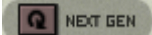# Mutation

To use the plugin (Microsoft Windows only) copy the Mutation folder to your VST plugins folder then load `Mutation.dll` in your DAW/host. NOTE: Mutation is tuned to standard note frequencies (A4 = 440Hz) at the sample rate 44100Hz. It will work at different sample rates but the output notes will be transposed accordingly. If Mutation's controls are too small to see, try pressing the Windows logo key and the '+' sign together to turn on the Windows magnifier

To use Mutation's genetic algorithms simply select a sound and move the **`Rating`** slider, then click **`Next Gen`** 🅀 NEXT GEN (you can rate multiple sounds before clicking **`Next Gen`** in which case the resulting population will be produced by crossing over data from each rated sound). This can be done with one of the existing sounds or alternatively clicking **`Next Gen`** without rating any sounds will create a new set of 10 random sounds.

Sound Controls

General Sound Controls

`Amp Envelope` – The Attack, Decay, Sustain and Release controls at the top of the window

`Octave` – The octave of the sound

`Volume` – The volume of the sound

`Glide` – Portamento/glide effect

Filter

`Filter Cutoff` – Filter cutoff frequency

`Filter Type Switch` – Low pass, High pass, Band pass, Low pass/High pass or Low pass/Band pass

`Filter Resonance 1` – The resonance of filter 1

`Filter Resonance 2` – The resonance of filter 2 if dual filter is selected

`Filter envelope amount` – Strength of the filter envelope effect

`Filter envelope` – To change the filter envelope use the filter Attack, Decay, Sustain and Release controls at the top of the window next to the amp envelope

Delay

First row of delay controls from left to right are as follows:

`Delay Feedback` – Delay feedback amount (maximum is 99%)

`Delay mix` – Amplitude of delay lines

`Delay Filter Frequency` – The cutoff frequency of the filter applied to each delay line

`Delay Filter Width` – Determines the separation between the two cutoff points if filter type is set to low pass/high Pass

`Delay Filter 1 Resonance` – Filter 1 resonance

`Delay Filter 2 Resonance` – Filter 2 resonance

`Delay Filter Type Switch` – Type of filter applied (Band Pass, Dual Low pass/High Pass or none)

Second row of delay controls from left to right are as follows:

`Delay time` – Set delay time (synced to tempo – may need resetting if tempo is changed)

`Delay Pitch Mod Amount` – Amount of pitch modulation applied to each delay line

`Delay Pitch Mod Rate` – Rate of delay pitch modulation

`Delay Pitch Mod Phase` – This offsets each pitch modulation wave slightly so the sound choruses differently at each cycle of the delay (if set too high can interfere with the timing)

`Delay Filter Mod Amount` – Amount of filter modulation

`Delay Filter Mod Rate` – Rate of filter modulation

`Delay Filter Mod Spread` – Gives each of the six delay lines a different cutoff frequency (within the range specified by filter mod amount)

Wave Controls

To select a wave, use the wave selector buttons, the `Wave Function` button shows a graphic of the wave's spectrum, the `Pitch Mod` button shows the graph for any pitch modulation (the `Spectrum Wave` function is not in use in this version of the software). The values in the number boxes may be changed by clicking on the number and then dragging the mouse up or down or alternatively clicking the up/down arrows on the right to change the value in set increments.
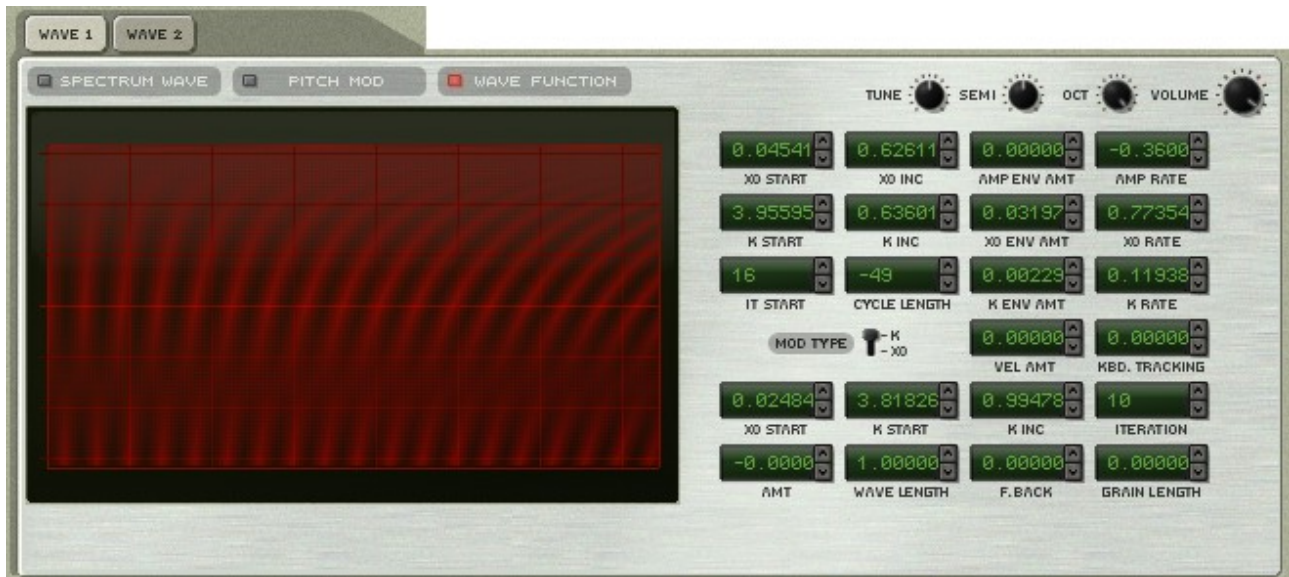
The volume and octave of an individual wave can be changed using the controls in the top right-hand corner (the GUI controls `tune` and `semitone` are also not working in this version of the software unfortunately).

The above image shows the Logistic map parameters which are applied to the sound spectrum as described in the thesis, changing these controls should update the image of the wave's spectrum (effect will only be applied to a sound with this form of spectrum modulation enabled, some sounds are set to only use 'Mod Function' and not the Logistic map).

This image shows the Frequency Modulation unit's envelope/LFO controls (for FM wave amplitude, X0 and K). Setting the rate to a positive value gives an envelope while setting to a negative value gives an LFO. Setting a negative rate beyond -0.35 means the LFO cycles at audio frequency at an integer ratio of the sound's frequency.

The image above shows the frequency Modulation Controls as described in the thesis. `Amount` sets the amount of frequency modulation, `Wavelength` sets the FM wave's wavelegth (using the up/down arrows on the right allows it to be kept as an integer ratio of the sound's wavelength). `Velocity Amount` ties the X0 parameter to note velocity while `Keyboard Tracking` ties note pitch to the X0 parameter.