Primes

Scott Mc Laughlin

January 2006

Duration 10+ mins.

Violin

Live Electronics (Max/MSP)

Primes

Performance instructions

General

- Primes has no score as such, the violinist duets with the live electronics according to a set of general principles and rules as set out in this document.

- The structure is open with no bounding length; a minimum of 10 minutes is suggested though.
- Each section of the piece is based on a fundamental frequency, the key. The section begins with the violinist playing a *col legno battuta* cue (see below) followed by a sustained note in the lowest octave. The cue triggers the computer to listen and the sustained note informs it of the key for the section.
- For the main part of the section, the violin improvises around the pitches of the harmonic series for that key (see below): improvisation is in two modes:
  I. Short declamatory melodic phrases with pitches chosen from the given spectrum: this should stand out from the computer part.
  II. Very long drones with slow microtonal glissando: this should blend with the computer part.
- Generally, melodic phrases should lead into drones, but not necessarily.
- The character of the computer part is slow and droning so the violin should aim to work with this, occasionally breaking out with some punctuating melodic phrases which soon sink back into drones.
- Plenty of space should be left between phrases: allow the computer part room to breathe.

The Beginning:

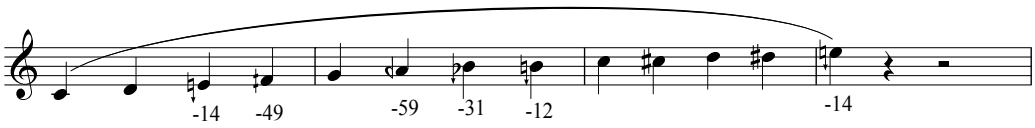
- The computer operator activates the Max/MSPpatch and signals the player who begins by playing a cue.

The Cue:

- The cue signals the computer to suspend its current output and listen for the violin's next pitch, which it interprets as the key-note/fundamental until the next cue. The cue ends and starts each section including the piece's beginning. The end of the piece happens if the violin makes no sound for 30 seconds, then the computer slowly fades out.
- The cue is three short taps in quick succession (less than one second overall) and should be played *col legno battuta* on an open string; it needs to be loud.

Melodic Phrases:

- Below is the harmonic spectrum for the key of C. Numbers refer to cents difference between the pitch and its equal tempered equivalent: F𝄲 (quarter-sharp) is 49c lower than F♯ where 100c = semitone.



- For different keys, transpose accordingly. The player does not have to use all possible keys in each performance and may repeat and alternate keys at will to create structural patterns.
- The spectrum can be used in any octave.
- Phrase structure should be mainly long notes with occasional short notes to connect them; use mostly stepwise pitch motion with some large leaps.
- Phrases should be largely declamatory in style, ornamentation and timbre/colour of any sort may be used but as the phrase approaches the drone the phrase should simplify accordingly to allow a smooth transition: some abrupt transitions may be used but should not be the norm.

Drone Phrases:

- These make up the majority of the piece, the object is to blend with the computer part. The computer is limited to playing the prime numbered partials of a sub-audio fundamental of the section's key but will attempt to play the

partial closest to the current violin pitch. The violin should play with this and slowly glissando towards and away from the closest computer pitch to create beats in the sound.

- This beating texture and the slow glissando of the intertwined violin and computer parts is the main soundworld of the piece.

The Computer:

- The computer generates two musical objects which blend together but have different functions.
- The first is a web of shifting sine-waves generated from a list of frequencies with prime number relations to the fundamental: the key note divided by 64. Up to 8 are playing at any given time and are generated randomly; they react to the average volume of the violin by changing density and volume.
- The second is a pair of biquad filtered tones which sound slightly noisier than the sine-waves. These listen to the violin and attempt to copy it, following the violin pitch by leap or by slow glissando. They are slow and clumsy so the violinist must coax them.The patch also reacts to the violin volume and will attempt to match it.
    - Beware of the patch making octave errors and occasionally false pitch readings. These are side-effects of the patch and should be treated as improvisation by the computer rather than as a mistake.

Ending:

- If at any point there is no sound output from the violin for 30 seconds then the computer assumes the player is finished and slowly fades out.

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Please contact the composer to arrange a performance.
Depending on circumstances, I will probably wish to be in attendance and operate the electronics myself but can also send the patch to anyone who wishes to operate the electronics.

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