my_grainer~ a Pure Data External for granular synthesis

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my_grainer~ is a Pure Data external for granular synthesis that was developed by Oscar Pablo Di Liscia as a part of the project "Sintesis espacial de sonido en la música electroacústica" (Universidad Nacional de Quilmes, 2009-2014).

Initialization

my_grainer~ must be initialized with a value of 1 2 o 4. These values mean respectively mono, stereo (intensity panning) output, or quad (Ambisonic) output. The quad output consists of the four signals of an Ambisonic B first order format (W, X, Y, Z) and must be further decoded for the available number of channels/loudspeakers. If none of those arguments are delivered, the default is 2 (stereo output). An extra (rightmost) signal outlet is always created to deliver the reverberation send signal (i.e., without distance scaling, see below).

General purpose messages:

start: starts the audio rendering of the unit. The unit is initialized with the default value parameters (see next section), but note that there are no default for the audio and envelope tables. These must be provide by the user in order to start the audio rendering.

stop: stops the audio rendering of the unit.

***seed* (float)**: seeds the random number generator with the float value delivered.

print: prints the actual parameter values of the unit in the PD prompt.

Synthesis messages

***gtable* tablename**: table name for the audio table.

***afile* tablename**: table name for the amp table.

NB: changing the audio or the envelope tables for the grains is not allowed during performance. The user must send a ***stop*** message before sending either a ***gtable*** or ***atable*** messages and after anyone of them, a ***start*** message must be sent again for resuming the audio rendering.

***ga* (float)**: gap between grains in secs., default 0.1

***gar* (float)**: gap random deviation, in secs., 0 to 1, default 0.

The temporal gap between each grain will be: *ga* + birand(*gar*)

***gs* (float)**: grain size in secs., default 0.05

***gsr* (float)**: grain size random deviation, in secs., 0 to 1, default 0. The size of each grain will be: *gs* + birand(*gsr*)

***gf* (float)**: grain read increment of the audio table (affects the frequency of the signal in the grain), default 1.

***gfr* (float)**: grain increment random deviation of the audio table, default 0.

The increment of each grain will be: *gf* + birand(*gfr*)

***gst* (float)**: initial point of the function table for grains, proportional to the length of the table (0=start of the table, 1 end of the table), default 0.

***gstr* (float)**: random deviation of the function table initial point, proportional to the length of the table, default 0.

The initial reading point for each grain will be: *gst* + birand(*gstr*).

***ag* (float)**: grain amplitude, default 1.

***agr* (float)**: grain amplitude random deviation, default 0.

The amplitude of each grain will be: *ag* + birand(*agr*)

***az* (float)**: grain azimuth angle in degrees. When the output is set to Stereo output, the range for the azimuth angle is from 45 to 135 degrees (45=right, 90 centre, 135=left, counterclock wise), default 90 Deg. When the output is set to Ambisonic 1st Order B Format, the azimuth angle is wrapped around to be in the range of 0 to 360 Deg. Note that 90 Deg. is always centre (facing the listener and counterclock wise) also in this case, which is different than the usual angle conventions for Ambisonics.

***azr* (float)**: grain azimuth angle random deviation in degrees, default 0.

The azimuth angle for each grain will be: *az* + birand(*azr*).

***el* (float)**: grain elevation angle in degrees (0=middle to 360), default 0.

Is taken in account only for quad (Ambisonic) output.

***elr* (float)**: grain elevation angle random deviation in degrees, default 0.
Is taken in account only for quad (Ambisonic) output.
The elevation angle is wrapped around to be in the range of 0 to 360 Deg.
The elevation angle for each grain will be: *el* + birand(*elr*).

***dis* (float)**: grain distance in arbitrary units. Minimal distance was set to 0.1. Default, 1.

***disr* (float)**: grain distance random deviation. At present, the distance cue is achieved by merely scaling the output by 1./distance.
The distance for each grain will be: *dis* + birand(*disr*).
NB: The rightmost signal outlet delivers a copy of the audio grains without the distance scaling to eventually feed a reverberator unit in order to reinforce the distance cue by means of the ratio between “dry” and “wet” signals.

gap_table* float1 float2...floatn**: switches the gap size (*ga*) to discrete gap values, alternating them at random. The same message without any float value switches to gap values selected on the basis of (*ga*, *gar*). Overrides ***ga values.
The resulting gap values in this case will be a random choice out of the delivered gap values plus the *gar* deviation. Useful to create rithmic patterns.

dur_table* float1 float2...floatn**: switches the *dur* size (*gs*) to discrete size values, alternating them at random. The same message without any float value switches to size values selected on the basis of (*gs*, *gsr*). Overrides ***gs values.
The resulting size values in this case will be a random choice out of the delivered *gs* values plus the *gsr* deviation.

pitch_table* float1 float2...floatn**: switches the read increment (*gf*) to discrete pitch deviation values, alternating them at random. The same message without any float value switches to increment values (*gf*, *gfr*). Overrides ***gf the value. The resulting pitch values in this case will be a random choice out of the delivered pitch values plus the pitch deviation set in *gfr*.
Useful for creating pitched sequences of grains. As an example, being the table fundamental frequency C5, the message *pitch_table 1 4 2 7* will produce pitched grains with their frequency being selected at random between C#5, E5, D5 and G5.

***ptr_table* float1 float2...floatn:** switches the start point of audio reading (*gst*) to discrete values, alternating them at random. The same message without any float value switches to start values selected on the basis of (*gst*, *gstr*). Overrides the *gst* values.
The resulting start values in this case will be a random choice out of the delivered start values plus the *gstr* deviation.
Useful to create grains from specific regions of th audio table.

(Information Updated by Pablo Di Liscia, 08/12/2014)