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 | ♮B -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 | ♮E -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 Freinherrn v. Hammer-Purgstall.
[2] **L** stands for Pythagorean-limma and **C** stands for Pythagorean-comma (auth.).

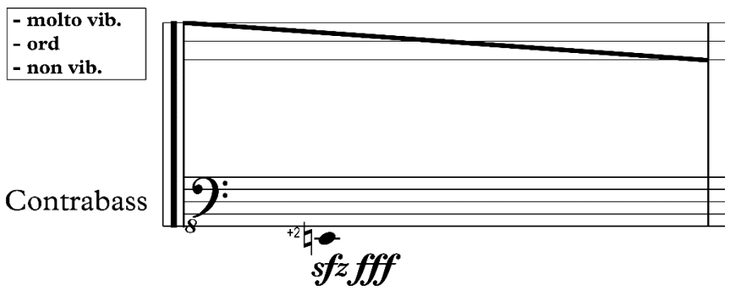
**About the notation:**

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



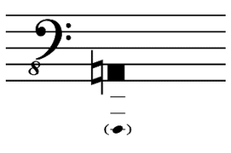
transition from one performance technique to another



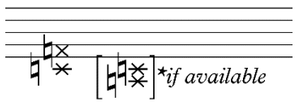
rapid rupture of the sound

tremolos are always irregular and vary in speed through time

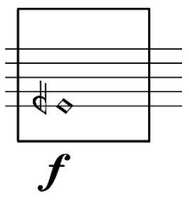
**m.s.t** **m.s.p** rapidly alternate between two positions of molto sul tasto and molto sul ponticello



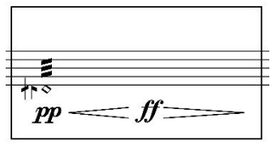
sub harmonic - best result occurs when locating the bow at 6° node, at the sul tasto position with extreme pressure and a completely constant and solid speed




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)



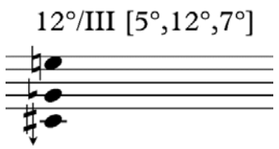

continuous repetition of the given pitch(es) and dynamic(s)

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:

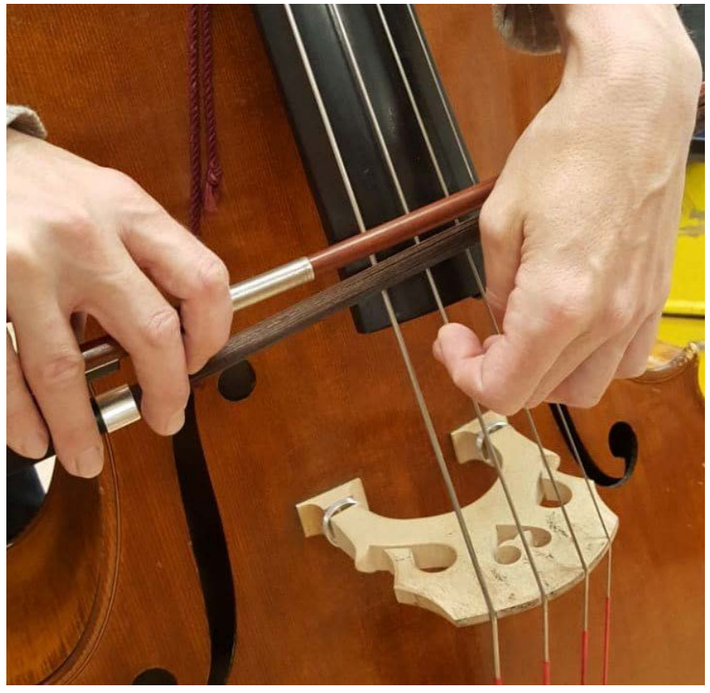
**1) very slow change 2) fast change 3) very fast change**

**Multiphonics:**

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




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

… 𝄫 ♭ ♮ ♯ 𝄪 …

*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* — $^{2187}/_{2048} \approx \pm 113.7$ 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

*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* — $^{32805}/_{32768} \approx \pm 2.0$ cents

## SEPTIMAL JI | PRIME 7

*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

*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

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

*alteration by one tridecimal thirdtone* — $^{27}/_{26} \approx \pm 65.3$ cents *(Gérard Grisey)*

## HIGHER PRIMES 17 – 47

*alteration by one 17-limit schisma* — $^{2187}/_{2176} \approx \pm 8.7$ cents

*alteration by one 19-limit schisma* — $^{513}/_{512} \approx \pm 3.4$ cents

*alteration by one 23-limit comma* — $^{736}/_{729} \approx \pm 16.5$ cents *(James Tenney / John Cage)*

*alteration by one 29-limit sixthtone* — $^{261}/_{256} \approx \pm 33.5$ cents

*alteration by one 31-limit quartertone* — $^{32}/_{31} \approx \pm 55.0$ cents *(Alinaghi Vaziri)*

*alteration by one 37-limit quartertone* — $^{37}/_{36} \approx \pm 47.4$ cents *(Ivan Wyschnegradsky)*

*alteration by one 41-limit comma* — $^{82}/_{81} \approx \pm 21.2$ cents *(Ben Johnston)*

*alteration by one 43-limit comma* — $^{129}/_{128} \approx \pm 13.5$ cents

*alteration by one 47-limit quartertone* — $^{752}/_{729} \approx \pm 53.8$ 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♮ 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𝄲 (−65 cents from A♮) could include the annotation A♭+35 placed above or below its accidental.

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

… 𝄫 ♭ 𝄲 ♮ 𝄳 ♯ 𝄪 …

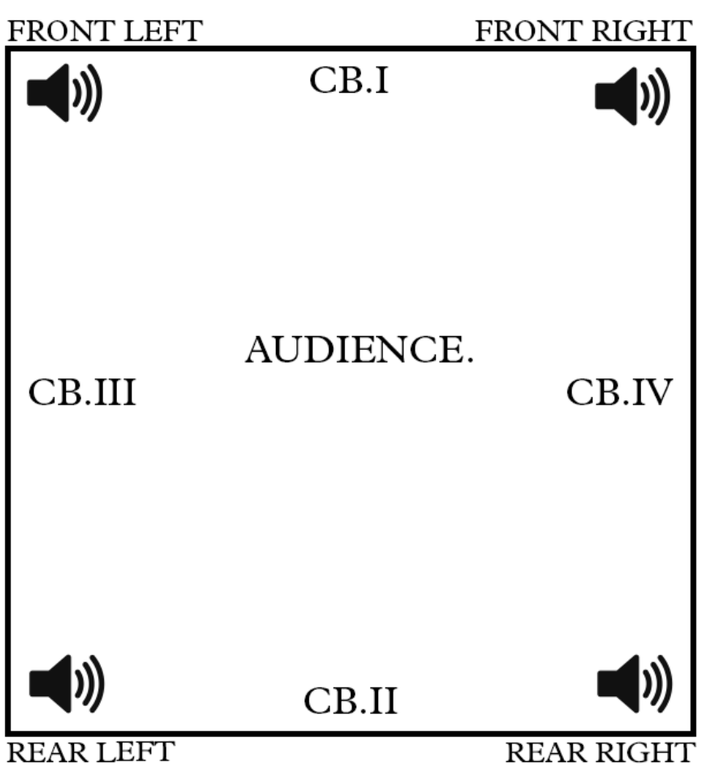
*indicate the respective equal tempered quartertone; show which pitch is assigned a deviation of 0c*

**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

Idin Samimi Mofakham

**Espressivo furioso** ♩ = 60

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

Contrabass I

- molto vib.
- ord
- non vib.

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

+2 gliss. -4 gliss. +6 gliss. +2 +2 +2 gliss.

*sfz fff* *mf* *ff p ff p fff*

Contrabass II

- molto vib.
- ord
- non vib.

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

+2 gliss. -8 gliss. +2 +2 gliss. -8 gliss.

*sfz fff* *mf* *ff p ff p fff*

Contrabass III

- molto vib.
- ord
- non vib.

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

+2 gliss. +6 gliss. -4 gliss. +2 +2 gliss. +6 gliss.

*sfz fff* *mf* *ff p ff p fff*

Contrabass IV

- molto vib.
- ord
- non vib.

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

+2 gliss. -8 gliss. +2 +2 gliss. -4 gliss.

*sfz fff* *mf* *ff p ff p fff*

1'00" 1'10" 1'20" 1'30" 1'40" 1'50"

Contrabass I

- molto vib.
- ord
- non vib.

-4 gliss. -18 gliss. -14 gliss. +10 gliss.

ord. molto sul pont.

*p* < *ff* > *p* < *ff* > *sfz fff* *p* < *ff* > *p* *fff*

Contrabass II

- molto vib.
- ord
- non vib.

-18 gliss. -4 gliss. +10 gliss. -14 gliss. +10 gliss.

ord. molto sul pont.

*sfz fff* *p* < *ff* > *p* < *ff* > *pp* *fff*

Contrabass III

- molto vib.
- ord
- non vib.

-8 gliss. +6 gliss. -4 gliss. -14 gliss.

ord. molto sul pont.

*p* < *ff* > *p* < *ff* > *pp* *ff* > *p* < *ff* > *p* *sfz fff* *fff*

Contrabass IV

- molto vib.
- ord
- non vib.

+6 gliss. -14 gliss. +6 gliss. gliss. -10 gliss.

ord. molto sul pont. ord.

*p* < *ff* > *p* < *ff* > *sfz fff* *p* < *ff* > *p* < *ff* > *p* *ff* > *p* *fff*

2'00" 2'10" 2'20" 2'30" 2'40" 2'50"

Contrabass I

- molto vib.
- ord
- non vib.

over pressure
IV (sempre) / sul tasto (at 6° node)

*gliss.*

normal pressure
molto sul pont.

-10

*gliss.*

over pressure
sul tasto (at 6° node)

normal pressure
molto sul pont.

+10

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

Contrabass II

- molto vib.
- ord
- non vib.

over pressure
IV (sempre) / sul tasto (at 6° node)

normal pressure
molto sul pont.

over pressure
sul tasto (at 6° node)

normal pressure
molto sul pont.

over pressure
sul tasto (at 6° node)

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

Contrabass III

- molto vib.
- ord
- non vib.

over pressure
IV (sempre) / sul tasto (at 6° node)

normal pressure
molto sul pont.

over pressure
sul tasto (at 6° node)

normal pressure
molto sul pont.

-10

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

Contrabass IV

- molto vib.
- ord
- non vib.

over pressure
IV (sempre) / sul tasto (at 6° node)

normal pressure
molto sul pont.

over pressure
sul tasto (at 6° node)

*gliss.*

normal pressure
molto sul pont.

+10

*gliss.*

over pressure
sul tasto (at 6° node)

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

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

Contrabass I

- molto vib.
- ord
- non vib.

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

*gliss.* *gliss.*

-10 -10 +10

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

Contrabass II

- molto vib.
- ord
- non vib.

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.

*gliss.* *gliss.*

+10 -14

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

Contrabass III

- molto vib.
- ord
- non vib.

over pressure
sul tasto (at 6° node)

normal pressure
sul pont.

over pressure
sul tasto (at 6° node)

*gliss.*

-4

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

Contrabass IV

- molto vib.
- ord
- non vib.

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*

4'00" 4'10" 4'20" 4'30" 4'40" 4'50"

Contrabass I

- molto vib.
- ord
- non vib.

normal pressure
molto sul pont.

over pressure
sul tasto (at 6° node)

damp both stings with left hand
over pressure/ scratch tone

m.s.t. m.s.p.

*if available

*fff possibile*

Contrabass II

- molto vib.
- ord
- non vib.

over pressure
sul tasto (at 6° node)

normal pressure
molto sul pont.

damp both stings with left hand
over pressure/ scratch tone

m.s.t. m.s.p.

*if available

*fff possibile*

Contrabass III

- molto vib.
- ord
- non vib.

normal pressure
sul pont.

over pressure
sul tasto (at 6° node)

damp both stings with left hand
over pressure/ scratch tone

m.s.t. m.s.p.

*if available

*fff possibile*

Contrabass IV

- molto vib.
- ord
- non vib.

normal pressure
sul pont.

over pressure
sul tasto (at 6° node)

normal pressure
sul pont.

damp both stings with left hand
over pressure/ scratch tone

m.s.t. m.s.p.

*if available

*fff possibile*

5'00" 5'10" 5'20" 5'30" 5'40" 5'50"

Contrabass I

2°/II 3°/I 8°/II

*p* *f* *p* *f*

Contrabass II

2°/II 3°/I 8°/II

*p* *f* *p*

Contrabass III

2°/II 3°/I 8°/II

*f* *p*

Contrabass IV

3°/I 8°/II 12°/I

*f*

6'00" 6'10" 6'20" 6'30" 6'40" 6'50"

Contrabass I

10°/I 11°/I 12°/I 13°/I

12°/I 13°/I 14°/I

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

Contrabass II

12°/I 14°/II 13°/II 14°/II

13°/II 13°/I 12°/I

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

Contrabass III

15°/II 12°/I 13°/I

*ff* *p*

Contrabass IV

14°/I 13°/I 12°/I

*f* *p* *f*

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

Contrabass I

11°/I 12°/I 13°/I

*pp*

12°/I

*pp* *ff*

Contrabass II

14°/II

*pp* *ff*

12°/I

*pp* *ff*

Contrabass III

13°/I 12°/I 11°/I 10°/I

*f*

11°/I

*pp* *ff*

Contrabass IV

*p*

14°/II 15°/II 12°/I

*pp* *f*

15°/II

*pp* *ff*

8'00" 8'10" 8'20" 8'30" 8'40" 8'50"

Contrabass I

14°/I

*f* *ff*

Contrabass II

13°/I

*f* *ff*

12°/I

*f* *ff*

Contrabass III

12°/I

*f* *ff*

15°/I

*f* *ff*

Contrabass IV

14°/II

*f* *ff*

13°/I

*f* *ff*

9'00" 9'10" 9'20" 9'30" 9'40" 9'50"

Contrabass I

14°/I [3°,14°,11°] 12°/I 12°/II 13°/II 12°/II 12°/III 12°/III [5°,12°,7°] 11°/III 10°/III

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

Contrabass II

12°/I 13°/I 13°/I [8°,13°,5°] 15°/I 13°/I 12°/I 11°/I 10°/I 12°/II 12°/III 13°/III 12°/III 11°/III

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

Contrabass III

12°/I 11°/I 10°/I 13°/II 12°/II 12°/III 12°/III [5°,12°,7°] 11°/III

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

Contrabass IV

14°/I [3°,14°,11°] 13°/I 12°/I 11°/I 10°/I

*ff* *ff*

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.

gliss. gliss.

over pressure
sul tasto (at 6° node)

8°/IV 8°/III

normal pressure
molto sul pont.

III -8
II -2

gliss.

-2
-10

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*

Contrabass III

- molto vib.
- ord
- non vib.

III
sul pont.

gliss.

over pressure
sul tasto (at 6° node)

8°/II 7°/II

normal pressure
molto sul pont.

II -10
I 0

gliss.

0
-14

gliss.

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

Contrabass IV

- molto vib.
- ord
- non vib.

II
sul pont.

gliss.

sul pont.

gliss.

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*

12'00" 12'10" 12'20" 12'30" 12'40" 12'50"

Contrabass I

-2
+8
gliss.
on the bridge
(no fundamental/rich white noise)
gliss.
normal pressure
sul tasto
sul pont.
III
on the bridge
damp both stings
over pressure/ scratch tone
m.s.t.
m.s.p.
*if available
f mf ff subito p ff

Contrabass II

0
-22
gliss.
melodic ratio 4194304 : 4782969
(+227.4 cents)
0
+6
gliss.
normal pressure
flautando
3°/I
11°/I 12°/I
damp both stings
over pressure/ scratch tone
m.s.t.
m.s.p.
*if available
f mf ff subito p ff

Contrabass III

B-20
gliss.
on the bridge
(no fundamental/rich white noise)
gliss.
normal pressure
molto sul pont.
12°/I
15°/I 14°/I
damp both stings
over pressure/ scratch tone
m.s.t.
m.s.p.
*if available
f mf ff subito p ff

Contrabass IV

sul pont.
gliss.
-4
-12
gliss.
I
II
8°/II
12°/I 13°/I
damp both stings
over pressure/ scratch tone
m.s.t.
m.s.p.
*if available
f mf ff subito p ff

13'00" 13'10" 13'20" 13'30" 13'40" 13'50"

Contrabass I

2°/II 3°/I 8°/II

13°/I 12°/I 14°/I — *f* *p* *ff*

15°/I 16°/I — *mf* *f*

16°/I 17°/I — *pp* < *f* *pp*

17°/I 18°/I — *p*

(very slow / as long as possible)

19°/I — *pp* *possibile*

Contrabass II

12°/I 13°/I

13°/I 14°/I 15°/I — *f* *p* *ff*

16°/I 17°/I — *p* *mf*

17°/I 18°/I — *pp* < *f* *pp*

16°/I 17°/I 18°/I — *p*

(very slow / as long as possible)

19°/I — *pp* *possibile*

Contrabass III

2°/II 3°/I 8°/II

14°/I 15°/I — *f* *p*

15°/I 16°/I — *mf* *pp*

16°/I 17°/I — *pp* < *f* *pp*

17°/I 18°/I — *p*

(very slow / as long as possible)

19°/I — *pp* *possibile*

Contrabass IV

12°/I 13°/I

12°/I 13°/I — *f* *p*

13°/I 14°/I — *f* *mf*

14°/I 15°/I — *pp* < *f* *pp*

16°/I 17°/I 18°/I — *p*

(very slow / as long as possible)

19°/I — *pp* *possibile*