Linear Feedback Shift Rhythms

Joshua Storm Becker

Concept

Linear Feedback Shift Rhythms is a piece for zero or four performers. Instrumentation is open, with a emphasis on non-pitched sounds.

The piece involves four linear feedback shift registers (LFSR) with simple taps to encourage periodicity. All of the LFSRs are to be clocked together, with optional clock dividing between them. The initial ”seed” state of the LFSRs is to be set entirely randomly before beginning the piece.

If non-performed, the LFSRs should be set to trigger four separate percussion sounds, set to unique spatial locations around a room. If performed, the stream of the four LFSRs should be projected for the performers to follow along, with each performer located across the performance space if possible.

With each clock pulse, the leftmost value is the trigger the machines/performers should follow, 1s representing percussion hits and 0s representing rests. Per usual LFSR behavior, as the leftmost value is used all register states are shifted left by one and the rightmost register is filled in with the XOR of the two tapped registers from the previous state.

Example Installation

An example version of this piece can be found at http://becker.codes/LFSRhythms.

This version can either be used as a non-performed installation, given the in-browser synthesized noises that are automatically triggered by the LFSR outputs, or can be used for projection to performers.

This example uses LFSRs of 20-bit length and taps on the first and second bits. The LFSRs are initially seeded by browser random number generation. The LFSRs are clock-divided such that the first LFSR is twice as fast as the second and third, which are both twice as fast as the fourth.