

2.7 Kelvin

for three retuned, computer-driven pianos

Kyle Gann
2020

Technical Specifications

The 33-pitch tuning of the three pianos (the same in every octave) is as follows, given first in the number of cents above E-flat, and then as ratios to the nearest E-flat 1/1 below:

| Piano | 1 | | 2 | | 3 | |
|-------|------|---------|------|---------|------|---------|
| D | 1088 | 15/8 | 977 | 225/128 | 1044 | 117/64 |
| Db | 969 | 7/4 | 938 | 55/32 | 906 | 27/16 |
| C | 857 | 105/64 | 773 | 25/16 | 840 | 13/8 |
| B | 738 | 49/32 | 755 | 99/64 | 729 | 195/128 |
| Bb | 702 | 3/2 | 590 | 45/32 | 609 | 91/64 |
| A | 551 | 11/8 | 551 | 11/8 | 481 | 169/128 |
| Ab | 471 | 21/16 | 440 | 165/128 | 408 | 81/64 |
| G | 386 | 5/4 | 320 | 77/64 | 342 | 39/32 |
| Gb | 204 | 9/8 | 275 | 75/64 | 275 | 75/64 |
| F | 155 | 35/32 | 192 | 143/128 | 192 | 143/128 |
| E | 92 | 135/128 | 53 | 33/32 | 27 | 65/64 |
| Eb | 0 | 1/1 | 1103 | 121/64 | 1173 | 63/32 |

Note that no string needs to be raised higher than its natural tuning except for the B-flat on piano 1, which is 2¢ sharp (or if one prefers, 2¢ could be subtracted from all quantities).

For electronic realization of the piece, it can prove helpful to reconfigure the tuning as a reference pitch in cycles per second for each piano, and ratios derived from that standard:

| Tuning pitch: | 38.891 cps | 36.7641 cps | 38.2833 cps |
|---------------|------------|-------------|-------------|
| D | 15/8 | 225/121 | 13/7 |
| Db | 7/4 | 20/11 | 12/7 |
| C | 105/64 | 200/121 | 104/63 |
| B | 49/32 | 18/11 | 65/42 |
| Bb | 3/2 | 180/121 | 13/9 |
| A | 11/8 | 16/11 | 169/126 |
| Ab | 21/16 | 15/11 | 9/7 |
| G | 5/4 | 14/11 | 26/21 |
| F# | 9/8 | 150/121 | 25/21 |
| F | 35/32 | 13/11 | 143/126 |
| E | 135/128 | 12/11 | 65/63 |
| Eb | 1/1 | 1/1 | 1/1 |

In the configuration of certain tuning softwares, the following sequences might facilitate getting the required tuning:

Piano 1:

38.891 = Eb0

1/1, 135/128, 35/32, 9/8, 5/4, 21/16, 11/8, 3/2, 49/32, 105/64, 7/4, 15/8

Piano 2:

36.7641485 = Eb0

1/1, 12/11, 13/11, 150/121, 14/11, 15/11, 16/11, 180/121, 18/11, 200/121, 20/11, 225/121

Piano 3:

38.283333 = Eb0

1/1, 65/63, 143/126, 25/21, 26/21, 9/7, 169/126, 13/9, 65/42, 104/63, 12/7, 13/7

For purposes of analysis, the entire scale (which I refer to as my 8x8 scale) is given below, grouping its pitches into eight harmonic series' on the 1st, 3rd, 5th, 7th, 9th, 11th, 13th, and 15th harmonics of E-flat, and naming each pitch in a typographical equivalent of Ben Johnston's just-intonation notation:

| Pitch name | Ratio | Cents | 1/1 | 3/2 | 5/4 | 7/4 | 9/8 | 11/8 | 13/8 | 15/8 |
|------------|---------|-------|-----|-----|-----|-----|-----|------|------|------|
| Db^^- | 121/64 | 1103 | | | | | | 11 | | |
| D | 15/8 | 1088 | 15 | 5 | 3 | | | | | 1 |
| Db13 | 117/64 | 1044 | | | | | 13 | | 9 | |
| C#+ | 225/128 | 977 | | | | | | | | 15 |
| Db7 | 7/4 | 969 | 7 | | | 1 | | | | |
| C^ | 55/32 | 938 | | | 11 | | | 5 | | |
| C+ | 27/16 | 906 | | 9 | | | 3 | | | |
| C7+ | 105/64 | 857 | | | | 15 | | | | 7 |
| Cb13 | 13/8 | 840 | 13 | | | | | | 1 | |
| B | 25/16 | 773 | | | 5 | | | | | |
| Bb^ | 99/64 | 755 | | | | | 11 | 9 | | |
| Cb77+ | 49/32 | 738 | | | | 7 | | | | |
| Bb13 | 195/128 | 729 | | | | | | | 15 | 13 |
| Bb | 3/2 | 702 | 3 | 1 | | | | | | |
| Bbb713 | 91/64 | 609 | | | | 13 | | | 7 | |
| A+ | 45/32 | 590 | | 15 | 9 | | 5 | | | 3 |
| Ab^ | 11/8 | 551 | 11 | | | | | 1 | | |
| Abb1313 | 169/128 | 481 | | | | | | | 13 | |
| Ab7+ | 21/16 | 471 | | 7 | | 3 | | | | |
| G^ | 165/128 | 440 | | | | | | 15 | | 11 |
| G+ | 81/64 | 408 | | | | | 9 | | | |
| G | 5/4 | 386 | 5 | | 1 | | | | | |
| Gb13 | 39/32 | 342 | | 13 | | | | | 3 | |
| Gb7^ | 77/64 | 320 | | | | 11 | | 7 | | |
| F#+ | 75/64 | 275 | | | 15 | | | | | 5 |
| F+ | 9/8 | 204 | 9 | 3 | | | 1 | | | |
| Fb13^ | 143/128 | 192 | | | | | | 13 | 11 | |
| F7+ | 35/32 | 155 | | | 7 | 5 | | | | |
| E+ | 135/128 | 92 | | | | | 15 | | | 9 |
| Eb^ | 33/32 | 53 | | 11 | | | | 3 | | |
| Eb13 | 65/64 | 27 | | | 13 | | | | 5 | |
| Eb | 1/1 | 0 | 1 | | | | | | | |
| Eb7+ | 63/32 | 1173 | | | | 9 | 7 | | | |

In Johnston's notation, + raises a pitch by 81/80, # raises it by 25/24, b lowers it by 24/25, 7 lowers it by 35/36, ^ raises it by 33/32, 13 raises it by 65/64, and F-A-C, C-E-G, and G-B-D are all perfectly tuned 4:5:6 major triads.

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Kyle Gann
2016/2020

♩ = 59 ♩ = 61 ♩ = 63 ♩ = 55 ♩ = 59 ♩ = 61 ♩ = 63 ♩ = 59 ♩ = 57 ♩ = 55 ♩ = 53

Piano 1 *pp*

Piano 2 *pp*

Piano 3 *pp*

4 ♩ = 59 ♩ = 61 ♩ = 57 ♩ = 64 ♩ = 66 ♩ = 61 ♩ = 59 ♩ = 60 ♩ = 55 ♩ = 52

Pno. 1

Pno. 2 *pp*

Pno. 3

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7 ♩ = 50 ♩ = 59 ♩ = 62 ♩ = 65 ♩ = 63 ♩ = 59 ♩ = 59

Pno. 1

Pno. 2

Pno. 3

p

p

p

p

p

10 $\text{♩} = 59$ $\text{♩} = 63$ $\text{♩} = 61$ $\text{♩} = 59$ $\text{♩} = 57$ $\text{♩} = 54$

Pno. 1

Pno. 2

Pno. 3

p

p

Detailed description: This is a musical score for three pianos, labeled Pno. 1, Pno. 2, and Pno. 3. The score is written in 5/4 time and consists of three measures. Above the first measure, the tempo is marked as 10 quarter notes = 59. Above the second measure, it is 1 quarter note = 63. Above the third measure, it is 1 quarter note = 57. Above the fourth measure, it is 1 quarter note = 54. Pno. 1 has a treble and bass staff. Pno. 2 has a treble and bass staff. Pno. 3 has a treble and bass staff. Pno. 2 and Pno. 3 have a dynamic marking of *p* (piano) in the first measure. The score includes various musical notations such as rests, notes, and accidentals.

13 $\text{♩} = 59$ $\text{♩} = 61$ $\text{♩} = 63$ $\text{♩} = 67$ $\text{♩} = 62$ $\text{♩} = 59$ $\text{♩} = 55$

Pno. 1

Pno. 2

p

p

Pno. 3

$\text{♩} = 59$ $\text{♩} = 61$ $\text{♩} = 63$ $\text{♩} = 67$ $\text{♩} = 62$ $\text{♩} = 59$ $\text{♩} = 55$

16 $\sharp\flat$ $\text{♩} = 59$ $\text{♩} = 56$ $\text{♩} = 54$ $\text{♩} = 61$ $\text{♩} = 64$ $\text{♩} = 61$ $\text{♩} = 57$ $\text{♩} = 53$

Pno. 1

Pno. 2

$\text{♩} = 59$ $\text{♩} = 56$ $\text{♩} = 54$ $\text{♩} = 61$ $\text{♩} = 64$ $\text{♩} = 61$ $\text{♩} = 57$ $\text{♩} = 53$

Pno. 3

19 ♩ = 59 ♩ = 65 ♩ = 60 ♩ = 58 ♩ = 54 ♩ = 51

Pno. 1

Pno. 2

♩ = 59 ♩ = 65 ♩ = 60 ♩ = 58 ♩ = 54 ♩ = 51

Pno. 3

22 ♩ = 59 ♩ = 64 ♩ = 60 ♩ = 57 ♩ = 55 ♩ = 51

Pno. 1

Pno. 2

Pno. 3

The musical score is arranged in three systems, one for each piano. The first system (Pno. 1) shows a treble and bass clef with a 5/4 time signature. The tempo markings are ♩ = 59, ♩ = 64, ♩ = 60, ♩ = 57, ♩ = 55, and ♩ = 51. The second system (Pno. 2) features a treble and two bass clefs, with a 5/4 time signature. It includes various musical notations such as chords, arpeggios, and melodic lines. The third system (Pno. 3) is similar to the first, with a treble and bass clef and a 5/4 time signature. The tempo markings are repeated at the top of the page.

25 $\text{♩} = 59$ $\text{♩} = 64$ $\text{♩} = 60$ $\text{♩} = 57$ $\text{♩} = 66$ $\text{♩} = 62$ $\text{♩} = 58$ $\text{♩} = 53$

Pno. 1

Pno. 2

$\text{♩} = 59$ $\text{♩} = 64$ $\text{♩} = 60$ $\text{♩} = 57$ $\text{♩} = 66$ $\text{♩} = 62$ $\text{♩} = 58$ $\text{♩} = 53$

Pno. 3

The image shows a musical score for three pianos, labeled Pno. 1, Pno. 2, and Pno. 3. The score is divided into three systems, each with a tempo marking above it: $\text{♩} = 59$, $\text{♩} = 64$, $\text{♩} = 60$, $\text{♩} = 57$, $\text{♩} = 66$ for the first system; $\text{♩} = 62$, $\text{♩} = 58$, $\text{♩} = 53$ for the second system; and the same tempo markings for the third system. The first system is marked with a piano dynamic (p). The second system is marked with a mezzo-forte dynamic (mf). The third system is marked with a piano dynamic (p). The score is written in 5/4 time for the first two systems and 4/4 time for the third system. Pno. 1 and Pno. 2 have complex melodic lines with many rests, while Pno. 3 has a simpler, more rhythmic line. The tempo markings are placed above the first and last measures of each system.

28 \flat $\frac{5}{4}$ $\text{♩} = 59$ $\text{♩} = 63$ $\text{♩} = 66$ $\text{♩} = 62$ $\text{♩} = 59$ \flat $\frac{4}{4}$

Pno. 1

Pno. 2

Pno. 3

$\text{♩} = 59$ $\text{♩} = 63$ $\text{♩} = 66$ $\text{♩} = 62$ $\text{♩} = 59$

2.7 Kelvin

31

pp

pp

p

p

p

Pno. 1

Pno. 2

Pno. 3

33 ♩ = 62 ♩ = 59 ♩ = 63 ♩ = 59

Pno. 1

mp

p

Pno. 2

p

Pno. 3

mp

Detailed description of the musical score: The score is for three pianos (Pno. 1, Pno. 2, Pno. 3) and spans four measures. Pno. 1: Measure 1 (5/4, ♩ = 62) has a melody in the right hand starting with a quarter note G4, followed by eighth notes A4, B4, C5, and a quarter note D5. The left hand has a bass line starting with a quarter note G2, followed by eighth notes F2, E2, D2, and a quarter note C2. Dynamics: *mp*. Measure 2 (4/4, ♩ = 59) has a melody in the right hand starting with a quarter note G4, followed by eighth notes A4, B4, and a quarter note C5. The left hand has a bass line starting with a quarter note G2, followed by eighth notes F2, E2, and a quarter note D2. Dynamics: *p*. Measure 3 (3/4, ♩ = 63) has a melody in the right hand starting with a quarter note G4, followed by eighth notes A4, B4, and a quarter note C5. The left hand has a bass line starting with a quarter note G2, followed by eighth notes F2, E2, and a quarter note D2. Dynamics: *p*. Measure 4 (4/4, ♩ = 59) has a melody in the right hand starting with a quarter note G4, followed by eighth notes A4, B4, and a quarter note C5. The left hand has a bass line starting with a quarter note G2, followed by eighth notes F2, E2, and a quarter note D2. Dynamics: *p*. Pno. 2: Measure 1 (5/4, ♩ = 62) has a whole rest in both hands. Measure 2 (4/4, ♩ = 59) has a whole rest in both hands. Measure 3 (3/4, ♩ = 63) has a whole rest in both hands. Measure 4 (4/4, ♩ = 59) has a whole rest in both hands. Pno. 3: Measure 1 (5/4, ♩ = 62) has a melody in the right hand starting with a quarter note G4, followed by eighth notes A4, B4, and a quarter note C5. The left hand has a bass line starting with a quarter note G2, followed by eighth notes F2, E2, and a quarter note D2. Dynamics: *mp*. Measure 2 (4/4, ♩ = 59) has a whole rest in both hands. Measure 3 (3/4, ♩ = 63) has a melody in the right hand starting with a quarter note G4, followed by eighth notes A4, B4, and a quarter note C5. The left hand has a bass line starting with a quarter note G2, followed by eighth notes F2, E2, and a quarter note D2. Dynamics: *mp*. Measure 4 (4/4, ♩ = 59) has a whole rest in both hands.

37 ♩ = 62 ♩ = 64 ♩ = 62 $6:5$ ♩ = 59 ♩ = 62 ♩ = 56

Pno. 1

Pno. 2

Pno. 3

p

p

Detailed description of the musical score: The score consists of three systems, one for each piano (Pno. 1, Pno. 2, Pno. 3). The first system (Pno. 1) is a grand staff with five staves. The top two staves are treble clef, and the bottom three are bass clef. The first measure is in 4/4 time with a tempo of ♩ = 62. The second measure is in 5/4 time with a tempo of ♩ = 64. The third measure is in 6/4 time with a tempo of ♩ = 59. A 6:5 interval is marked between the second and third measures. Pno. 1 has a complex texture with many notes and ties. Pno. 2 has a grand staff with two treble and two bass staves, mostly silent. Pno. 3 has a grand staff with two treble and two bass staves, with a simple accompaniment. Dynamics include piano (p). Tempo markings are ♩ = 62, ♩ = 64, ♩ = 62, ♩ = 59, ♩ = 62, ♩ = 56.

♩ = 59 ♩ = 62 ♩ = 65 ♩ = 62 ♩ = 59

40

Pno. 1

pp

5

5

Pno. 2

pp

Pno. 3

♩ = 59 ♩ = 62 ♩ = 65 ♩ = 62 ♩ = 59

5

5

pp

44

$\text{♩} = 54$ $\text{♩} = 50$ $\text{♩} = 59$ $\text{♩} = 63$ $\text{♩} = 61$

Pno. 1

Pno. 2

Pno. 3

pp *p* *mp*

5

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Detailed description: This page of a musical score is for three pianos, labeled Pno. 1, Pno. 2, and Pno. 3. Each piano part consists of a grand staff (treble and bass clefs) with a common 8/8 time signature. The score is divided into three measures. Measure 1 (measures 44-45) features Pno. 1 with a melodic line in the treble clef and a bass line in the bass clef, marked with a piano (*p*) dynamic. Pno. 2 and Pno. 3 are silent in this measure. Measure 2 (measures 46-47) shows Pno. 1 with sustained chords in both staves. Pno. 2 has a melodic line in the bass clef marked *p*, and Pno. 3 has a melodic line in the bass clef marked *pp*. Measure 3 (measures 48-49) features Pno. 1 with sustained chords, Pno. 2 with a melodic line in the bass clef marked *p*, and Pno. 3 with a melodic line in the bass clef marked *mp*. Above the first measure, tempo markings are given as quarter notes: 54, 50, 59, 63, and 61. Above the third measure, a bracketed fingering '5' is shown above a note in Pno. 1. The page number '14' is in the top left, and the section title '2.7 Kelvin' is at the bottom center.

47 ♩ = 57 ♩ = 59 ♩ = 62 ♩ = 65 ♩ = 61 ♩ = 59

Pno. 1

Pno. 2

Pno. 3

The musical score is for three pianos (Pno. 1, Pno. 2, Pno. 3) in 4/4 time. The tempo markings are ♩ = 57, ♩ = 59, ♩ = 62, ♩ = 65, ♩ = 61, and ♩ = 59. Pno. 1 has a whole rest in all measures. Pno. 2 has a whole rest in the first measure, followed by a 9th fingering in the second measure, a 9th fingering in the third measure, and a 7th fingering in the fourth measure. Pno. 3 has a whole rest in the first measure, followed by a 9th fingering in the second measure, a 9th fingering in the third measure, and a 7th fingering in the fourth measure. Dynamics include *p* and *pp*.

51

$\text{♩} = 57$ $\text{♩} = 55$ $\text{♩} = 50$ $\text{♩} = 59$

Pno. 1

Pno. 2

Pno. 3

54

The musical score is divided into three systems, each for a different piano (Pno. 1, Pno. 2, Pno. 3). The first system (Pno. 1) consists of four measures. The first measure is in 5/4 time, the second in 3/4, and the last two in 4/4. It features complex textures with multiple staves, including grand staff notation and large chords. Dynamic markings include *mp* and *p*. Fingering numbers 5 and 7 are present. The second system (Pno. 2) also has four measures with the same time signature progression. It is simpler, focusing on melodic lines in the upper and lower staves. Dynamic markings are *mp* and *p*. The third system (Pno. 3) follows the same four-measure structure. It features sparse textures with some melodic movement in the upper and lower staves. Dynamic markings are *p*.

58 $\text{♩} = 63$ $\text{♩} = 59$ $\text{♩} = 56$ $\text{♩} = 52$

Pno. 1

Pno. 2

Pno. 3

pp

pp

$\text{♩} = 63$ $\text{♩} = 59$ $\text{♩} = 56$ $\text{♩} = 52$

61 ♩ = 59

Pno. 1

Pno. 2

Pno. 3

61 ♩ = 59

4/4 5/4 3/4 4/4

p *mp* *mp*

p *mp* *p*

p *mp* *p*

65

Pno. 1

Pno. 2

Pno. 3

The musical score consists of three systems, each for a piano (Pno. 1, Pno. 2, Pno. 3). Each system has four staves: two for the right hand and two for the left hand. The first system (Pno. 1) starts at measure 65. The time signature is 7/4, which changes to 3/4 in the second measure of each system. Pno. 1 has a complex texture with chords in the right hand and a melodic line in the left hand. Pno. 2 has sparse bass notes in the left hand. Pno. 3 has a melodic line in the right hand and bass notes in the left hand. Dynamics include *mp* and *p*. The score ends with a fermata in the final measure of each system.

70

Pno. 1

Pno. 2

Pno. 3

The musical score is divided into three systems, each for a piano. The first system (Pno. 1) starts at measure 70 in 5/4 time. It features a complex texture with multiple staves. The right hand has a melodic line with slurs and ties, while the left hand has a bass line with slurs and ties. The second system (Pno. 2) continues the piece, with the right hand playing a melodic line and the left hand providing harmonic support. The third system (Pno. 3) shows a more sparse texture with fewer notes. The score includes various musical notations such as chords, melodic lines, and fingerings.

73

Pno. 1

Pno. 2

Pno. 3

p

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77

Pno. 1

Pno. 2

Pno. 3

The musical score is divided into three systems, each for a different piano (Pno. 1, Pno. 2, Pno. 3). The first two systems are in 4/4 time, and the third system is in 7/4 time. The score includes various musical notations such as notes, rests, dynamics (p), and articulation marks (accents, slurs). Pno. 1 features a melodic line in the right hand and a bass line with chords in the left hand. Pno. 2 has a complex texture with multiple voices in both hands. Pno. 3 is mostly silent until the final measure, where it plays a melodic line in the right hand and a bass line with chords in the left hand.

80

Pno. 1

Pno. 2

Pno. 3

The musical score is divided into three systems, each for a different piano (Pno. 1, Pno. 2, Pno. 3). The first system (Pno. 1) consists of two staves (treble and bass clef) in 4/4 time. The second system (Pno. 2) consists of four staves (treble and bass clef) in 4/4 time. The third system (Pno. 3) consists of two staves (treble and bass clef) in 4/4 time. The score includes various musical notations such as rests, notes, chords, and dynamic markings like '11' and '5:3'. The time signature changes to 7/4 in the third measure of each system.

83

Pno. 1

Pno. 2

Pno. 3

The musical score consists of three systems, each for a piano (Pno. 1, Pno. 2, Pno. 3). Each system has three staves: a treble clef staff, a bass clef staff, and a lower bass clef staff. The time signature is 4/4, with a 3/4 measure in the middle of each system. The key signature has one sharp (F#). Pno. 1 features a complex rhythmic pattern with slurs and accents, including a 7-measure sextuplet and a 3-measure triplet. Pno. 2 has a similar rhythmic pattern with a 7-measure sextuplet and a 3-measure triplet. Pno. 3 has a simpler rhythmic pattern with a 7-measure sextuplet and a 3-measure triplet. The score is marked with measure numbers 83, 84, 85, and 86.

92 $\text{♩} = 63$ $\text{♩} = 59$

Pno. 1

Pno. 2

$\text{♩} = 63$ $\text{♩} = 59$

Pno. 3

94 $\text{♩} = 63$

Pno. 1

Pno. 2

Pno. 3

$\text{♩} = 63$

fff

mf

fff

The musical score is for three pianos (Pno. 1, Pno. 2, Pno. 3) in 5/4 time. The score spans from measure 96 to measure 31. The key signature is one sharp (F#).

Piano 1 (Pno. 1): Measures 96-31. Treble clef. Starts with a whole note chord (F#, C#, G, F) in the right hand and a whole note chord (F#, C#, G, F) in the left hand. The right hand continues with a melodic line: quarter notes (F#, C#, G, F), eighth notes (F#, C#, G, F), and a triplet of eighth notes (F#, C#, G). The left hand has a triplet of eighth notes (F#, C#, G) and a 7th chord (F, C, G, Bb). Dynamics include *mf* and *ff*.

Piano 2 (Pno. 2): Measures 96-31. Treble clef. Starts with a whole note chord (F#, C#, G, F) in the right hand and a whole note chord (F#, C#, G, F) in the left hand. The right hand continues with a melodic line: quarter notes (F#, C#, G, F), eighth notes (F#, C#, G, F), and a triplet of eighth notes (F#, C#, G). The left hand has a triplet of eighth notes (F#, C#, G) and a 7th chord (F, C, G, Bb). Dynamics include *ff* and *mf*.

Piano 3 (Pno. 3): Measures 96-31. Treble clef. Starts with a whole note chord (F#, C#, G, F) in the right hand and a whole note chord (F#, C#, G, F) in the left hand. The right hand continues with a melodic line: quarter notes (F#, C#, G, F), eighth notes (F#, C#, G, F), and a triplet of eighth notes (F#, C#, G). The left hand has a triplet of eighth notes (F#, C#, G) and a 7th chord (F, C, G, Bb). Dynamics include *mf*.

97 $\text{♩} = 68$ $\text{♩} = 63$

Pno. 1

Pno. 2

$\text{♩} = 68$ $\text{♩} = 63$

Pno. 3

100

Pno. 1

Pno. 2

Pno. 3

The musical score is divided into three systems, each for a different piano (Pno. 1, Pno. 2, Pno. 3). The tempo is marked as 100. The key signature is one sharp (F#). The time signature starts as 3/4 and changes to 6/4 at the beginning of the second system. Pno. 1 features a melodic line in the right hand with a fermata and a sequence of notes with fingerings 5 and 7. Pno. 2 has a more complex texture with multiple voices in both hands, including a large intervallic leap in the right hand and a dense chordal texture in the left hand. Pno. 3 provides a simple harmonic accompaniment with a single note in the right hand and a chord in the left hand.

105 ♩ = 59 ♩ = 63 ♩ = 59 ♩ = 63 ♩ = 66

Pno. 1

Pno. 2

Pno. 3

The musical score is arranged in three systems, one for each piano. Each system contains four staves (two treble and two bass clefs). The time signature is 5/4. Measure 105 starts with a tempo marking of ♩ = 59. Measure 106 has a tempo marking of ♩ = 63. Measure 107 has a tempo marking of ♩ = 66. The score includes various musical notations such as rests, notes, and fingerings. Pno. 1 has a complex part with many notes and fingerings. Pno. 2 has a simpler part with fewer notes. Pno. 3 has a part with many notes and fingerings.

108

♩ = 69 ♩ = 72 ♩ = 69

Pno. 1

Pno. 2

Pno. 3

The musical score consists of three systems, each for a different piano (Pno. 1, Pno. 2, and Pno. 3). Each system contains four staves: two for the treble clef and two for the bass clef. The first system (Pno. 1) begins at measure 108. The tempo markings are ♩ = 69, ♩ = 72, and ♩ = 69. The second system (Pno. 2) follows, and the third system (Pno. 3) concludes the page. The score includes various musical notations such as notes, rests, and triplets.

112 $\text{♩} = 67$ $\text{♩} = 69$ $\text{♩} = 72$

Pno. 1

Pno. 2

Pno. 3

The musical score consists of three systems, each for a different piano (Pno. 1, Pno. 2, Pno. 3). Each system contains four staves (two treble and two bass). The music is divided into five measures, with tempo markings of 67, 69, and 72. The key signature has one sharp (F#). The score includes various musical notations such as rests, notes, triplets, and dynamic markings.

117

Pno. 1

Pno. 2

Pno. 3

The musical score consists of three systems, each for a piano (Pno. 1, Pno. 2, Pno. 3). Each system has three staves (treble and two bass clefs). The time signature is 4/4, with changes to 5/4 and 2/4 in the second and third measures respectively. Pno. 1 features a piano (*p*) dynamic in the third measure and a forte (*f*) dynamic in the fourth. Pno. 2 and Pno. 3 have various articulations and dynamics throughout the measures.

121

$\text{♩} = 75$ $\text{♩} = 71$ $\text{♩} = 68$ $\text{♩} = 72$ 39

Pno. 1

f *mf* *p* *mf*

Pno. 2

p *f* *mf* *mf*

Pno. 3

f *p*

124 $\text{♩} = 76$ $\text{♩} = 78$ $\text{♩} = 75$ $\text{♩} = 72$ $\text{♩} = 69$ $\text{♩} = 67$ $\text{♩} = 72$

Pno. 1

p *mf* *p* *mp* *mf* *mp*

Pno. 2

p *mp* *p* *mp*

Pno. 3

$\text{♩} = 76$ $\text{♩} = 78$ $\text{♩} = 75$ $\text{♩} = 72$ $\text{♩} = 69$ $\text{♩} = 67$ $\text{♩} = 72$

mf *mf*

The musical score is divided into three systems, each for a different piano. The first system, Pno. 1, features a complex rhythmic pattern in the right hand with a tempo of 76, followed by rests in the 2/4 and 4/4 measures, and then a melodic line in the 5/4 measure with a tempo of 72. The left hand provides harmonic support with sustained notes and chords. The second system, Pno. 2, has a melodic line in the right hand starting in the 4/4 measure with a tempo of 75, and a sustained bass line in the left hand. The third system, Pno. 3, has a melodic line in the right hand starting in the 2/4 measure with a tempo of 78, and a sustained bass line in the left hand. Dynamic markings range from piano (p) to mezzo-forte (mf) and mezzo-piano (mp). The score concludes with the text '2.7 Kelvin'.

♩ = 65 ♩ = 61 ♩ = 66 ♩ = 63 ♩ = 61 43

135

Pno. 1

Pno. 2

Pno. 3

p

139

Pno. 1

Pno. 2

Pno. 3

p

♩ = 63 ♩ = 64 ♩ = 61

♩ = 63 ♩ = 64 ♩ = 61

149 ♩ = 59 ♩ = 66 ♩ = 63 ♩ = 62

Pno. 1

Pno. 2

pp

pp

5 6:5

♩ = 59 ♩ = 66 ♩ = 63 ♩ = 62

Pno. 3

pp

152

Pno. 1

pp

5

6

pp

pp

#

ppp

Pno. 2

7:6

pp

5

6

pp

ppp

Pno. 3

158

Pno. 1

pp

6:5

6:5

Pno. 2

pp

7:6

6:5

Pno. 3

6:5

6:5

♯♭

162 $\text{♩} = 59$

Pno. 1

Pno. 2

Pno. 3

166

Pno. 1

Pno. 2

Pno. 3

173

The musical score consists of three systems, each for a piano (Pno. 1, Pno. 2, Pno. 3). Each system has a grand staff with a treble and bass clef. The time signature changes from 3/4 to 5/4 and back to 3/4. Dynamic markings include *pp* and *pp*. Time signatures are indicated as 9:5 and 11:10. The score includes various musical notations such as rests, notes, and slurs.

Pno. 1

Pno. 2

Pno. 3

178 *13:10*

Pno. 1

pp

Pno. 2

Pno. 3

13:10

13:10

181

Pno. 1

Pno. 2

Pno. 3

2.7 Kelvin

July - September 27, 2020
from a Dec. 2016 sketch
Germantown, NY