Ever-Accelerating Sequences

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Here is a way of creating a sequence that appears to be constantly speeding up or slowing down: The sounds must form a temporal fractal (a temporally self-similar sequence). Here is a simple example. The sequence of 1's shown below represents a series of clicks, whose temporal spacing is indicated by the spacing in the diagram.

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- It starts with a pair of clicks, separated by a brief silence. Think of each individual click as a unit at Level 1, and the pair as a unit at Level 2.
- Then comes a longer silence followed by a second Level-2 unit (two more clicks). Think of these first four clicks as a unit at Level 3.
- After a longer space, the Level-3 unit occurs a second time. These eight clicks form a unit at Level 4.
- After a yet longer space, the eight clicks at Level 4 repeat to form a unit at Level 5,
- Then after a proportionately longer silence, the Level-5 unit is repeated to form a unit at Level 6,
- … etc. for as many levels as desired.

When this sequence is gradually speeded up, all silences shrinking proportionately, all the elements approach each other temporally. When the two nearest clicks of Level 2 come together, at time *t*, they merge into a single click (with the intensity of a single click). That is, they become a Level-1 unit. Level 3 has now become Level 2, Level 4 has become Level 3, etc. Thus, the sequence at time *t* is identical to what it was at time zero. Take this *t*-sec sound file and repeat it indefinitely to give the experience of a sequence that gets faster forever. Play it backward repeatedly to experience a sequence that is forever slowing down.

The simple sequence is self-similar at all levels (a pair of units, separated from the next pair by a silence). However, the basic unit need not be as simple as the one I described here, nor do they have to be of the same intensity, nor does the sequence even have to consist of discrete units. The rule is only that the sound stream be a temporal fractal, a sound that can be split into parts, each of which has (at least approximately) the same structure as the whole. The transformation over time must gradually change a unit of Level n into a unit of Level n-1 (for speeding up), or the reverse (for slowing down). I believe the example by Guy Madison, cited by Leon, follows this principle.

The speeding up must not be at the level of individual samples. A change in sampling rate would change the pitches of the sounds. The speeding up or slowing down has to mimic

the effect of taking a spectrogram and compressing it or stretching it on the temporal dimension (*x* axis). In score-driven synthesizers, such as MITSYN, it is the score that is compressed or stretched, not the waveform.