

Dave Soldier & Brad Garton

String Quartet #3 opus 21
with electroencephalograms or recordings

“The Essential”

after the second movement of Arnold Schoenberg's Second String Quartet

1. Sample & Hold Variation
2. Fractal Variation “Benoit meets Arnold in 5 Dimensions”
3. Fourier Transformations
4. Integral Variation
5. First Derivative Variation

June 14 2011 version

about 30 minutes

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Performance notes for “The Essential Quartet”

This piece can either be performed by a string quartet using EEG headbands that trigger previously recorded samples, or using a fifth musician as an engineer who triggers the samples. The EEG triggering is accomplished via MAX/MSP programs that Brad Garton has devised. The triggered samples are only required in the first movement, but a creative programmer can use the EEGs to trigger appropriate sounds for the other movements except for the Fractal Variation, which should be entirely live. Samples already prepared for the 1st and 3rd movement can be downloaded from my website davesoldier.com

1. *Sample & Hold*

This uses the EEGs or the prerecorded music. The sections with repeat signs are repeated at will by the players: move on when they become tedious unless you decide that tedium is actually desired. Either the EEGs or the engineer can repeat the same sections out of phase. Thus, these repeat sections can either use tracks the players have recorded previously, or one could download versions that we have already prepared.

2. *Fractal Variation*

Inspired by Benoit Mandelbrot, who passed away just before this piece was written, a fractal shows similarity and multiple scales. We took five pitches that reoccur throughout Schoenberg’s and produced a fractal pattern where the same intervals occur between each set of 5 note, every 5th note, every 25th note, and every 125th note. It should be played very quickly, and extreme changes in timbre to the taste of the performers are encouraged – do your best to make this not sound dry and predictable and to have the rapid notes sound as if they are passed from voice to voice.

3. *Fourier Transformations*

The bar graphs show each instrument’s pitches times it’s total duration times its volume. For instance if C is played for 8 beats in the 2nd movement of Schoenberg’s second, and Eb for 16 beats, and both are at the same volume, the bar is twice as high for Eb. Choose the notes at will, and use whatever sounds and effects you like, but attempt to represent them as the fractions shown, i.e., in the case above, Eb should be played twice as much as C. Don’t let it last to the point where it is tedious, unless that’s the effect you would like for your listeners. Here too, timbral changes and a thick sound are desired. Eventually, drift to your average note, which is the average of all your bars in the graph, and eventually everyone slowly slides together to the average note of the entire piece.

4. *Integral Variation*

This sums all of the pitches, and this rapidly goes beyond the range that the instruments can play, and then beyond the range of hearing. It is thus very short.

The value of the lowest note is an arbitrary constant: the reason that the cello lasts longest is that the low D is chosen as the constant, so that succeeding Ds add zeroes, and the low C makes the integral negative. Nevertheless, even starting at a very low range, the pitches inevitably climb rapidly.

5. First Derivative Variation

This uses the first derivative of each separate part. For example, if the viola plays in succession C, E, Bb below the C, the intervals are a major third up and a tritone below. If A is chosen as the pitch center, the resulting notes would be A, C# (A plus a major third), D# (A minus a tritone).

While all of the notes are from the first derivative of the original Schoenberg movement, quite a few are removed to make the piece less dense: it feels like making a sculpture of David by removing everything from the stone that isn't David.

-Brad Garton & Dave Soldier NYC April 18, 2011

String Quartet #3 "The Essential"

June 12, 2011 version

Score

after Arnold Schoenberg's 2nd Quartet, with electroencephalograms

Dave Soldier & Brad Garton

1. Sample & Hold

$\text{♩} = 70$ each repeat section is repeated at least 3 times, and more at will of 1st violinist
solo cello

Violin I

Violin II

Viola

Cello

free dynamics

mf

B

C

Vln. I

Vln. II

Vla.

Vc.

p

pp

mf

mp

tr

D

Vln. I

Vln. II

Vla.

Vc.

E

F

Musical score for measures 12-18. The score is for four staves: Vln. I, Vln. II, Vla., and Vc. The key signature is one flat (B-flat). The time signature changes from 6/4 to 3/4 to 4/4 to 2/4. Measure 12 starts with a dynamic of *pp*. Measure 13 has a dynamic of *pp*. Measure 14 has a dynamic of *f*. Measure 15 has a dynamic of *pp*. Measure 16 has a dynamic of *f*. Measure 17 has a dynamic of *pp*. Measure 18 has a dynamic of *f*. There are two vertical bar lines with repeat signs: one at the end of measure 14 and another at the end of measure 17.

Musical score for measures 19-24. The score is for four staves: Vln. I, Vln. II, Vla., and Vc. The key signature is one flat (B-flat). The time signature changes from 2/4 to 3/4 to 4/4. A tempo marking of $\text{♩} = 70_3$ is present at the beginning of measure 19. The dynamic is *mp*. Measures 19-24 feature triplet markings (3) over groups of notes.

Musical score for measures 25-28. The score is for four staves: Vln. I, Vln. II, Vla., and Vc. The key signature is one flat (B-flat). The time signature is 2/4. A tempo marking of $\text{♩} = 100$ is present at the beginning of measure 25. The dynamic is *ff*. Measures 25-28 feature dynamic markings of *ff* and *mp*. A "bounce" marking is present in measure 26. The dynamic is *mf* in measure 28.

1. Sample & Hold Variation

29

Vln. I

Vln. II

Vla.

Vc.

p

G

33

Vln. I

Vln. II

Vla.

Vc.

ff

fierce rock n' roll

H

37

Vln. I

Vln. II

Vla.

Vc.

p

mf

lyric

super sul tasto

p

p

p

43 $\underline{\underline{mf}}$ very jazzy

Vln. I mf very jazzy

Vln. II *end tasto* mf very jazzy

Vla. *end tasto* mf very jazzy

Vc. *pizz.* walking bass sound f mf

49 $\text{♩} = 60$ Nancarrow light & bouncy

Vln. I Nancarrow light & bouncy

Vln. II Nancarrow light & bouncy

Vla. Nancarrow light & bouncy

Vc. Nancarrow light & bouncy arco

I

53

Vln. I

Vln. II

Vla.

Vc.

1. Sample & Hold Variation

53

Vln. I

Vln. II

Vla.

Vc.

J

K

L

ff

ff

ff

ff

p

p

p

legno battuto

legno battuto

legno battuto

58

Vln. I

Vln. II

Vla.

Vc.

legno battuto

$\text{♩} = 60$ arco, mechanically

pizz. arco, mechanically

pizz. arco

pizz.

62

Vln. I

Vln. II

Vla.

Vc.

pizz. arco

pizz. arco

pizz. arco

pizz. arco

pizz. arco

pizz. arco

66

Vln. I *dolce*

Vln. II *pizz. arco*

Vla. *pizz. arco*

Vc. *mf*

p arco dolce

M

77

Vln. I *mp*

Vln. II *mp*

Vla. *mp*

Vc. *mf*

p

melody expressive

N

77

Vln. I *mf*

Vln. II *mf*

Vla. *mf*

Vc. *mf*

gradually to smoother texture

$\text{♩} = 100$

81

Vln. I

Vln. II

Vla.

Vc.

mp

mp

f

85

Vln. I

Vln. II

Vla.

Vc.

f

f

89

Cajun

Vln. I

Vln. II

Vla.

Vc.

Cajun

Cajun

Cajun

1. Sample & Hold Variation

94 P $\text{♩} = 116$

Vln. I
Vln. II
Vla.
Vc. pizz.

100

Vln. I pizz. arco *Singtra*
Vln. II pizz. arco
Vla. pizz. arco
Vc. arco pizz.

107

Vln. I arco
Vln. II arco
Vla. arco
Vc. pizz.

112

Vln. I

Vln. II

Vla.

Vc. arco

Q

120

Vln. I

Vln. II

Vla.

Vc. arco

R

126

Vln. I

Vln. II

Vla.

Vc. pizz.

S

T
131

Vln. I

Vln. II

Vla.

Vc.

arco

Vln. I

Vln. II

Vla.

Vc.

sfz

mf

mf

Vln. I

Vln. II

Vla.

Vc.

1. Sample & Hold Variation

$\text{♩} = \text{c. } 108$

Wayne Shorter

G.P.

146

Vln. I

Vln. II

Vla.

Vc.

stress beat 2

mp

f

stress beat 2

pizz.

Wayne Shorter

152

Vln. I

Vln. II

Vla.

Vc.

stress beat 2

sim.

159

U

W

solo cello

Vln. I

Vln. II

Vla.

Vc.

f

p \rightarrow *f*

espress.

X

167

Vln. I *mf*

Vln. II

Vla. *mf* gliss.

Vc. *mf*

175

Vln. I *mf*

Vln. II

Vla. *ff* *mf* gliss. *mf* *ff* *mf* arco mod., light sound again

Vc. *ff* *mf* *mf* gliss. *ff* *mf* arco mod., light sound again

182

Vln. I *ff* *f*

Vln. II *ff* *f*

Vla. *ff* *f*

Vc. *ff* *f*

187

Vln. I

Vln. II

Vla.

Vc.

192

Vln. I

Vln. II

Vla.

Vc.

pp

pp

pp

pp

198

Vln. I

Vln. II

Vla.

Vc.

fff

fff

fff

fff

Y miserably dramatic Vienna

pizz.

pizz.

Z keep tempo (108)

203

Vln. I *mf*

Vln. II *mf* arco pizz.

Vla. *mf* arco

Vc. *mf*

208

Vln. I *f* sim.

Vln. II

Vla. arco

Vc.

AA
273

BB ♩ = 90

Vln. I *f*

Vln. II *mf*

Vla. *mf*

Vc. *mf*

218

Vln. I

Vln. II

Vla.

Vc.

222

CC

Vln. I

Vln. II

Vla.

Vc.

226

DD

thrash, nasty pont.

Vln. I

Vln. II

Vla.

Vc.

mf *ff* *mf* *f*

230

Vln. I

Vln. II

Vla.

Vc.

235

Vln. I

Vln. II

Vla.

Vc.

240

Vln. I

Vln. II

Vla.

Vc.

pizz.

ff pizz.

ff pizz.

ff pizz.

ff

2. Fractal Variation: Arnold & Benoit in 5 Dimensions

2. Fractal Variation

Presto ♩=190 use sul tasto & ponticello at will: impromptu dynamics are encouraged

245 arco

Violin I *p* *f* *pp*

Violin II *pp* arco

Viola *pp* arco

Cello *pp* *mp*

3

Vln. I *mf*

Vln. II *f*

Vla. *f*

Vc. *f*

7

Vln. I *pp*

Vln. II *pp*

Vla. *pp* *f*

Vc. *pp* *f* *mp*

Detailed description: This image shows three systems of musical notation for a string quartet. The first system covers measures 245-266. It features Violin I with a melodic line starting at measure 245, marked 'arco'. Dynamics range from piano (*p*) to fortissimo (*f*) and pianissimo (*pp*). Violin II, Viola, and Cello provide harmonic support, with dynamics ranging from *pp* to *mp*. The second system covers measures 267-290. Violin I has a melodic line with dynamics *mf* and *f*. Violin II, Viola, and Cello have more active parts, with dynamics *f* and *pp*. The third system covers measures 291-314. Violin I has a melodic line with dynamics *pp* and *f*. Violin II, Viola, and Cello have active parts with dynamics *pp* and *f*. The overall texture is complex and dynamic.

11

Vln. I

Vln. II

Vla.

Vc.

mp

f

pp

15

Vln. I

Vln. II

Vla.

Vc.

f

pp

mf

pp

19

Vln. I

Vln. II

Vla.

Vc.

mp

pp

pp

f

23

Vln. I

Vln. II

Vla.

Vc.

mp

pp

Detailed description: This system contains measures 23 through 26. The first violin part (Vln. I) features a melodic line with a *mp* dynamic marking in measure 26. The second violin part (Vln. II) plays a similar melodic line. The viola part (Vla.) has a complex rhythmic pattern of eighth notes with a *pp* dynamic marking in measure 26. The cello part (Vc.) provides a harmonic foundation with long, sustained notes.

27

Vln. I

Vln. II

Vla.

Vc.

f

pp

Detailed description: This system contains measures 27 through 30. The first violin part (Vln. I) has a *f* dynamic marking in measure 28 and features a more active melodic line. The second violin part (Vln. II) continues with a melodic line. The viola part (Vla.) plays a steady eighth-note accompaniment. The cello part (Vc.) has a melodic line with a *pp* dynamic marking in measure 30.

31

Vln. I

Vln. II

Vla.

Vc.

pp

mf

mf

Detailed description: This system contains measures 31 through 34. The first violin part (Vln. I) has a *pp* dynamic marking in measure 32. The second violin part (Vln. II) has a melodic line. The viola part (Vla.) has a *mf* dynamic marking in measure 32 and plays a rhythmic accompaniment. The cello part (Vc.) has a *mf* dynamic marking in measure 34 and plays a rhythmic accompaniment.

35

Vln. I

Vln. II

Vla.

Vc.

pp

p

mf

39

Vln. I

Vln. II

Vla.

Vc.

ff

ppp

ppp

ff

ppp

43

Vln. I

Vln. II

Vla.

Vc.

47

Vln. I

Vln. II

Vla.

Vc.

pp

ff

51

Vln. I

Vln. II

Vla.

Vc.

f

pp

f

55

Vln. I

Vln. II

Vla.

Vc.

f

59

Vln. I

Vln. II

Vla.

Vc.

62

Vln. I

Vln. II

Vla.

Vc.

ff pizz.

ff pizz.

ff pizz.

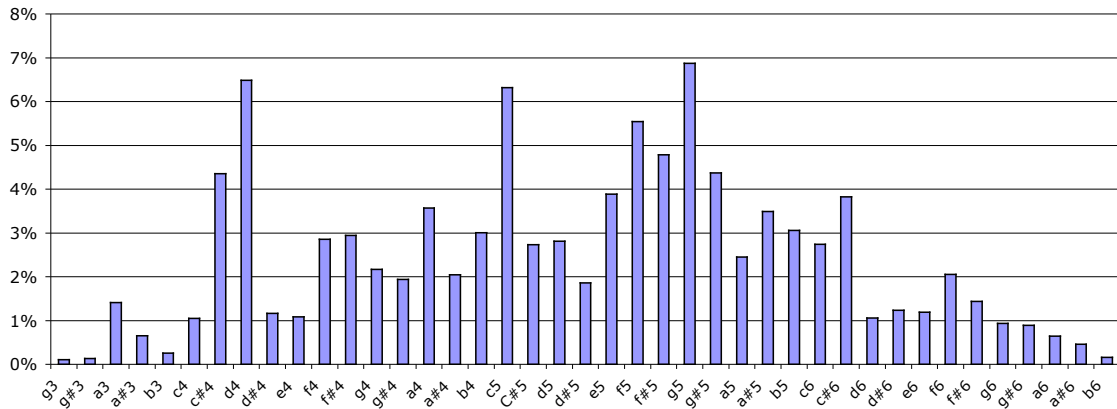
ff

3. Fourier Transformations

April 20, 2011 version

from the Essential String Quartet

VIOLIN 1 PART



Bars indicate the power (duration * volume) for each pitch in the original Schoenberg piece. C4 is middle C.

Play the amount of each pitch represented (for example, D above middle C, C above middle C, and G on top line of treble clef should be played the twice as much as notes that are around 3%). You can use double stops, different tones, and rhythms at will, but try to make a sustained sound with the entire group.

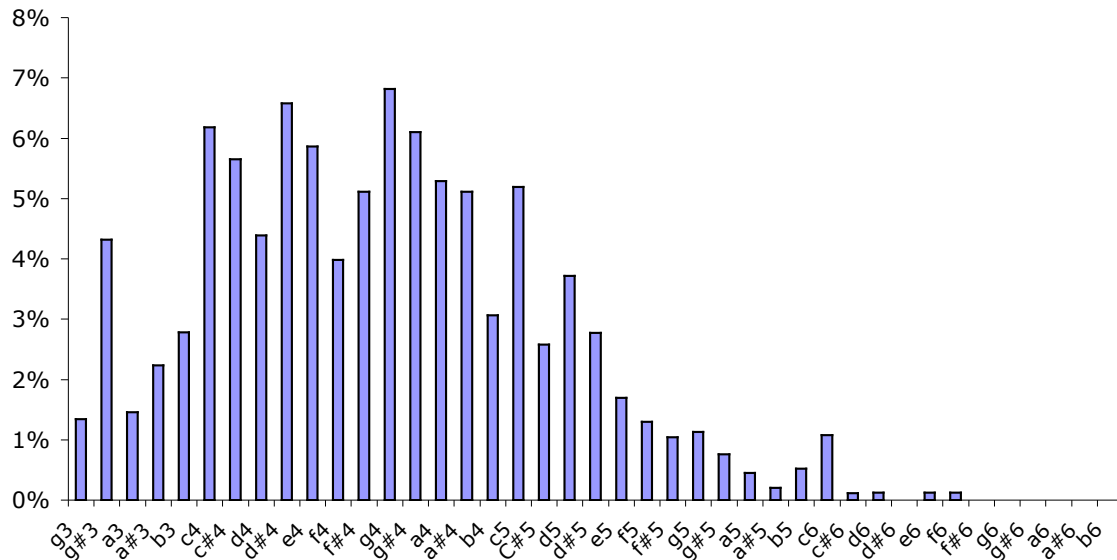
At cue 1, take 30-40 sec to slowly move the pitches closer to your average note: e5.1 (the open E string plus a tiny bit sharp)

At cue 2, take 30-40 sec to slowly move \ to the average note of the entire piece: e4.8, which is the e above middle C very sharp (almost F).

3. Fourier Transformations

April 20, 2011 version

VIOLIN 2 PART



Bars indicate the power (duration * volume) for each pitch in the original Schoenberg piece. C4 is middle C.

Play the amount of each pitch represented (for example, D above middle C, G above middle C should be played the most. You can use double stops, different tones, and rhythms at will, but try to make a sustained sound with the entire group.

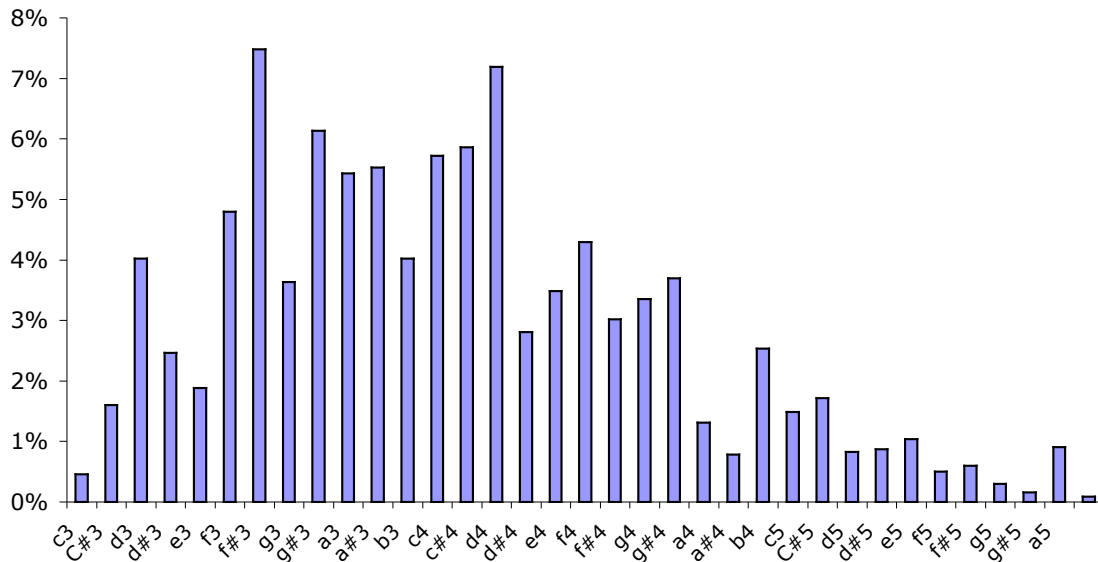
At cue 1, take 30-40 sec to slowly move the pitches closer to your average note: G#4.1 (G# below the A string a tiny bit sharp).

At cue 2, take 30-40 sec to slowly move \ to the average note of the entire piece: e4.8, which is the e above middle C very sharp (almost F).

3. Fourier Transformations

April 20, 2011 version

VIOLA PART



Bars indicate the power (duration * volume) for each pitch in the original Schoenberg piece. C4 is middle C.

Play the amount of each pitch represented (for example, F# below middle C is the loudest and most played, followed by the D above middle C). You can use double stops, different tones, and rhythms at will, but try to make a sustained sound with the entire group.

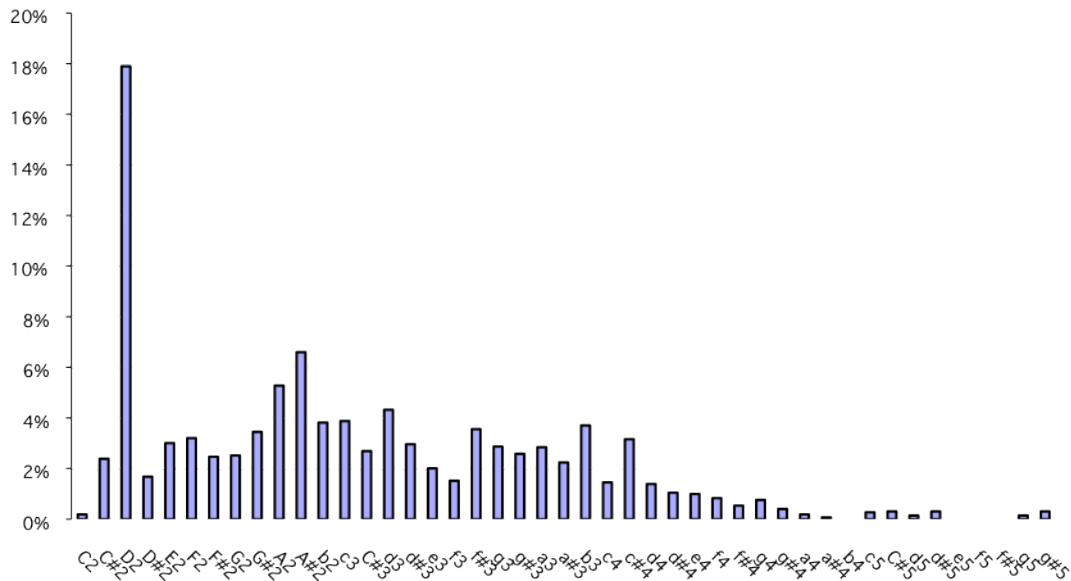
At cue 1, take 30-40 sec to slowly move the pitches closer to your average note: C#4.5, which is the C# above middle C plus a quarter tone.

At cue 2, take 30-40 sec to slowly move \ to the average note of the entire piece: e4.8, which is the e above middle C very sharp (almost F).

3. Fourier Transformations

April 20, 2011 version

CELLO PART



Bars indicate the power (duration * volume) for each pitch in the original Schoenberg piece. C4 is middle C.

Play the amount of each pitch represented (for example, D above middle C, C above middle C, and G on top line of treble clef should be played the twice as much as notes that are around 3%). You can use double stops, different tones, and rhythms at will, but try to make a sustained sound with the entire group.

At cue 1, take 30-40 sec to slowly move the pitches closer to your average note: D3.3, which is the open D string plus a 3rd tone sharp.

At cue 2, take 30-40 sec to slowly move \ to the average note of the entire piece: e4.8, which is the e above middle C very sharp (almost F).

4. Integral Variation

4. Integral Variation

64 $\text{♩} = 116$ scherzo

The musical score is divided into three systems, each with four staves: Violin I, Violin II, Viola, and Cello. The key signature is one flat (B-flat) and the time signature is 4/4. The tempo is marked 'scherzo' with a quarter note equal to 116 beats per minute. The first system starts at measure 64. In this system, Violin I and II are mostly silent, with Violin II entering in measure 68 with a melodic line. Viola and Cello play a rhythmic accompaniment. The second system starts at measure 73. Violin I and II have more active parts, with Violin I playing a melodic line and Violin II playing a rhythmic accompaniment. Viola and Cello continue their accompaniment. The third system starts at measure 81. Violin I and II are mostly silent, with Violin II playing a melodic line. Viola and Cello play a rhythmic accompaniment. The score includes various musical notations such as dynamics (mf), articulation (>), and performance instructions (pizz., 8va).

5. First Derivative Variation

5. First Derivative Variation

12 $\text{♩} = 116$

Violin I

Violin II

Viola

Cello

arco
leggiero

pp
arco

pp
leggiero

Vln. I

Vln. II

Vla.

Vc.

arco

p

mf *cresc.*

mf *cresc.*

mf *fresc.*

mf

cresc.

$\text{♩} = 70$

mp

Vln. I

Vln. II

Vla.

Vc.

mp

mp

mp

Musical score for measures 16-22. The score is arranged in four staves: Vln. I, Vln. II, Vla., and Vc. Measure 16 is marked with a rehearsal mark '16'. The key signature has one flat (Bb) and the time signature is 4/4. Dynamics include *mp* for the Viola and *f marcato* for the Violins and Cello. Performance markings include *marcato* and *accel.* (accelerando). The Vln. I part features a melodic line with a crescendo leading to a forte dynamic.

Musical score for measures 23-29. The score continues with the same four staves. Measure 23 is marked with a rehearsal mark '23'. The key signature remains Bb and the time signature is 4/4. The tempo is indicated as $\text{♩} = 80$. Dynamics are marked as *mf* (mezzo-forte) for all parts. The Vln. I part continues its melodic line, while the other instruments provide harmonic support with sustained notes and rhythmic patterns.

Musical score for measures 30-36. The score continues with the same four staves. Measure 30 is marked with a rehearsal mark '30'. The key signature changes to two flats (Bb, Eb) and the time signature is 4/4. Dynamics include *ff* (fortissimo) for the Violins and Cello, and *f* for the Viola. Performance markings include *cue* and double bar lines with repeat signs. The Vln. I part features a fast, rhythmic passage.

34

Vln. I

Vln. II

Vla.

Vc.

mf

38

Vln. I

Vln. II

Vla.

Vc.

43

Vln. I

Vln. II

Vla.

Vc.

48

Vln. I

Vln. II

Vla.

Vc.

p *mp* *mp* *p*

Detailed description: This system of music covers measures 48 to 52. It features four staves: Violin I, Violin II, Viola, and Violoncello. Violin I has a whole rest. Violin II and Viola play a melodic line starting with a half note G4, followed by quarter notes A4, B4, and C5. The Viola part includes accents and slurs. Violoncello plays a bass line with eighth notes and quarter notes, including a long slur across measures 48-50. Dynamics are marked *p* for Violin II, Viola, and Violoncello, and *mp* for the Viola in measure 51.

53

Vln. I

Vln. II

Vla.

Vc.

mp

Detailed description: This system covers measures 53 to 56. Violin I and Violin II play a melodic line with eighth and quarter notes, including slurs and accents. Viola and Violoncello provide harmonic support with quarter and eighth notes. A dynamic marking of *mp* is present for Violin I in measure 53.

57

Vln. I

Vln. II

Vla.

Vc.

pp *pp* *pp* *pp*

Detailed description: This system covers measures 57 to 60. All instruments play a melodic line with dotted quarter notes and eighth notes, featuring slurs and accents. The music concludes in measure 60 with a 2/4 time signature. Dynamics are marked *pp* for all instruments in measures 58-60.

63 $\text{♩} = 116$

Vln. I
pizz. *mp*
3
f arco

Vln. II
f
pizz.

Vla.
f
pizz.

Vc.
f
arco
mf

70

Vln. I
f pizz.
3
arco
f

Vln. II
arco
f
pizz.
f
arco
f

Vla.
mf
pizz.
f
arco

Vc.
mf
pizz.
f
arco
f

78 *cue*

Vln. I
arco
f
pizz.
f

Vln. II
pizz. arco
f
arco
f
pizz.
f

Vla.
f
pizz.
f

Vc.
f
pizz.
f

87

Vln. I pizz. arco

Vln. II pizz. arco

Vla. pizz.

Vc. pizz. arco

mf *mf* *mf*

94

Vln. I

Vln. II

Vla. arco

Vc. arco

mf *mp*

100

Vln. I

Vln. II

Vla. pizz. arco

Vc. pizz.

mp *mf*

107

Vln. I

Vln. II

Vla.

Vc.

f

114

Vln. I

Vln. II

Vla.

Vc.

f pizz. arco

f pizz.

pizz.

120

Vln. I

Vln. II

Vla.

Vc.

mf

mfco

f arco

f

5. First Derivative

126

$\text{♩} = 116$
pizz.

Vln. I *ff* *mf*

Vln. II *ff* *mf*

Vla. 3 3 3 3

Vc. 3 3 3 3 pizz. *mf*

133

Vln. I

Vln. II

Vla.

Vc.

141

arco

Vln. I *mf* *mp*

Vln. II arco *mp*

Vla.

Vc.

$\text{♩} = 80$

150

Vln. I *p* *f* *mp* arco

Vln. II *mp* arco

Vla. *mp* arco

Vc. *mp* arco

157

Vln. I *f*

Vln. II *<f* *f*

Vla. *f*

Vc. *<f*

163

Vln. I *f*

Vln. II *f*

Vla. *f*

Vc. *f*

168

Vln. I

Vln. II

Vla.

Vc.

173

Vln. I

Vln. II

Vla.

Vc.

ff a bit of nasty ponticello

some accel. to end

178

Vln. I

Vln. II

Vla.

Vc.

183

Vln. I

Vln. II

Vla.

Vc.

Detailed description: This system of music covers measures 183 to 187. It features four staves: Violin I, Violin II, Viola, and Violoncello. The key signature has one flat (B-flat). The time signature is 4/4. Measures 183-185 show active, rhythmic patterns in all parts. In measure 186, the Violin II and Viola parts have rests, while the Violin I and Violoncello parts continue. In measure 187, all parts have rests.

188

pizz.

Vln. I

Vln. II

Vla.

Vc.

Detailed description: This system of music covers measures 188 to 191. It features four staves: Violin I, Violin II, Viola, and Violoncello. The key signature has one flat (B-flat). The time signature is 4/4. Measures 188-190 show rests for all instruments. In measure 191, there is a double bar line followed by a fermata. The Violin I, Violin II, and Viola parts have a single eighth note with a 'pizz.' (pizzicato) marking. The Violoncello part has a single eighth note with a 'pizz.' marking.