

Idin Samimi Mofakham

... of struggle and hope

for

contrabass quartet and electronics

2020/2021

About the 17-tone unequal division gamut
designed by Safi-al-Din Ormavi (1216-1294)

Without any doubt, the theories of **Safi-al-Din Ormavi** covering music theory, written in the 13th century, are the most crucial milestone in Middle Eastern music history. His opus magnum, "Ketāb al-Advār", is considered a complete and essential surviving work on scientific music theory, written by an Iranian theoretician, following Farabi (9th century) and Ibn Sina's (10th century) previous research and treaties on tuning systems. Ormavi's division of the octave into 17 tones is the first step towards the "Systematist" school of music in the Middle East. It makes him the "Zarlino of the Orient", as Raphael Kiesewetter famously called him [1].

The fascinating character of this 17-tone gamut that Ormavi presents in details in book "Ketāb al-Advār", is that each whole-tone is constructed of two Pythagorean-limmas (chromatic semitones) with the ratio of 256/243 (90.225¢) and one Pythagorean-comma with the ratio of 531441/524288 (23.460¢). Thus, each whole-tone, with a 9/8 (203.9¢) ratio, is divided into two Limma and One Pythagorean comma: 0 – 90 -180 -204 (in cents). In Ormavi's 17-tone gamut, the critical aspect is that thanks to this unique division, he could reach to organize and work with the practical arrangement of unique microtones of Iranian and Arabic music. One octave in Ormavi's system consists of two tetrachords following with a whole-tone. He describes the tetrachord as LLC, LLC, L [2], which leads us to a perfect fourth with the ratio of 4/3 and the size of 498 cents, and the scheme for the 17-tone gamut arises as follows:

LLC, LLC, L + LLC, LLC, L + LLC
nE nF eG vF nG eA vG nA eB eC nB nC eD vC nD eE eF nE
90 90 24, 90 90 24, 90 + 90 90 24, 90 90 24, 90 +90 90 24 = 1200 cents

0 is equal to E (the concert pitch note A4 = 440 Hz)

#	Ratio	Pitch	tuning meter read-out/¢ deviation	Cents
0	1/1	♮E	♮E +2 cents	0.00
1	256/243	♮F	♮F -8 cents	90.23
2	65536/59049	♭G	♭G -18 cents	180.45
3	9/8	♯F	♯F +6 cents	203.91
4	32/27	♮G	♮G -4 cents	294.13
5	8192/6561	♭A	♭A -14 cents	384.36
6	81/64	♯G	♯G +10 cents	407.82
7	4/3	♮A	♮A ±0 cents	498.04
8	1024/729	♭B	♭B -10 cents	588.27
9	262144/177147	♭C	♭C -20 cents	678.49
10	3/2	♮B	♮B +4 cents	701.96
11	128/81	♮C	♮C -6 cents	792.18
12	32768/19683	♭D	♭D -16 cents	882.40
13	27/16	♯C	♯C +8 cents	905.87
14	16/9	♮D	♮D -2 cents	996.09
15	4096/2187	♭E	♭E -12 cents	1086.31
16	1048576/531441	♭F	♭F -22 cents	1176.54
17	2/1	♮E	♮E +2 cents	1200.00

[1] Kiesewetter, Raphael Georg. *Die Musik der Araber, Nach Originalquellen* [Arabic Music Based on Original Sources]. Leipzig-Wiesbaden/R: Breitkopf und Härtel – Dr. Martin Sändig oHG/R, 1842-1968/R. With a preface by Freiherrn v. Hammer-Purgstall.
[2] **L** stands for Pythagorean-limma and **C** stands for Pythagorean-comma (auth.).

About the notation:

The score is notated in the Helmholtz-Ellis JI Pitch Notation system (HEJI) to control every small detail in the intervals and pitches and be respectful to Ormavis's gamut design. Furthermore, as an important part of this piece is based on my research on the natural harmonic series and notating the playable harmonic nodes, it was crucial to choose the HEJI notation system to be extremely precise in the size of the intervals and pitches.

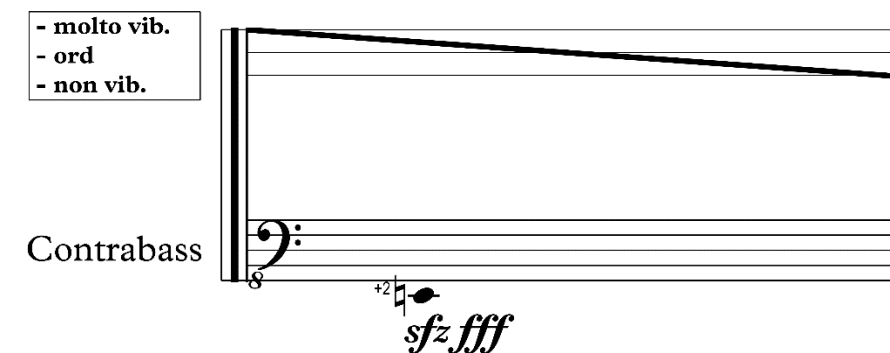
The small numbers next to the sharps, flats, and naturals are the deviations in cents from the 12-TET and present the pitches' exact size as they should be in the Ormavi's gamut.

When tuning the strings of contrabass, please take time to obtain clear, resonant, and beatless pure Pythagorean fourths, so the pitches of the open strings will be C -6¢, G -4¢, D -2¢, A +0, E +2¢ (Pythagorean tuning). This precision is crucial to the successful performance and the correct sound intonation.

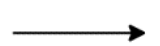
There are no time signatures involved in this piece as the divisions control the piece's temporality in seconds. Each bar is ten seconds long, and each page consists of six measures, thus taking one minute for each page to execute.

The control of the time and communication between performers will happen through the special patch designed for the piece and is available together with the electronic materials.

The first one is introduced at the beginning of the piece, above the main stave for each performer, and controls the fluctuations and vibrato variation tensions. The example below shows the gradual and slow change of vibrato from molto-vibrato towards non-vibrato in a ten seconds period span (one bar).

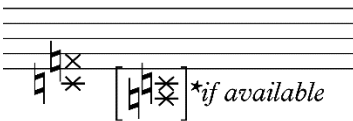


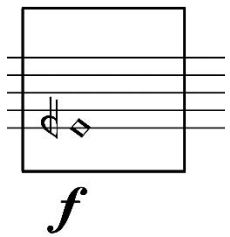
Explanation of signs:

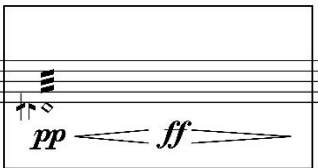
-  crescendo dal niente
-  decrescendo al niente
-  transition from one performance technique to another
-  rapid rupture of the sound
-  tremolos are always irregular and vary in speed through time

m.s.t  **m.s.p** rapidly alternate between two positions of molto sul tasto and molto sul ponticello

 sub harmonic - best result occurs when locating the bow at 6° node, at the sul tasto position with extreme pressure and a completely constant and solid speed

 scratch tone - damp both stings with left hand with extreme pressure of bow. Always on two lowest strings

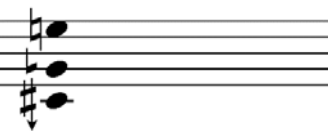
 continuous repetition of the given pitch(es)

 continuous repetition of the given pitch(es) and dynamic(s)

 the duration and speed of repetition of the pitch material inside the repetition boxes in case of multiple pitches in one box. Respectively from up to down:
1) **very slow change** 2) **fast change** 3) **very fast change**

Multiphonics:

The harmonic node and the vibrating partials are described for each multiphonic in the piece, like in the following example:

12°/III [5°,12°,7°]


While performing the multiphonic, the bow should be positioned almost a perfect forth above the node of the multiphonic. Bow above the finger multiphonics to achieve better sounding result.



The Helmholtz-Ellis JI Pitch Notation (HEJI) | 2020 | LEGEND

revised by Marc Sabat and Thomas Nicholson | PLAINSOUND MUSIC EDITION | www.plainsound.org

in collaboration with Wolfgang von Schweinitz, Catherine Lamb, and M.O. Abbott, building upon the original HEJI notation devised by Marc Sabat and Wolfgang von Schweinitz in the early 2000s

PYTHAGOREAN JUST INTONATION | generated by multiplying / dividing an arbitrary reference frequency by PRIMES 2 and 3 only

... $\flat$ $\flat$ $\natural$ $\sharp$ $\times$...

notate a series of **perfect fifths** above / below a reference — $3/2 \approx \pm 702.0$ cents (ca. 2c wider than tempered)
each new accidental therefore represents 7 fifths, altering by one apotome — $2^{187}/2048 \approx \pm 113.7$ cents

Frequency ratios including higher prime numbers (5–47) may be precisely written by adding the following distinct accidental symbols. Custom indications for higher primes or various enharmonic substitutions may be invented as needed by simply defining further symbols representing the relevant ratio alterations.

PTOLEMAIC JUST INTONATION | PRIMES up to 5

$\flat\flat$ $\flat$ $\natural$ $\sharp$ $\times$ $\flat\flat$ $\flat$ $\natural$ $\sharp$ $\times$
 $\flat\flat$ $\flat$ $\natural$ $\sharp$ $\times$ $\flat\flat$ $\flat$ $\natural$ $\sharp$ $\times$
~ $\sharp$ = $\flat$ ~ $\flat$ = $\sharp$

includes the consonant **just major third** — $5/4 \approx \pm 386.3$ cents (ca. 14c narrower than tempered)

alteration by one syntonic comma — $81/80 \approx \pm 21.5$ cents

alteration by two syntonic commas — $81/80 \cdot 81/80 \approx \pm 43.0$ cents

alteration by one schisma to notate an exact enharmonic substitution — $3^{2805}/32768 \approx \pm 2.0$ cents

SEPTIMAL JI | PRIME 7

$\flat$ $\natural$
 $\sharp$ $\natural$

includes the consonant **natural seventh** — $7/4 \approx \pm 968.8$ cents (ca. 31c narrower than tempered)

alteration by one septimal comma — $64/63 \approx \pm 27.3$ cents (Giuseppe Tartini)

alteration by two septimal commas — $64/63 \cdot 64/63 \approx \pm 54.5$ cents

UNDECIMAL | PRIME 11

$\flat$ $\natural$

includes the **undecimal semi-augmented fourth** — $11/8 \approx \pm 551.3$ cents (ca. 51c wider than tempered)

alteration by one undecimal quartertone — $33/32 \approx \pm 53.3$ cents (Richard H. Stein)

TRIDECIMAL | PRIME 13

$\flat$ $\natural$

includes the **tridecimal neutral sixth** — $13/8 \approx \pm 840.5$ cents (ca. 41c wider than a tempered minor sixth)

alteration by one tridecimal thirddtone — $27/26 \approx \pm 65.3$ cents (Gérard Grisey)

HIGHER PRIMES 17 – 47

$\approx$ $\approx$
 $\backslash$ $\swarrow$
 $\downarrow$ $\uparrow$
 $\downarrow$ $\uparrow$
 $\flat$ $\sharp$
 $\sharp$ $\flat$
 $-$ $+$
 $\vee$ $\wedge$
 $\natural$ $\natural$

alteration by one 17-limit schisma — $2^{187}/2^{176} \approx \pm 8.7$ cents

alteration by one 19-limit schisma — $5^{13}/5^{12} \approx \pm 3.4$ cents

alteration by one 23-limit comma — $7^{36}/7^{29} \approx \pm 16.5$ cents (James Tenney / John Cage)

alteration by one 29-limit sixthtone — $2^{61}/2^{56} \approx \pm 33.5$ cents

alteration by one 31-limit quartertone — $3^2/3^1 \approx \pm 55.0$ cents (Alinaghi Vaziri)

alteration by one 37-limit quartertone — $3^7/3^6 \approx \pm 47.4$ cents (Ivan Wyschnegradsky)

alteration by one 41-limit comma — $8^2/8^1 \approx \pm 21.2$ cents (Ben Johnston)

alteration by one 43-limit comma — $1^{29}/1^{28} \approx \pm 13.5$ cents

alteration by one 47-limit quartertone — $7^{52}/7^{29} \approx \pm 53.8$ cents

CENTS HEJI accidentals may be combined with an indication of their deviation in cents from equal temperament as read on a tuning meter; A $\natural$ 440 Hz is usually defined to be ± 0 cents. If this deviation exceeds ± 50 cents, the nearest tempered pitch-class may be added: e.g. A $\flat$ (-65 cents from A $\natural$) could include the annotation A $\flat$ +35 placed above or below its accidental.

TEMPERED NOTES | may be combined with cents deviations to notate free microtonal pitches

... $\flat$ $\flat$ $\natural$ $\natural$ $\sharp$ $\times$...

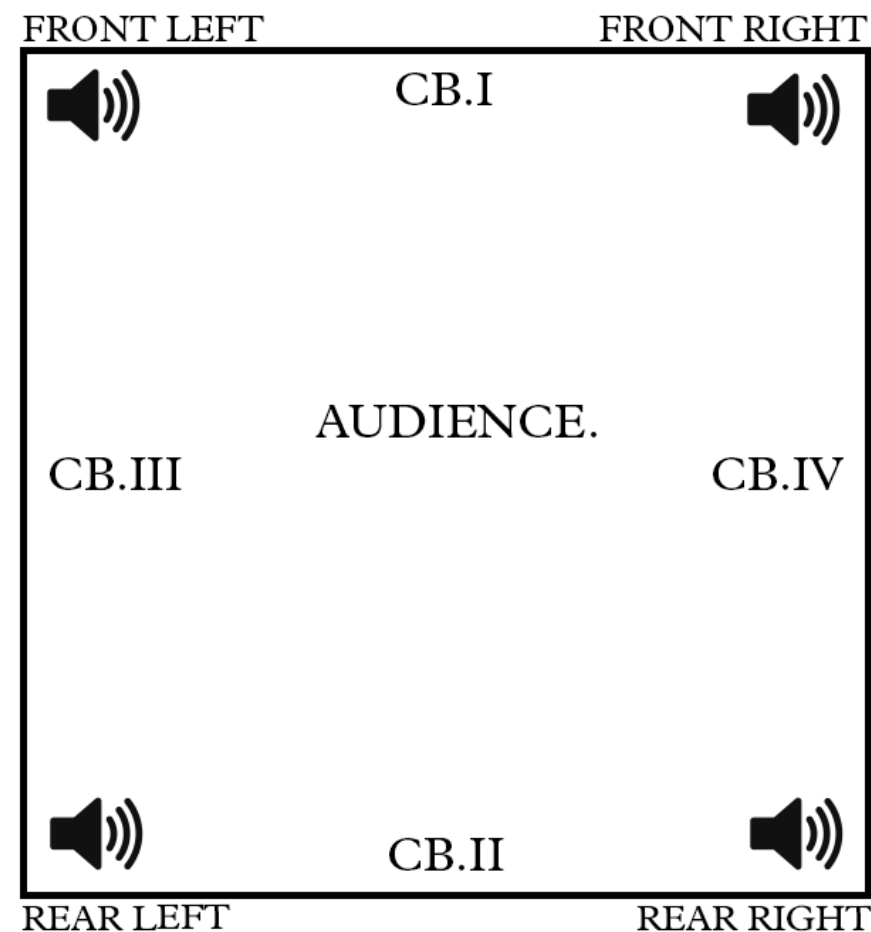
indicate the respective equal tempered quartertone; show which pitch is assigned a deviation of 0c

Technical equipment required:

- four contact microphones for the amplification of each contrabass
- a quadraphonic sound spatialization system

Localization and spatialization:

During the live performances, the audience should be located centrally and surrounded by the performers and loudspeakers. Therefore, the most preferred type of sound diffusion is the quadraphonic setup and spatialization of the performers around the audience.



Amplification:

All four instruments should be amplified, and their sound should be mixed into the playback system, including the fixed media material, with the right balance between the live and fixed sound material. A moderate reverb considering the size of the room should be added to each contrabass microphone. Diffusion pattern for each contrabass sound should be prepared as follows:

- CB.I Rear left and rear right
- CB.II Front left and front right
- CB.III Front right and rear right
- CB.IV Front left and rear left

Duration: 14 minutes

... of struggle and hope

Espressivo furioso ♩ = 60

Idin Samimi Mofakham

0" 10" 20" 30" 40" 50"

- molto vib.
- ord
- non vib.

ord. → molto sul pont. → sul tasto → molto sul pont.

Contrabass I

8 +2 gliss. sfz fff -4 gliss. +6 gliss. +2 mf +2 ff > p < ff > p < fff +2 gliss.

- molto vib.
- ord
- non vib.

ord. → molto sul pont. → sul tasto → molto sul pont.

Contrabass II

8 +2 gliss. sfz fff -8 gliss. +2 mf +2 gliss. -8 gliss.

- molto vib.
- ord
- non vib.

ord. → molto sul pont. → sul tasto → molto sul pont.

Contrabass III

8 +2 gliss. sfz fff +6 gliss. -4 gliss. +2 mf +2 gliss. +6 gliss.

- molto vib.
- ord
- non vib.

ord. → molto sul pont. → sul tasto → molto sul pont. →

Contrabass IV

8 +2 gliss. sfz fff -8 gliss. +2 mf +2 gliss. -4 gliss.

The image displays a musical score for four contrabass parts, labeled Contrabass I, II, III, and IV. The score is written in bass clef and includes various musical notations and performance instructions.

Contrabass I: The part begins with a glissando from -4 to -18, followed by another glissando from -18 to -14. It then features a series of dynamic markings: *p*, *ff*, *p*, *ff*, *sfz*, *fff*, *p*, *ff*, *p*, and *fff*. The part concludes with a glissando from +10 to -14 and a final glissando from -14 to -10.

Contrabass II: The part starts with a glissando from -18 to -4, followed by another glissando from -4 to +10. It includes dynamic markings: *sfz*, *fff*, *p*, *ff*, *p*, *ff*, *pp*, and *fff*. The part ends with a glissando from +10 to -14 and a final glissando from -14 to -10.

Contrabass III: The part begins with a glissando from -8 to +6, followed by another glissando from +6 to -4. It features dynamic markings: *p*, *ff*, *p*, *ff*, *pp*, *ff*, *p*, *ff*, *p*, *sfz*, *fff*, and *fff*. The part concludes with a glissando from -14 to -10 and a final glissando from -10 to -6.

Contrabass IV: The part starts with a glissando from +6 to -14, followed by another glissando from -14 to +6. It includes dynamic markings: *p*, *ff*, *p*, *ff*, *sfz*, *fff*, *p*, *ff*, *p*, *ff*, *p*, *ff*, *p*, and *fff*. The part ends with a glissando from -10 to -6 and a final glissando from -6 to -2.

The score also includes a legend in the top left corner, indicating the meaning of the symbols: *- molto vib.*, *- ord.*, and *- non vib.*. The time signature is 4/4, and the key signature is one flat (B-flat).

3'00" 3'10" 3'20" 3'30" 3'40" 3'50"

Contrabass I

over pressure sul tasto (at 6° node) → normal pressure sul pont. → over pressure sul tasto (at 6° node) → normal pressure molto sul pont. → normal pressure sul tasto

p *ff* *p* *ff*

gliss. *-10* *gliss.* *+10*

Contrabass II

normal pressure molto sul pont. → over pressure sul tasto (at 6° node) → normal pressure sul pont. → over pressure sul tasto (at 6° node) → normal pressure molto sul pont.

p *ff* *p* *ff*

gliss. *+10* *gliss.* *-14*

Contrabass III

over pressure sul tasto (at 6° node) → normal pressure sul pont. → over pressure sul tasto (at 6° node)

p *ff* *p* *ff*

gliss. *-4*

Contrabass IV

normal pressure molto sul pont. → over pressure sul tasto (at 6° node) → normal pressure sul pont. → over pressure sul tasto (at 6° node) → normal pressure sul pont. → over pressure sul tasto (at 6° node)

p *ff* *p* *ff* *p* *ff*

Legend:

- molto vib.
- ord
- non vib.

The image displays a musical score for four contrabasses, labeled Contrabass I through IV. The score is organized into four systems, each corresponding to one of the instruments. Above the staves, time markers are provided at 10-second intervals: 3'00", 3'10", 3'20", 3'30", 3'40", and 3'50". Each system includes a legend box with three entries: '- molto vib.', '- ord', and '- non vib.'. The musical notation for each instrument consists of a single bass staff with a key signature of one flat (B-flat). The notes are connected by horizontal lines, indicating sustained sounds. Above the staves, there are performance instructions in Italian, such as 'over pressure sul tasto (at 6° node)', 'normal pressure sul pont.', and 'normal pressure molto sul pont.'. These instructions are connected by arrows, showing the sequence of playing techniques. Below the staves, there are dynamic markings: *p* (piano) and *ff* (fortissimo). Additionally, there are vibrato diagrams consisting of horizontal lines with a central dot, indicating the extent of vibrato. Some of these diagrams are labeled with numbers: -10, +10, -14, and -4. The word 'gliss.' (glissando) is also present, indicating a glissando effect. The overall layout is clean and professional, typical of a musical score for a large ensemble.

The image displays four staves of musical notation, each representing a different contrabass player (Contrabass I, II, III, and IV). Each staff includes a series of notes connected by glissando lines, with various performance instructions and fingerings indicated.

Contrabass I: The staff shows a sequence of notes with fingerings 0, +10, 0, +6, 0, -4, 0, +10. Performance instructions include "normal pressure molto sul pont." and "over pressure sul tasto (at 6° node)". The final instruction is "damp both stings with left hand over pressure/ scratch tone" followed by "m.s.t. ≡ m.s.p." and "fff possibile".

Contrabass II: The staff shows a sequence of notes with fingerings -4, 0, -14, 0, -10, 0. Performance instructions include "over pressure sul tasto (at 6° node)" and "normal pressure molto sul pont.". The final instruction is "damp both stings with left hand over pressure/ scratch tone" followed by "m.s.t. ≡ m.s.p." and "fff possibile".

Contrabass III: The staff shows a sequence of notes with fingerings 0, -4, 0, +6, 0, -4, 0. Performance instructions include "normal pressure sul pont." and "over pressure sul tasto (at 6° node)". The final instruction is "damp both stings with left hand over pressure/ scratch tone" followed by "m.s.t. ≡ m.s.p." and "fff possibile".

Contrabass IV: The staff shows a sequence of notes with fingerings +10, 0, +6, 0, B-20, 0. Performance instructions include "normal pressure sul pont." and "over pressure sul tasto (at 6° node)". The final instruction is "damp both stings with left hand over pressure/ scratch tone" followed by "m.s.t. ≡ m.s.p." and "fff possibile".

Each staff also includes a legend box with the following text: "- molto vib.", "- ord", "- non vib.".

5'00"

5'10"

5'20"

5'30"

5'40"

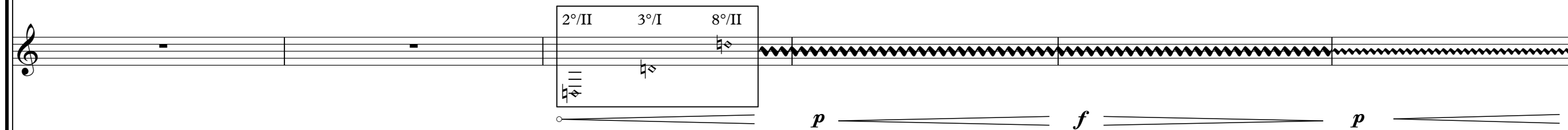
5'50"

Contrabass I



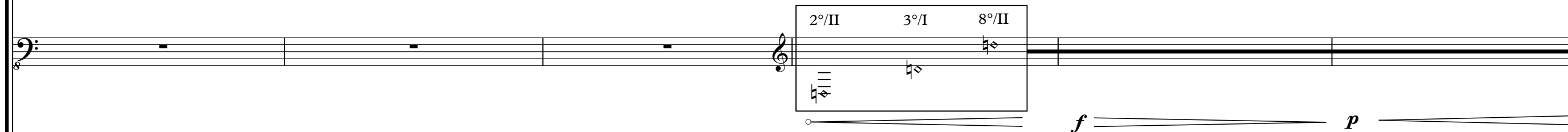
Contrabass I staff notation. The staff is in treble clef. It begins with a whole rest at 5'00". At 5'10", a box contains three fingering options: 2°/II, 3°/I, and 8°/II. The 8°/II option is selected, indicated by a diamond symbol. The staff then continues with a series of sixteenth notes, marked with a *p* (piano) dynamic at 5'20" and a *f* (forte) dynamic at 5'30".

Contrabass II



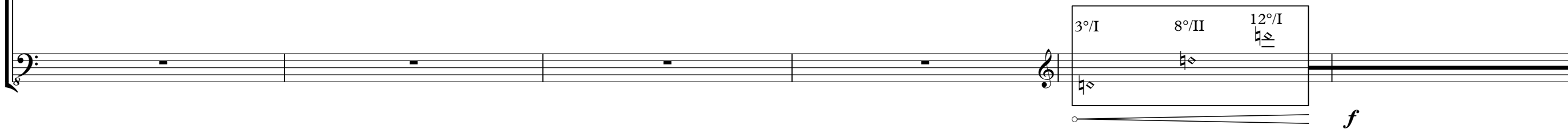
Contrabass II staff notation. The staff is in treble clef. It begins with a whole rest at 5'00". At 5'10", a box contains three fingering options: 2°/II, 3°/I, and 8°/II. The 8°/II option is selected, indicated by a diamond symbol. The staff then continues with a series of sixteenth notes, marked with a *p* (piano) dynamic at 5'20" and a *f* (forte) dynamic at 5'30".

Contrabass III



Contrabass III staff notation. The staff is in bass clef. It begins with a whole rest at 5'00". At 5'10", a box contains three fingering options: 2°/II, 3°/I, and 8°/II. The 8°/II option is selected, indicated by a diamond symbol. The staff then continues with a series of sixteenth notes, marked with a *f* (forte) dynamic at 5'20" and a *p* (piano) dynamic at 5'30".

Contrabass IV



Contrabass IV staff notation. The staff is in bass clef. It begins with a whole rest at 5'00". At 5'10", a box contains three fingering options: 3°/I, 8°/II, and 12°/I. The 8°/II option is selected, indicated by a diamond symbol. The staff then continues with a series of sixteenth notes, marked with a *f* (forte) dynamic at 5'20".

The musical score is divided into four staves, each representing a different contrabass player. The time markers at the top are 6'00", 6'10", 6'20", 6'30", 6'40", and 6'50".

Contrabass I: The staff begins with a treble clef. The first measure contains a box with four fingerings: 10°/I (b2), 11°/I (b3), 12°/I (b4), and 13°/I (b5). The dynamics are *ff* from 6'00" to 6'20", *p* from 6'20" to 6'30", *f* from 6'30" to 6'40", *p* from 6'40" to 6'50", and *f* from 6'50" onwards. The second measure contains a box with three fingerings: 12°/I (b2), 13°/I (b3), and 14°/I (b4).

Contrabass II: The staff begins with a treble clef. The first measure contains a box with four fingerings: 12°/I (b2), 14°/II (b3), 13°/II (b4), and 14°/II (b5). The dynamics are *f* from 6'00" to 6'10", *ff* from 6'10" to 6'30", *p* from 6'30" to 6'50", and *f* from 6'50" onwards. The second measure contains a box with three fingerings: 13°/II (b2), 13°/I (b3), and 12°/I (b4).

Contrabass III: The staff begins with a treble clef. The first measure contains a box with three fingerings: 15°/II (b2), 12°/I (b3), and 13°/I (b4). The dynamics are *ff* from 6'00" to 6'20", *p* from 6'20" to 6'40", and *f* from 6'40" onwards.

Contrabass IV: The staff begins with a treble clef. The first measure contains a box with three fingerings: 14°/I (b2), 13°/I (b3), and 12°/I (b4). The dynamics are *f* from 6'00" to 6'30", *p* from 6'30" to 6'40", and *f* from 6'40" onwards.

7'00" 7'10" 7'20" 7'30" 7'40" 7'50"

Contrabass I

11°/I 12°/I 13°/I

pp *ff*

Contrabass II

14°/II 12°/I

pp *ff*

Contrabass III

13°/I 12°/I 11°/I 10°/I 11°/I

f *pp* *ff*

Contrabass IV

14°/II 15°/II 12°/I 15°/II

p *pp* *f* *pp* *ff*

The musical score is for four Contrabass parts, labeled Contrabass I through IV. The score is written on a grand staff with four staves. The time signature is not explicitly shown, but the notation suggests a common time or 4/4 time. The score includes various musical notations such as notes, rests, and dynamic markings. The dynamics range from *pp* (pianissimo) to *ff* (fortissimo). The score also includes performance markings such as *p* (piano) and *f* (forte). The fingerings are indicated by numbers 1 through 5. The score is divided into measures by vertical bar lines. The time markers 7'00", 7'10", 7'20", 7'30", 7'40", and 7'50" are placed above the staves. The fingerings for each part are: Contrabass I: 11°/I, 12°/I, 13°/I; Contrabass II: 14°/II, 12°/I; Contrabass III: 13°/I, 12°/I, 11°/I, 10°/I, 11°/I; Contrabass IV: 14°/II, 15°/II, 12°/I, 15°/II. The dynamics for each part are: Contrabass I: *pp*, *ff*; Contrabass II: *pp*, *ff*; Contrabass III: *f*, *pp*, *ff*; Contrabass IV: *p*, *pp*, *f*, *pp*, *ff*.

8'00"

8'10"

8'20"

8'30"

8'40"

8'50"

The image displays a musical score for four contrabass parts, labeled Contrabass I, II, III, and IV. Each part is written on a single staff with a treble clef. The score includes various fingering and dynamic markings.

- Contrabass I:** Features a fingering box at the end of the staff with the notation $14^{\circ}/I$ and dynamic markings f and ff .
- Contrabass II:** Features two fingering boxes. The first box has the notation $13^{\circ}/I$ and dynamic markings f and ff . The second box has the notation $12^{\circ}/I$ and dynamic markings f and ff .
- Contrabass III:** Features two fingering boxes. The first box has the notation $12^{\circ}/I$ and dynamic markings f and ff . The second box has the notation $15^{\circ}/I$ and dynamic markings f and ff .
- Contrabass IV:** Features two fingering boxes. The first box has the notation $14^{\circ}/II$ and dynamic markings f and ff . The second box has the notation $13^{\circ}/I$ and dynamic markings f and ff .

The image displays a musical score for four contrabass parts, labeled Contrabass I, II, III, and IV. The score is written on four staves, each with a treble clef. The music is organized into measures, with time signatures indicated at the top: 9'00", 9'10", 9'20", 9'30", 9'40", and 9'50".

Contrabass I: This part features a series of chords and dynamics. It begins with a $14^\circ/\text{I}$ [3°,14°,11°] chord at 9'00", followed by a $12^\circ/\text{I}$ and $12^\circ/\text{II}$ chord at 9'10". The dynamics range from *f* (forte) to *ff* (fortissimo) and *p* (piano). The part concludes with a $11^\circ/\text{III}$ and $10^\circ/\text{III}$ chord at 9'50".

Contrabass II: This part includes chords such as $12^\circ/\text{I}$ and $13^\circ/\text{I}$ at 9'00", $13^\circ/\text{I}$ [8°,13°,5°] at 9'10", $15^\circ/\text{I}$ and $13^\circ/\text{I}$ at 9'20", $12^\circ/\text{I}$, $11^\circ/\text{I}$, and $10^\circ/\text{I}$ at 9'30", $12^\circ/\text{II}$ and $12^\circ/\text{III}$ at 9'40", and $13^\circ/\text{III}$, $12^\circ/\text{III}$, and $11^\circ/\text{III}$ at 9'50". The dynamics include *mf* (mezzo-forte), *ff*, *f*, *p*, and *f*.

Contrabass III: This part features chords like $12^\circ/\text{I}$, $11^\circ/\text{I}$, and $10^\circ/\text{I}$ at 9'00", $13^\circ/\text{II}$ and $12^\circ/\text{II}$ at 9'10", $12^\circ/\text{III}$ at 9'20", $12^\circ/\text{III}$ [5°,12°,7°] at 9'30", and $11^\circ/\text{III}$ at 9'40". The dynamics range from *f* to *ff* and *p*.

Contrabass IV: This part is simpler, featuring a $14^\circ/\text{I}$ [3°,14°,11°] chord at 9'20" and a $13^\circ/\text{I}$, $12^\circ/\text{I}$, $11^\circ/\text{I}$, and $10^\circ/\text{I}$ chord at 9'30". The dynamics are *ff* and *ff*.

The score uses various musical notations, including chords, dynamics, and time signatures, to convey the intended performance.

10'00"

10'10"

10'20"

10'30"

10'40"

10'50"

Contrabass I

11°/III [3°,8°,11°]

10°/III 11°/III 12°/III

10°/II [7°,10°,13°,3°]

10°/II 10°/III

9°/III

8°/III [3°,11°,8°,13°]

ff

p

ff

mf

f

p

ff

Contrabass II

10°/III [7°,10°,13°,3°]

11°/III

11°/III [3°,8°,11°]

10°/III

8°/III [3°,11°,8°,13°]

8°/III

ff

p

ff

mf

f

ff

mf

f

Contrabass III

13°/III [8°,13°,5°]

12°/III

12°/III [5°,12°,7°]

11°/III [3°,8°,11°]

8°/III

10°/III [7°,10°,13°,3°]

ff

p

ff

mf

ff

mf

ff

p

ff

Contrabass IV

12°/III [5°,12°,7°]

13°/III

10°/III [7°,10°,13°,3°]

9°/III

8°/IV [3°,11°,8°,13°]

9°/IV 8°/IV

ff

p

ff

mf

ff

ff

mf

f

11'00" 11'10" 11'20" 11'30" 11'40" 11'50"

Contrabass I

- molto vib.
- ord
- non vib.

sul pont. → over pressure sul tasto (at 6° node)

8°/IV 8°/III

normal pressure
molto sul pont.

III -8
II -2

gliss.

p subito *f* *ff* *mf* *f*

Contrabass II

- molto vib.
- ord
- non vib.

IV sul pont. → over pressure sul tasto (at 6° node)

8°/III [3°,11°,8°,13°]

7°/III 7°/IV

normal pressure
molto sul pont.

IV 0
III -2

gliss.

p subito *f* *ff* *mf* *f* *f*

Contrabass III

- molto vib.
- ord
- non vib.

III sul pont. → over pressure sul tasto (at 6° node)

8°/II 7°/II

normal pressure
molto sul pont.

II -10
I 0

gliss.

p subito *f* *ff* *mf* *f*

Contrabass IV

- molto vib.
- ord
- non vib.

II sul pont. sul pont. → over pressure sul tasto (at 6° node)

8°/I [3°,11°,8°,13°]

11°/II 10°/II 9°/II

normal pressure
molto sul pont.

I -4
II +6

gliss.

f *ff* *mf* *f* *f*

The musical score is written for four Contrabass parts, labeled Contrabass I through Contrabass IV. Each part has a staff with a bass clef and a key signature of one flat (B-flat). Above each staff is a box with three options: '- molto vib.', '- ord', and '- non vib.'. The score is divided into measures by vertical lines, with time markers at the top: 11'00", 11'10", 11'20", 11'30", 11'40", and 11'50". Each part includes dynamic markings (*p subito*, *f*, *ff*, *mf*, *f*) and performance instructions such as 'sul pont.' (sul ponticello), 'over pressure sul tasto (at 6° node)', and 'normal pressure molto sul pont.'. Fingerings are indicated by Roman numerals (I, II, III, IV) and degrees (e.g., 8°/IV, 7°/III). Glissando markings (*gliss.*) are present in several measures. Some measures contain complex fingering diagrams or specific fingerings for chords. The score concludes with a final measure at 11'50" marked with an arrow pointing right.

[illegible]

13'00"

13'10"

13'20"

13'30"

13'40"

13'50"

(very slow / as long as possible)

Contrabass I

2°/II 3°/I 8°/II

13°/I 12°/I 14°/I

15°/I 16°/I

16°/I 17°/I

17°/I 18°/I

19°/I

f p ff

mf f

pp $< f$ pp

p pp possible

Contrabass II

12°/I 13°/I

13°/I 14°/I 15°/I

16°/I 17°/I

17°/I 18°/I

16°/I 17°/I 18°/I

19°/I

f p ff

p mf

pp $< f$ pp

p pp possible

Contrabass III

2°/II 3°/I 8°/II

14°/I 15°/I

15°/I 16°/I

16°/I 17°/I

17°/I 18°/I

19°/I

f p

mf pp

pp $< f$ pp

p pp possible

Contrabass IV

12°/I 13°/I

12°/I 13°/I

13°/I 14°/I

14°/I 15°/I

16°/I 17°/I 18°/I

19°/I

f p

f mf

pp $< f$ pp

p pp possible