

*Marc Sabat*

**Les Duressees**

*a book of music in Just Intonation*

**PLAINSOUND MUSIC EDITION**

## Les Duresses (2004–)

*for violins*

This work-in-progress is a collection of pieces for violin or violin+instrument, conceived as experimental 'intonation studies' in a sense parallel to Conlon Nancarrow's 'Studies for Player Piano'. Like Couperin's books of music for harpsichord, I think of my collection as contemporary house music existing for private playing pleasure which might occasionally double as more formal concert music. 'Les Duresses' is dedicated to Natalie Pfeiffer.

The first two pieces in the series, titled 'Intonation after Morton Feldman #1 and #2', each take as a point of departure a pair of tuned dyads drawn from Morton Feldman's unfinished 'Composition' (1984) for solo violin. The harmonically complex transitions become the respective topics of the new pieces, seeking to make these comprehensible to both player and listener. These pieces may be transposed and played on viola, Partch adapted viola, or cello if desired.

# The Extended Helmholtz-Ellis JI Pitch Notation

microtonal accidentals designed by Marc Sabat and Wolfgang von Schweinitz, 2004

## 3-LIMIT (PYTHAGOREAN) INTERVALS

bb b b# # x

## FUNCTION OF THE ACCIDENTALS

notate 35 pitches from the series of untempered perfect fifths  
 $(3/2) \approx \pm 702.0$  cents;  
*perfect fifth (3/2); perfect fourth (4/3); major wholetone (9/8)*

## 5-LIMIT (PTOLEMAIC) INTERVALS

bb b b# # x bb b b# # x

notate an alteration by one syntonic comma  $(81/80) \approx \pm 21.5$  cents;  
*major third (5/4); minor third (6/5); major sixth (5/3); minor sixth (8/5);  
 minor wholetone (10/9)*

bb b b# # x bb b b# # x

notate an alteration by two syntonic commas  
 $(81/80) \cdot (81/80) \approx \pm 43.0$  cents;  
*augmented fifth (25/16); diminished fourth (32/25)*

bb b b# # x bb b b# # x

notate an alteration by three syntonic commas  
 $(81/80) \cdot (81/80) \cdot (81/80) \approx \pm 64.5$  cents;  
*minor diesis (128/125)*

## 7-LIMIT (SEPTIMAL) INTERVALS

l r ll or ll ll or ll

notate an alteration by one septimal comma  $(64/63) \approx \pm 27.3$  cents;  
*natural seventh (7/4); septimal wholetone (8/7);  
 septimal diminished fifth (7/5); septimal tritone (10/7);  
 septimal minor third (7/6); septimal quartertone (36/35)*

notate an alteration by two septimal commas  
 $(64/63) \cdot (64/63) \approx \pm 54.5$  cents;  
*septimal sixtitone (49/48)*

## 11-LIMIT (UNDECIMAL) INTERVALS

t d

notate an alteration by one undecimal quartertone  
 $(33/32) \approx \pm 53.3$  cents;  
*undecimal augmented fourth (11/8); undecimal diminished fifth (16/11)*

## 13-LIMIT (TRIDECIMAL) INTERVALS

d# #

notate an alteration by one tridecimal thirdditone  $(27/26) \approx \pm 65.3$  cents;  
*tridecimal neutral sixth (13/8); tridecimal neutral third (16/13)*

## PRIMES IN THE HARMONIC SERIES OCTAVE 16 - 32 (5-limit signs are given here relative to "A")

=b =#

notate an alteration of the 5-limit accidental by one 17-limit schisma  
 $(16/17) \cdot (16/15) = (256/255) \approx \pm 6.8$  cents;  
*Galileo's "equal-tempered" semitone (18/17);  
 17-limit diminished seventh chord 10:12:14:17*

-b -b

notate an alteration by one 19-limit schisma  
 $(19/16) \cdot (27/32) = (513/512) \approx \pm 3.4$  cents;  
*19-limit minor third (19/16); 19-limit minor triad 16:19:24*

^# v b

notate an alteration by one 23-limit comma  
 $(23/16) \cdot (8/9) \cdot (8/9) \cdot (8/9) \approx \pm 16.5$  cents;  
*raised leading tone (23/12)*

↑  
♯

↓  
♯

notate an alteration of the 5-limit accidental by one 29-limit comma  
 $(29/16) \cdot (5/9) = (145/144) \approx \pm 12.0$  cents

-  
♯

+  
♯

notate an alteration of the 11-limit accidental by one 31-limit schisma  
 $(32/31) \cdot (32/33) = (1024/1023) \approx \pm 1.7$  cents

**PRIMES IN THE HARMONIC SERIES OCTAVE 32 - 64** (5-limit signs are given here relative to "A")

{  
} ↑  
♯

{  
} ↓  
♯

notate an alteration of the 11-limit accidental by one 37-limit schisma  
 $(36/37) \cdot (33/32) = (297/296) \approx \pm 5.8$  cents

{  
} ↑  
♯

{  
} ↓  
♯

notate an alteration of the 5-limit accidental by one 41-limit schisma  
 $(32/41) \cdot (81/64) \cdot (81/80) = (6561/6560) \approx \pm 0.3$  cents

{  
} ↑

{  
} ↓

notate an alteration by one 43-limit comma  
 $(43/32) \cdot (3/4) = (129/128) \approx \pm 13.5$  cents

{  
} ↑  
♯ or {  
} ↑  
♯

{  
} ↓  
♯ or {  
} ↓  
♯

notate an alteration of the 7-limit accidental by one 47-limit schisma  
 $(32/47) \cdot (48/49) \cdot (3/2) = (2304/2303) \approx \pm 0.8$  cents

{  
} ↑  
♯

{  
} ↓  
♯

notate an alteration of the 5-limit accidental by one 53-limit comma  
 $(32/53) \cdot (5/3) = (160/159) \approx \pm 10.9$  cents

{  
} ↑  
♯

{  
} ↓  
♯

notate an alteration of the 13-limit accidental by one 59-limit schisma  
 $(32/59) \cdot (24/13) = (768/767) \approx \pm 2.3$  cents

{  
} ↑  
♯

{  
} ↓  
♯

notate an alteration of the 7-limit accidental by one 61-limit schisma  
 $(61/32) \cdot (21/40) = (1281/1280) \approx \pm 1.4$  cents

**IRRATIONAL AND TEMPERED INTERVALS**

♭

♭

♯

♯

×

notate the respective Equal Tempered Semitone;  
may be combined with a cents indication to notate any pitch

**NOTE ABOUT CENTS INDICATIONS**

optional cents indications may be placed above or below the respective accidentals and are always understood in reference to Equal Tempered semitones, as implied by the Pythagorean accidentals

# 'Les Duresses' : a book of music in Just Intonation

for Natalie Pfeiffer

## No. 1 : Intonation after Morton Feldman #1 (violin solo)

Marc Sabat, 2004

814 ¢  $\boxed{8/5}$  969 ¢  $\boxed{7/4}$  498 ¢  $\boxed{4/3}$  386 ¢  $\boxed{5/4}$  2. repeat sign : entire bracket

con sordino +155 cents 32 : 35 -112 ¢ 16 : 15

1.

as many bow changes and repetitions as accurate intonation requires,  
proceed continuously through the numbered phrases

653 ¢  $\boxed{35/24}$

2.

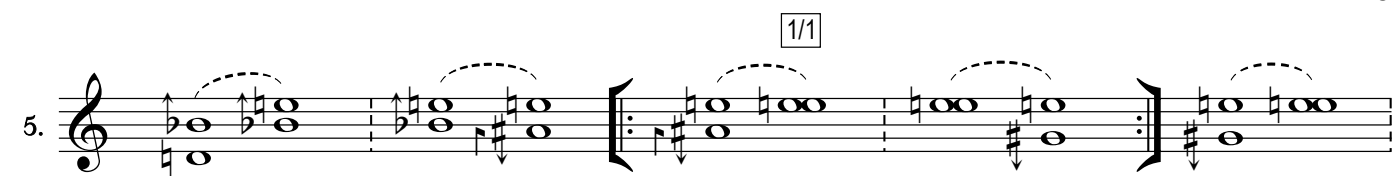
3.

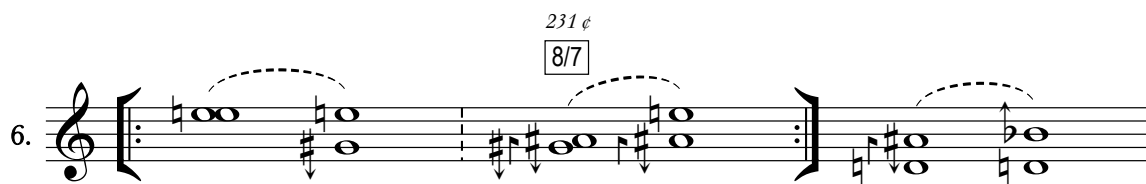
590 ¢  $\boxed{45/32}$  582.5 ¢  $\boxed{7/5}$  1. time only

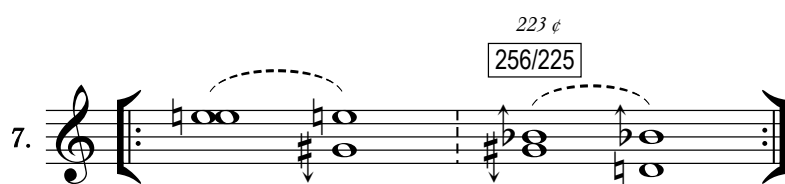
224 : 225 +8 ¢

4.

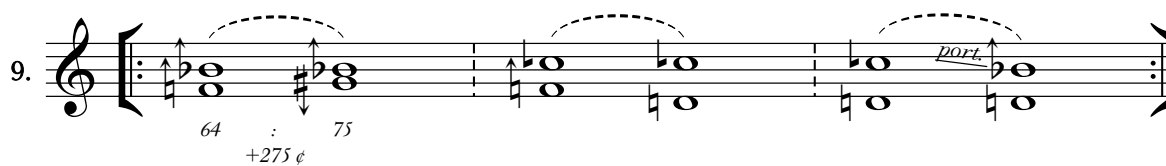
821 ¢  $\boxed{45/28}$  1. time only

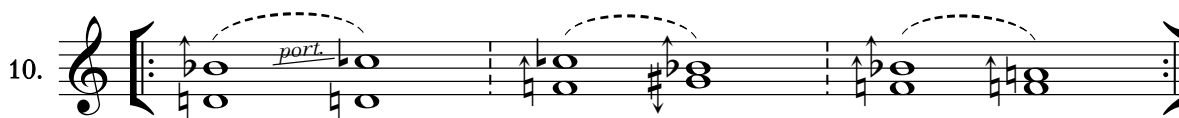
5. 

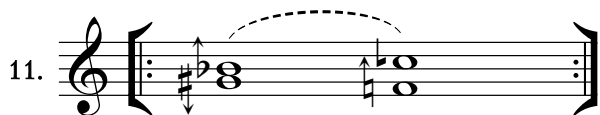
6. 

7. 

8. 

9. 

10. 

11. 

No. 2 : Intonation after Morton Feldman #2 (*violin solo*)

386  $\epsilon$  5/4      814  $\epsilon$  8/5      275  $\epsilon$  75/64

con sordino      sempre simile

as many bow changes and repetitions (at least 3) of each interval as accurate intonation requires;  
 "loure" stroke with several articulations in one bow; repeat segments under square brackets as desired

498  $\epsilon$  4/3      267  $\epsilon$  7/6      379  $\epsilon$  56:45

582.5  $\epsilon$  7/5

617.5  $\epsilon$  10/7      506  $\epsilon$  75/56      590  $\epsilon$  45/32

884  $\epsilon$  5/3      969  $\epsilon$  7/4      1018  $\epsilon$  9/5

20      +84.5  $\epsilon$       21

1173  $\epsilon$  63/32

541.5 ¢ 175:128      316 ¢ 6/5      1200 ¢ 2/1

1178 ¢ 160/81

1067 ¢ 50/27      1049 ¢ 11/6      547.2 ¢ 1000:729      612 ¢ 729:512

100 : 99      55 : 54

-17 ¢      -32 ¢

12/7

41 ¢ 128/125      231 ¢ 8/7      546.8 ¢ 48/35

49 ¢ 36/35      551.3 ¢ 11/8

540 : 539

225 : 224

-3 ¢      -8 ¢

1045 ¢ 64/35

No. 3 : Two Commas (*violin solo*)

con sordino

5/3 8/5 81/64 5/4 27/16 81 : 80 -21.5¢ 81/50

80 : 81 +21.5¢

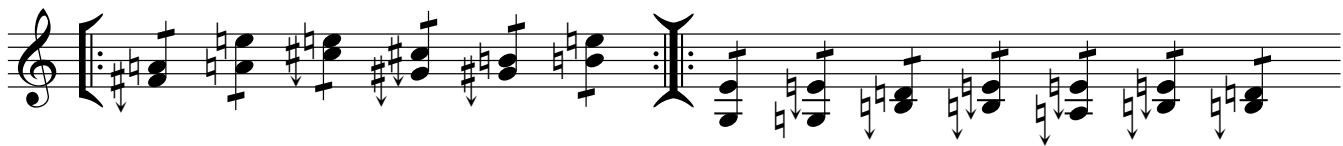
*repeat each double-stop 2 or 3 times as indicated, and each pattern 2 or 3 times as desired; tune as accurately as possible whilst maintaining a lively brisk tempo*

27/20 4/3 7/4 9/7 9/5

35 : 36 +49¢

3/2

81/40 6/5



Skhisma  
-2¢  
----->  
32805 : 32768



Octave (2:1) + Ptolemaic (Syntonic) Comma (81:80)

Octave (2:1) + Pythagorean Comma (531441:524288)

+2¢  
----->  
32768 : 32805



-2¢  
----->  
32805 : 32768



32805 : 32768  
----->  
-2¢



## No. 4 : Duas Quintas (2 violins)

con sordino, legato sempre

35

24

con sordino, legato sempre

*events which are connected by dotted lines are to be co-ordinated as indicated, otherwise played freely; boxed numbers refer to the harmonic series numbers over a low G0 (3 octaves below the G string)*

36

The image shows a musical score for two staves, likely a piano and a violin or flute. The score is divided into several systems. The first system consists of two staves with various notes and rests. The second system also has two staves, with a measure number '25' in a box above the second staff. Below the first staff of the second system is the instruction 'un poco più forte'. The third system has two staves, with a measure number '37' in a box above the first staff. Below the first staff of the third system is the instruction 'number of repetitions always ad libitum'. The score includes various musical notations such as notes, rests, slurs, and dynamic markings. There are also some decorative elements like a large bracket on the left side of the first system.

The musical score consists of six systems of two staves each. The notation includes various musical symbols such as notes, rests, and accidentals. Fret numbers (III, IV, I, II, III) are indicated below the bottom staff of each system. Measure numbers are placed above or below notes: (22), (3), (15), (5), (110), (111), (21), (16), (25), (12), (37). Performance markings include a repeat sign with first and second endings, a wavy line indicating a tremolo effect, and a double bar line with repeat dots. A tempo or performance change is marked with  $+16 \epsilon$  between measures 110 and 111, and  $+12 \epsilon$  between measures 147 and 148. Dashed lines connect notes between staves, indicating fingerings or specific articulations.



First system of musical notation, consisting of two staves. The upper staff contains a melodic line with a flat sign (b) and various rhythmic values. The lower staff contains a bass line with chords and a wavy line indicating a tremolo effect.

Second system of musical notation, consisting of two staves. It includes fingerings (II, III), a measure number (15), and a measure number in parentheses (4). The notation includes various rhythmic patterns and accidentals.

Third system of musical notation, consisting of two staves. It features fingerings (II, III) and various rhythmic patterns. The lower staff has a wavy line indicating a tremolo effect.

Fourth system of musical notation, consisting of two staves. It includes fingerings (III, IV), a measure number (13), and a measure number in parentheses (6). The notation includes various rhythmic patterns and accidentals.

Fifth system of musical notation, consisting of two staves. It features various rhythmic patterns and accidentals. The lower staff has a wavy line indicating a tremolo effect.

Sixth system of musical notation, consisting of two staves. It features various rhythmic patterns and accidentals. The lower staff has a wavy line indicating a tremolo effect.

First system of musical notation. The upper staff contains a melodic line with notes marked with circled numbers (7), (12), and (19). The lower staff provides a harmonic accompaniment with chords and moving lines.

Second system of musical notation. The upper staff continues the melody with a flat sign (-b) above a note. The lower staff includes the instruction *più calmo* and a fermata over a note. A double bar line with a repeat sign is present in the lower staff.

Third system of musical notation. The upper staff has a circled number 39 above a note. The lower staff has a circled number 27 above a note. Dashed lines connect notes between the two staves, indicating a specific relationship or interval.

Fourth system of musical notation. This system continues the melodic and harmonic development, with dashed lines connecting notes between the upper and lower staves.

Fifth system of musical notation. The lower staff features a fermata over a note and is marked with Roman numerals II and III, likely indicating fingerings or specific harmonic positions.

Sixth system of musical notation. The lower staff is marked with Roman numerals II and III, continuing the fingering or harmonic indications from the previous system.

This page of musical notation is for guitar and consists of six systems, each with a treble and bass staff. The key signature is one sharp (F#). The notation includes various musical symbols such as notes, rests, slurs, and fingerings (I, II, III). The piece concludes with a double bar line and a wavy line.

**System 1:** Treble staff has a whole note chord (F#4, A4) followed by a half note (F#4) and a quarter note (A4). Bass staff has a whole note chord (F#2, A2) followed by a half note (F#2) and a quarter note (A2). Fingering: II, III.

**System 2:** Treble staff has a whole note chord (F#4, A4) followed by a half note (F#4) and a quarter note (A4). Bass staff has a whole note chord (F#2, A2) followed by a half note (F#2) and a quarter note (A2). Fingering: I, I.

**System 3:** Treble staff has a whole note chord (F#4, A4) followed by a half note (F#4) and a quarter note (A4). Bass staff has a whole note chord (F#2, A2) followed by a half note (F#2) and a quarter note (A2). Fingering: I.

**System 4:** Treble staff has a whole note chord (F#4, A4) followed by a half note (F#4) and a quarter note (A4). Bass staff has a whole note chord (F#2, A2) followed by a half note (F#2) and a quarter note (A2). Fingering: I.

**System 5:** Treble staff has a whole note chord (F#4, A4) followed by a half note (F#4) and a quarter note (A4). Bass staff has a whole note chord (F#2, A2) followed by a half note (F#2) and a quarter note (A2). Fingering: I.

**System 6:** Treble staff has a whole note chord (F#4, A4) followed by a half note (F#4) and a quarter note (A4). Bass staff has a whole note chord (F#2, A2) followed by a half note (F#2) and a quarter note (A2). Fingering: I.

First system of musical notation. The upper staff contains a melodic line with eighth and sixteenth notes, some beamed together, and a final comma. The lower staff contains a bass line with chords and fingerings: I, II, II, II, I.

Second system of musical notation. The upper staff has a few notes with a comma. The lower staff has a melodic line with fingerings: I, I, II, III, III.

Third system of musical notation. The upper staff has a melodic line with a repeat sign and a wavy line at the end. The lower staff has a bass line with fingerings: III, I, I, I.

Fourth system of musical notation. The upper staff is mostly empty with a wavy line. The lower staff has a melodic line with fingerings: II, III, III, III.

Fifth system of musical notation. The upper staff has a melodic line with a dashed line pointing to a note. The lower staff has a bass line with fingerings: I, I, I, II, II.