Douglas C. Wadle

Systema

(Cognitive Disjunction, proper)

violin, viola, cello

PLAINSOUND MUSIC EDITION

Systema (Cognitive Disjunction, proper) (2008)

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NOTES for performers

A version of *Systema* will be generated by selecting, first, an interval that will serve as the "frame" for the realization. This frame replaces (or is) the octave as the interval of redundancy and, hence, the distance from the starting (mid)point, G4, (a perfect fifth above middle C) to the final pitches performed by the violin (upward) and cello (downward).

Seven pitch-class ratios, "P", are to be calculated by the following formulas, where "F" is the "frame":

$$P^1 = (F - 1)(1/8) + 1$$
$$P^2 = (F - 1)(1/5) + 1$$
$$P^3 = (F - 1)(2/7) + 1$$
$$P^4 = (F - 1)(1/2) + 1$$
$$P^5 = (F - 1)(3/5) + 1$$
$$P^6 = (F - 1)(5/7) + 1$$
$$P^7 = (F - 1)(1/1) + 1 = F$$

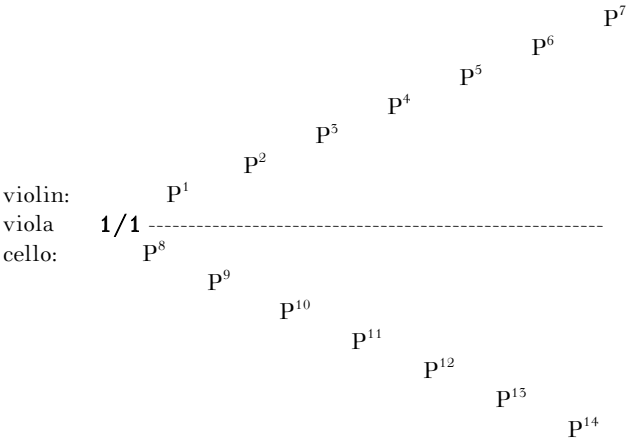
These pitch-classes will form the (primary) rising line of the violin. The pitch-classes of the (primary) descending line of the cello are to be determined by the following formulas:

$$P^8 = P^6(1/F)$$
$$P^9 = P^5(1/F)$$
$$P^{10} = P^4(1/F)$$
$$P^{11} = P^3(1/F)$$
$$P^{12} = P^2(1/F)$$
$$P^{13} = P^1(1/F)$$
$$P^{14} = 1/F$$

The distance of the resulting pitch-class ratios, in cents (1/100 of an equal-tempered semitone), from the beginning G is to be calculated by the formula:

$$1200*\log(A)/\log(2)$$

The outline of the realization is to be constructed according to the following diagram:



The duration between successive introductions of these pitches should be approximately equal, and each pitch is to be sustained at least until the next successive pitch is established. The beginning G is to be sustained throughout the piece (primarily, though not necessarily exclusively, by the viola).

The realization should be constructed in such a way that it can be performed by ear. As such, intervening pitches (in any voice) may be required to facilitate the tuning of certain primary pitches (determined through the calculations above). Wherever possible, these intervening pitches should lie between the extremes of register then sounding in the violin and cello. The frequency relationship between two pitches may be calculated by dividing the smaller ratio into the larger. The size of the resulting interval in cents may be calculated by the formula given above. Note: As a general rule, frequency ratios involving higher numbers, and particular possessing higher prime number factors, are harder to tune[1]. Where no workable solution to the tuning of some primary pitch can be found, a judicious use of scordatura may be necessary.

Douglas C. Wadle
28 March, 2008
Los Angeles

A sample realization at the 3/1 "frame" is provided.

[1] A catalog of frequency ratios tunable by ear was compiled by Marc Sabat and Wolfgang von Schweinitz. The intervals included are, in order of increasing size: 1/1 (unison), 8/7, 7/6, 6/5 (just minor third), 11/9, 5/4 (just major third), 9/7, 13/10, 4/3, 11/8, 7/5, 10/7, 13/9, 16/11, 3/2 (just perfect fifth), 14/9, 11/7, 8/5 (just minor sixth), 13/8, 5/3 (just major sixth), 12/7. 7/4, 9/5, 11/6, 13/7, 15/8, 23/12, 2/1 (octave), 13/6, 11/5, 9/4 (just major ninth), 7/3, 19/8, 12/5, 17/7, 5/2, 18/7, 13/5, 8/3, 11/4, 14/5, 17/6, 20/7, 23/8, 3/1.

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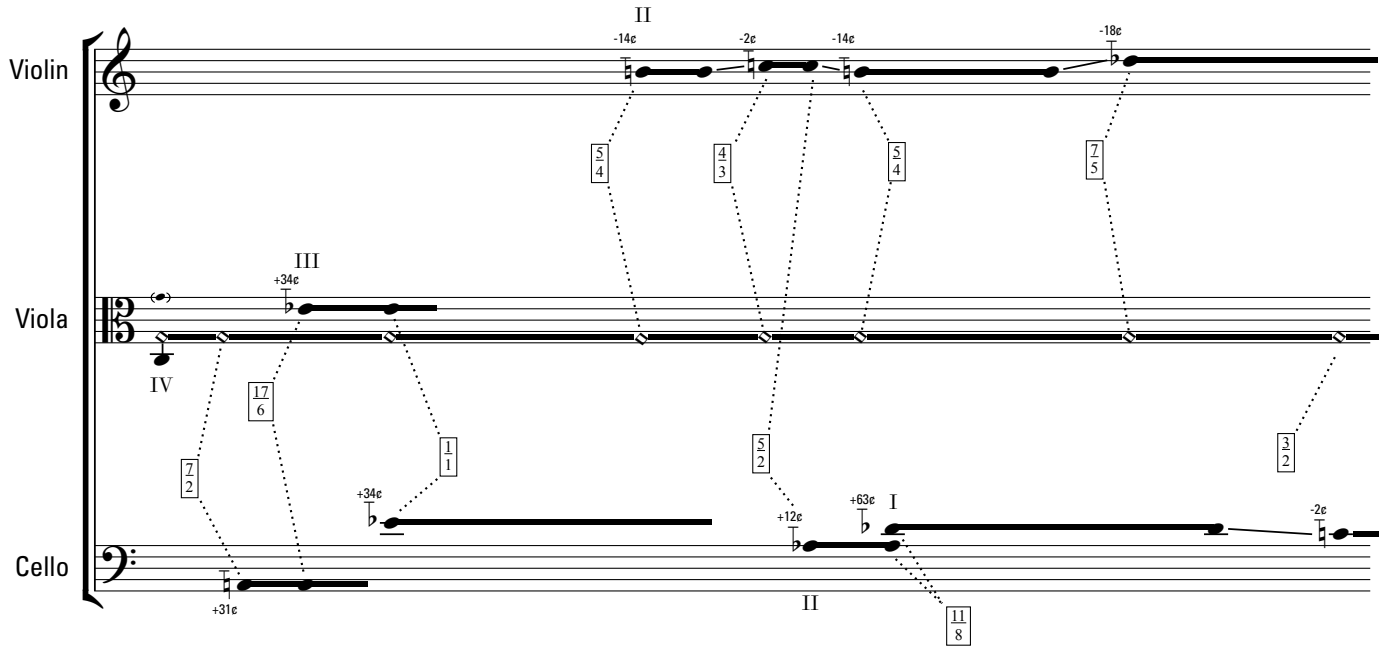
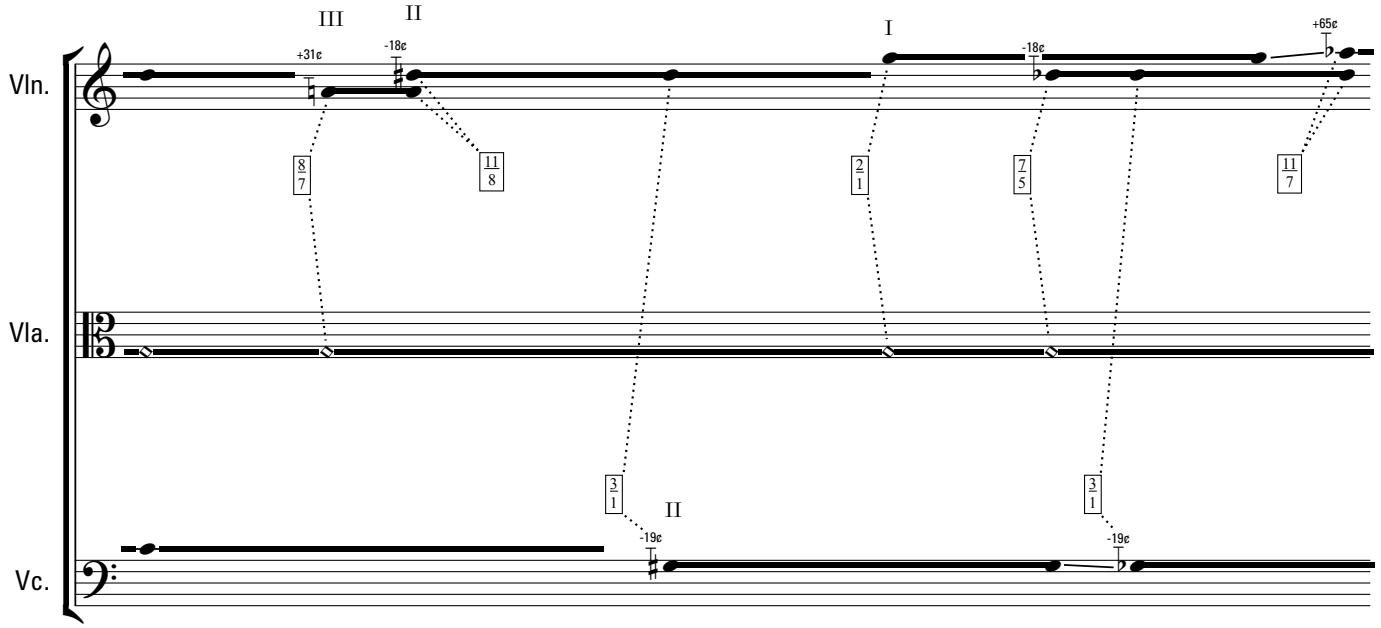
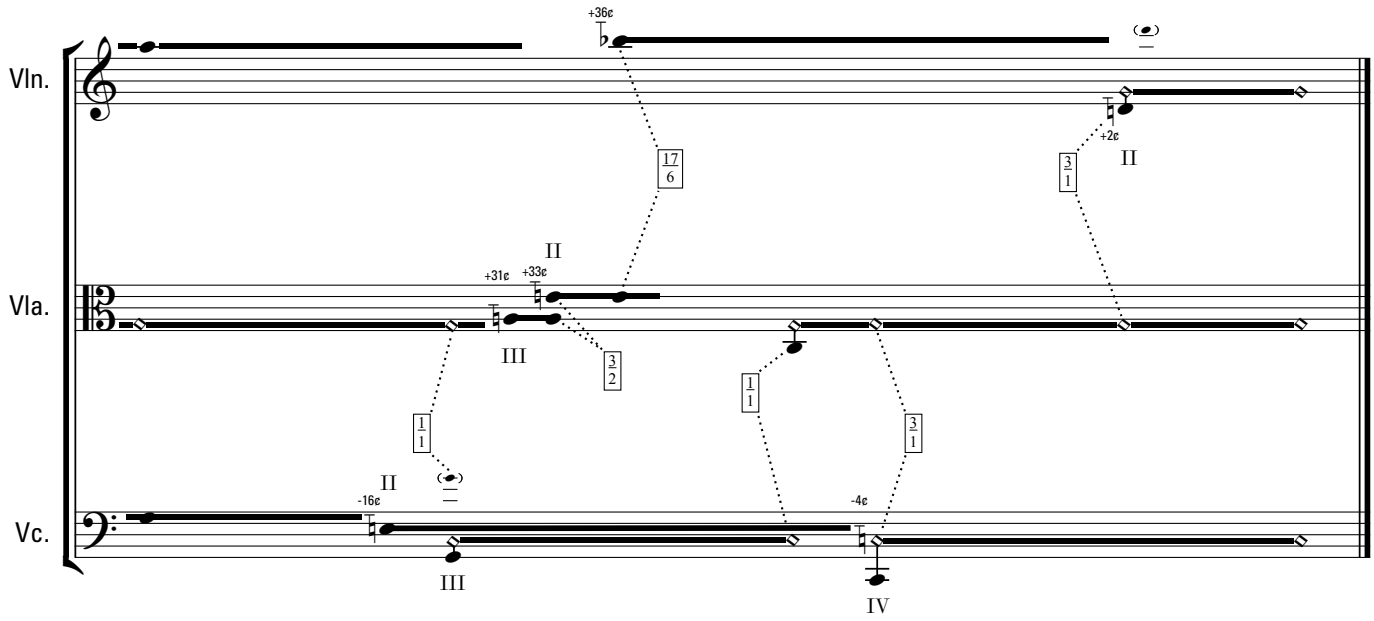
D. C. Wadle

Realization at the 3:1 Frame






Vln.
Vla.
Vc.
+36¢
17/6
II
+31¢
+33¢
III
3/2
1/1
II
-16¢
III
1/1
-4¢
IV
3/1
+2¢
II
3/1