibilities for the chords, then I'll try to capitalize on those, and try to emphasize those, so that for a certain section, you might hear more of a couple of different intervals than you might hear in another section. This provides one example of a way that I utilize this sort of background structure to try and create foreground material, whether it's obvious to a listener or not. In this way I provide some sort of a harmonic frame, if you will, for working within. I also use similar devices that have an equal impact on motivic design. Finally, I'm also very interested in voice leading aspects in my music. I feel as though I'm influenced by a sense of lyricism in which I tend to think about melodic design and phrase structure in very specific linear registral terms. I try to create voice leading connections both when working with harmony and melody, hopefully creating clear and obvious relationships that help a listener understand the formal structure. For example, I might compose sections in

which some of the primary melodic pitches might include an E-flat moving to a D, whether the notes are adjacent to each other or separated by a longer temporal span. I try to set up those sorts of structures and relationships so that even if someone is not able to listen for the exact sets that are being played, one hopefully hears that there is some sort of linear connection between melodic and harmonic ideas that create a more local sense of structure, cadence, closure, or imbalance. Once you set up a series of expectations then it's also possible to then deny that expectation so that it sounds as though it didn't cadence when you thought that it was going to. In this manner it is possible to create the post-tonal equivalent to a full, half, or deceptive cadence. However, a post-tonal syntax provides a much more infinite variety of degrees of closure…

Marosek: And it's different for every piece, possibly...

Nelson: Yes. Each post-tonal composition can essentially establish its own syntactical structure. However, I suspect that many composers remain somewhat consistent in their syntactical approach from one composition to another, and this may be one component of establishing a composer's style.

Marosek: In your sketches for the concerto there's an attempt to devise a rhythmic system based on the hexachords. I was just wondering is that something that you actually used? Moreover, since it looked like you had a few different plans, I wonder which, if any, of these rhythmic systems you might have used.

Nelson: Although I cannot recall exactly, I suspect that that I probably didn't utilize these rhythmic sets in any sort of structured way with the exception of the longer algorithmic section. I've been intrigued by rhythmic devices like that and find them kind of fascinating and interesting on a certain level. I enjoy looking at how composers like Babbitt or Messiaen have used rhythmic series, for example, but I'm not entirely convinced that I want to incorporate them in my own music. I don't feel that terribly compelled by the rhythmic structures that one can create with this sort of system. I think rhythm is a very different kind of a beast than pitch structure and so I'm more skeptical and reluctant to utilize time point implementations of sets. I think I probably was exploring that in some of the sketches and trying to see if there was some way I could make it work. If I did utilize it, it would have been very minimally and certainly not pervasive throughout the piece. I've also been the kind of person where the temporal unfolding of a composition is something that I've not been able to relegate to a system. It seems somehow for me something that's much more personal and intuitive. Perhaps I'm so programmed to what one might think of as more traditional ways of thinking about the rhythmic structure and the ways in which rhythmic structure can be emotive that I find it difficult to try to come up with algorithms that express the way I think about rhythmic structure, what I want to express with rhythmic structure, or possibly even with the way that I understand rhythm. I don't think I can address these matters in a set theoretical approach.

Marosek: Ok. Is it something you can explain, though, even apart from some kind of set rules, or is it something that's so intuitive that you feel that this just needs to be heard?

Nelson: That is a tough question. I don't know. It is so intrinsically related to the way I understand phrase structure and formal design. I think to try to bring it down to a level of dealing with it in a set theoretical fashion may create too narrow a set of possibilities and too few possible rhythmic configurations to really be useful or meaningful. For me, a set theoretical approach to structuring rhythm has always had the roadblock of determining whether the system should be applied to durations of notes or attack points. If you're dealing with attack points then how do you deal with rests in between since these can dramatically influence the way we hear and understand the rhythms? We don't simply listen to when a note begins. For me, four notes that share the same attack point create completely different rhythmic structures if the notes are all long notes in one figure and half of them are short notes in another figure.

I think that rhythm seems to have several different facets or attributes that impact our understanding of the musical structure. In my mind it is almost impossible to disentangle duration and attack point, not to mention the different sorts of articulations for both attacks and releases that influence how we understand rhythm. As a result, I tend to approach crafting rhythmic structures on a much more personal and intuitive level. A number of composers have worked with utilizing sets to control rhythm, articulation, and virtually every aspect of the music and have done so in a fairly effective manner. However, I have not felt compelled to work in this direction in my own music.

Marosek: Ok. What would you like for a listener to take with them after a performance of *Fantasies and Flourishes*?

Nelson: Well, I hope that they would think 'Wow, that was a great pianist,' and 'Wow, that was really bizarre, how did they get all those notes coming out of the piano?' On one level, I hope that a listener might respond to some basic or banal level of excitement in the composition.

Marosek: Like a concerto.

Nelson: Yes, hopefully they would find it intriguing for those reasons. I would also hope that an audience would also find it to be a colorful piece and think that there were some beautiful melodies in it. Since the melodies are through-composed and contain somewhat complex rhythmic structures, I would not anticipate that they would be whistling them on their ride home in the car, but hopefully they'd find it to be something that they enjoyed and found some intrinsic value in listening to the piece. I would also hope that some people find it to be beautiful and energetic.

Marosek: Great. Is there anything else that we've missed, or is there anything else you'd think that it would be useful to know about the composition of this concerto, or is there another place that you'd like to take this conversation to help elucidate some of the things that you were thinking about when writing this piece, and some of the things that you were trying to get across in this piece?

Nelson: Well, perhaps I should mention a little bit about the whole algorithmic section of the work. This section was a bit of an anomaly for me and it ties in with some of your questions that you've asked about rhythmic structure. In this section, the Disklavier music is being algorithmically generated on the fly, and the orchestral part is also something that was algorithmically generated. Although I have never been drawn to algorithmic music in a serious manner, I did find it somewhat fascinating. In a lot of my electronic music I use algorithmic devices to create a microscopic structure for granular synthesis paradigms. In *Fantasies and Flourishes* I also use a number of algorithmic devices to create the Disklavier music on a local level. As a result, I thought that it might be particularly appropriate for me to work to create a longer span of music that was entirely algorithmically generated to see if I could successfully integrate an algorithmic section within this larger composition. I wanted to see if I could find an algorithmic model that I could feel comfortable utilizing and remain happy with the final result. It was a really interesting process to try to come up with algorithms that try to speak to the way that I hear things and tried to address some of the ways in which I would want to compose algorithmically if I was choosing to do so. In other words, I tried to evaluate the devices and tools that I use in my composing to see if I could define these and reduce them to algorithms that could be expressed in computer code. This was a very interesting process for me and hopefully the result provided a section that remained consistent relative to the rest of the composition and was also musically compelling. I did not want to end up with something that somehow sounded non-musical, mechanical, or whatever other pejorative term one hears people use to

describe algorithmic music. From my perspective I felt pleased with the result and am hopeful that the audience also feels the same way.

Returning to the question of whether or not I used any systems to apply to my rhythms in this work, that the algorithmic section does incorporate four different rhythm generators:

1) a generator that would create repeated dyads—simply two-note chords that would repeat a certain number of times
2) a trill generator
3) a repeated note generator—the number of note repetitions was determined randomly with weighted possible values changing as the section progressed
4) a melodic generator that would generate melodies that had a range of four to eight notes with rhythms randomly selected from a weighted set of rhythmic durations— the number of notes possible would change throughout the span of the section as it unfolded

For the melodic generator, there were up to eight notes in a gesture, as you might be able to predict since I was dealing with octachords as my primary sets. For the rhythms of each octachord I would assign a weighted rhythmic set such as four possible sixteenth notes, two possible eighth notes, one possible dotted eighth note, and one possible quarter note. As a result, if you had an eight-note melody, somewhere in that little eight-note melody there would be a quarter note, a dotted eighth, two eighths, and four sixteenths, but the order would be different depending upon what was being selected randomly be the computer. This provides you with one example of an instance in which I used algorithmically generated rhythms, but this deviates from the sketches

we looked at previously. In other words, there is no direct correlation between the rhythms that were derived directly from the octachords or the tetrachords.

Marosek: Ok. But it does kind of pull different aspects of the whole piece together…

Nelson: Yes. For the algorithmically generated materials I would have come up with more sophisticated algorithms if I had enjoyed the luxury of more time to do so. Some of my ideas are not that difficult to implement but I just didn't have time and possibly didn't have the Max experience. Ideally, I would have wanted the motive generator communicating with all the other generators (dyads, trills, repeated notes), to make sure that I was not creating octaves and possibly to work toward creating aggregate sets. So I could have made it perhaps a more set theoretical and comprehensive algorithmic model. I suppose I also could have probably fed in the orchestral score data to ensure that the Disklavier notes also fit well into the theoretical framework of the orchestral pitches that were sounding. This sort of model would have more accurately reflected some of the ways in which I thought about pitch materials at this point. Although I had spent a number of years trying to avoid octaves in my music so that I could use motion through register and octave transfer from a pitch class to create a sense of motion and formal structure, in writing an orchestral piece I wanted to incorporate octaves to help reinforce certain pitches or to provide coloristic touches.

Marosek: Like in the cello solo this happened, in the sketch you have these circled.

Nelson: Yes.  Although I think that most of the cello line is simply doubled at the unison there are other spots I am using octaves. In a way, I suspect that I may still be trying to reconcile my relationship to octaves relative to my background that is steeped in twelve-tone theory and high modernist ways of thinking about octaves.

# *Fantasies and Flourishes*

an Interactive Disklavier Concerto
by Jon Christopher Nelson

**FORMAL STRUCTURE:**

**Introduction**—tripartite structure
orchestral entrance—establishes the harmonic palette
trumpet solo—lyric melody
Disklavier entrance—three ascending passages

**A**—long, lyric violoncello line punctuated by percussive articulations

**Interlude**—alternates between fast and static material

**B**—slow Disklavier solo with resonating string section

**Interlude**—metallic percussion, string harmonic glissandi, stopped Disklavier notes, and Disklavier harmonics

**C**—fast, percussive material with Disklavier improvisations*

**Cadenza**—multiple canons of virtuosic material

**Coda**—provides closure by creating references to previous material and returning to important harmonic areas

*Much of the Disklavier and orchestral music is algorithmically derived in this section. In order to maintain a high level of integration between the Disklavier and orchestra, algorithms which are similar to those that generate the Disklavier material during a live performance were used to generate the orchestral score in this section. The algorithms include dyad generators, repeated note generators, trill generators, and motive generators.

Precompositional Notes/Ideas

—Base the entire work on the two all-interval tetrachords [0,1,4,6] and [0,1,3,7]

—These tetrachords generate the following octachord supersets:

Four octachords can be generated by combining [0,1,4,6] and [0,1,3,7]

1) [0,1,2,3,4,5,6,9] 5) [0,1,3,4,5,7,8,t]

6) [0,1,2,4,6,7,8,t] 7) [0,1,3,4,6,7,9,t]

Two octachords can be generated by combining either [0,1,4,6] and [0,1,4,6] or [0,1,3,7] and [0,1,3,7]

2) [0,2,3,4,5,6,7,9] 4) [0,1,2,3,6,7,8,9]

One octachord can be generated by combining [0,1,4,6] with itself

3) [0,1,3,4,5,6,8,9]

—Placed in ascending normal order the chords are as follows (with the complementary tetrachords to the right of the octachords):

| | | |
|---|---|---|
| 1) | [0,1,2,3,4,5,6,9] | [0,1,3,4] |
| 2) | [0,2,3,4,5,6,7,9] | [0,2,3,5] |
| 3) | [0,1,3,4,5,6,8,9] | [0,3,4,7] |
| 4) | [0,1,2,3,6,7,8,9] | [0,1,6,7] |
| 5) | [0,1,3,4,5,7,8,t] | [0,3,5,8] |
| 6) | [0,1,2,4,6,7,8,t] | [0,2,6,8] |
| 7) | [0,1,3,4,6,7,9,t] | [0,3,6,9] |

—The following 39 hexachords which contain either [0,1,4,6] or [0,1,3,7] can be extrapolated from the octachord supersets. The notes following the hexachords indicate the complementary hexachord (CxI=combinatorial by inversion) and the octachord number and the tetrachord it contains (a=[0,1,4,6], b=[0,1,3,7], and a hexachord number without a or b indicates that both tetrachords are found within the hexachord):

| # | hexachord | compl. | octa/tetra | # | hexachord | compl. | octa/tetra |
|---|---|---|---|---|---|---|---|
| s1 | [0,1,2,3,4,6] | CxI | 1a, 2a | s21 | [0,1,3,5,6,8] | s32 | 5b |
| s2 | [0,1,2,3,5,6] | s4 | 1a, 3a | s22 | [0,2,3,5,6,8] | [023469] | 7 |
| s3 | [0,1,2,4,5,6] | s12 | 1a | s23 | [0,1,2,3,7,8] | s11 | 4b |
| s4 | [0,1,2,3,4,7] | s2 | 1b, 2b | s24 | [0,1,2,4,7,8] | s20 | 6 |
| s5 | [0,1,2,3,5,7] | CxI | 2 | s25 | [0,1,3,4,7,8] | s31 | 5b |
| s6 | [0,1,2,4,5,7] | s13 | 2a, 5a | s26 | [0,2,3,4,7,8] | CxI | 3a |
| s7 | [0,1,3,4,5,7] | s15 | 2b, 5b | s27 | [0,1,2,5,7,8] | CxI | 4 |
| s8 | [0,1,2,3,6,7] | CxI | 4 | s28 | [0,1,3,5,7,8] | s34 | 5b |
| s9 | [0,1,2,4,6,7] | s16 | 6 | s29 | [0,1,2,4,6,9] | s18 | 1a, 2a |
| s10 | [0,1,3,4,6,7] | [012369] | 7 | s30 | [0,1,3,4,6,9] | CxI | 1,7,3a, 2,5 |
| s11 | [0,1,2,5,6,7] | s23 | 4a | s31 | [0,1,2,5,6,9] | s25 | 1a, 3a |
| s12 | [0,1,2,3,4,8] | s3 | 1b | s32 | [0,1,2,4,7,9] | s21 | 2a, 5a |
| s13 | [0,1,2,3,5,8] | s6 | 1b | s33 | [0,1,3,4,7,9] | [013569] | 7 |
| s14 | [0,1,2,4,5,8] | CxI | 1b | s34 | [0,1,2,5,7,9] | s28 | 5a |
| s15 | [0,2,3,4,5,8] | s7 | 1b | s35 | [0,1,3,5,7,9] | CxI | 6 |
| s16 | [0,1,2,3,6,8] | s9 | 4 | s36 | [0,2,3,5,7,9] | CxI | 2b, 5b |
| s17 | [0,1,2,4,6,8] | CxI | 6 | s37 | [0,1,4,5,7,9] | CxI | 3a, 5a |
| s18 | [0,1,3,4,6,8] | s29 | 3a, 5a | s38 | [0,1,3,6,7,9] | CxI | 7, 6, 4 |
| s19 | [0,2,3,4,6,8] | CxI | 6 | s39 | [0,2,3,5,8,9] | [023679] | 7 |
| s20 | [0,1,2,5,6,8] | s24 | 4 | | | | |

The [0,1,3,6,7] pentachord contains both tetrachords

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