SplineEQ

VERSION 1.0.x

User Guide

TABLE OF CONTENTS
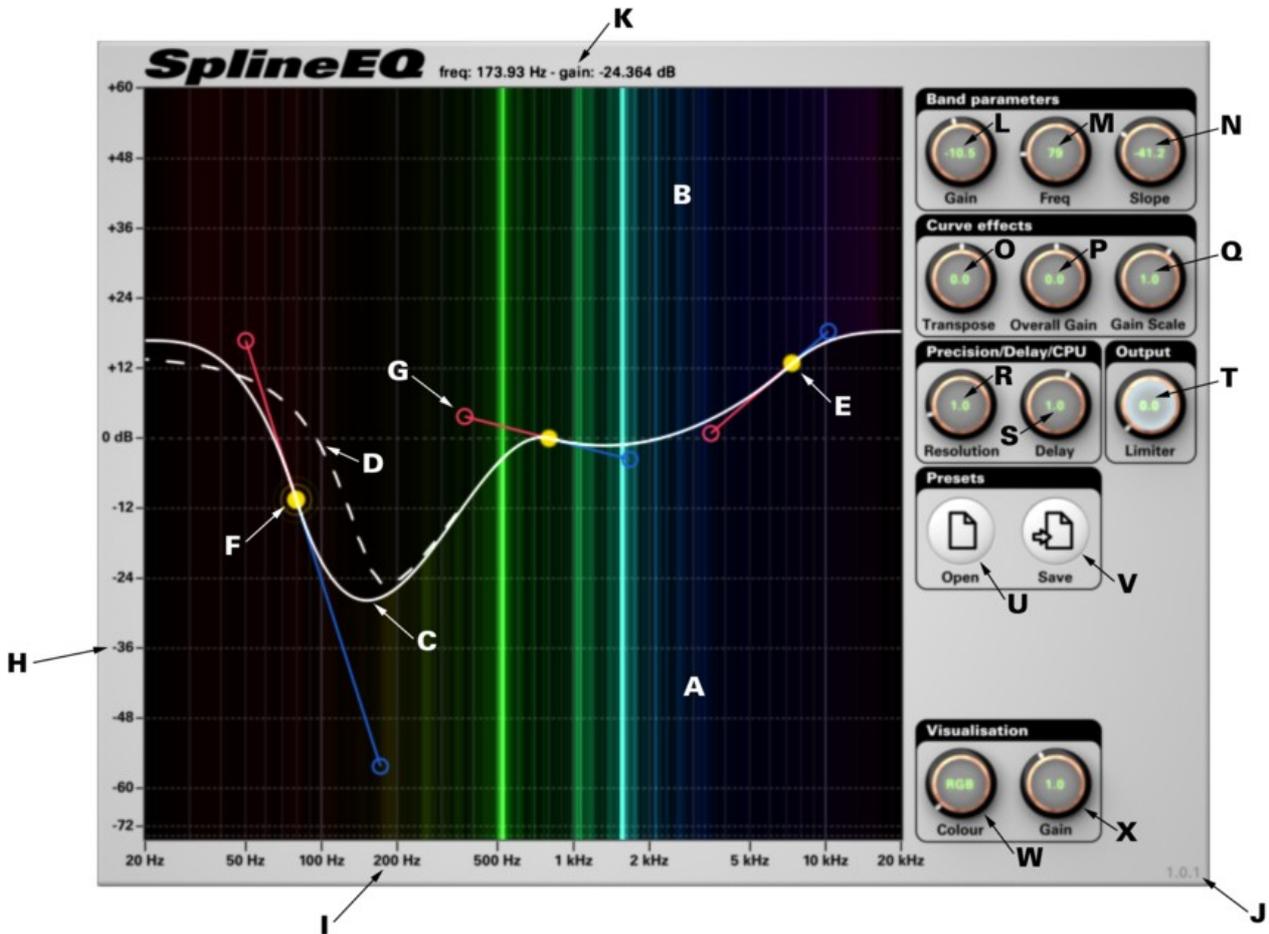
I. Interface

OVERVIEW

A. Spectral analyser (Before)
B. Spectral analyser (After)
C. Equalisation curve (Ideal)
D. Equalisation curve (Actual)
E. Band control point
F. Selected control point
G. Band slope handle
H. Gain scale
I. Frequency scale
J. Version number
K. Mouseover information
L. Gain of the selected band in dB
M. Frequency of the selected band in Hz
N. Slope of the selected band in dB/octave
O. Transposition of the whole curve in semitones
P. Overall gain applied to the whole curve in dB
Q. Multiplier applied to the gain and slopes of all bands
R. Size of the filter (affects filtering resolution)
S. Size of the input buffer (affects delay and CPU usage)
T. Output loudness limiter in dB
U. Open preset file
V. Save preset file
W. Colour setting for the spectral visualisation
X. Intensity of the spectral visualisation

CURVE EDITING

SplineEQ creates a filter based entirely on the ideal equalisation curve (C) which is defined by the band control points (E) and their tangent handles (G) and modified by several curve effects (O, P, Q). The actual equalisation curve (D) is displayed as a dashed line when it differs from the ideal curve (C). The actual equalisation curve can be modified to be more faithful to the ideal curve by increasing the frequency resolution (R) of the filter.

When a band control point (E) is selected by clicking on it the circle it is represented by becomes surrounded by rings (F) and the knob parameters of gain (L), frequency (M) and slope (N) are changed to reflect the values of the selected band. All three of these parameters that defines the selected band can be modified either by clicking and dragging the 3 dots (E, G) that represent it in the visualisation area, by tweaking the band parameter knobs (L, M, N), by directly entering new values into these knobs by right clicking on them or even by moving the sliders that are linked to these values in the host's interface. Double clicking on the gain (L) and slope (N) knobs resets those values to zero while double clicking on the frequency knob (M) reverts to the frequency of the band when it was originally created.

Band control points (E) can be created or disabled by double clicking. Double clicking an existing band control point (E) will disable it while double clicking where no dots exist will create a new band with a gain and frequency that places the band control point under the cursor and with a slope of zero.

The curve is calculated based on all the parameters of all the active bands as a cubic Bézier spline curve in the hybrid linear-logarithmic gain/logarithmic frequency domain. The curve is composed of segments, each segment starting from a band control point (E) and going up to the next control point in frequency, and is shaped by the position of these points as well as their slopes which define the angle of the tangent at the band control point (E). The segments before the first control point in frequency and after the last control point frequency are defined by extra control points that are invisible and automatically calculated. The frequency of these invisible control points is the frequency at the edge of the visualisation area (20 Hz and 20 kHz, respectively) unless the first and last user-created control points are outside of the visualisation area in which case their frequency is respectively lower and higher. The gain of those invisible control points is the same as the gain at which the control for the handle (G) of the corresponding user-created control point appears to be and the slope of the invisible band is always at zero, this way it always appears that the first and last segment are smoothly transitioning from the first/last user-created band to the edge of the visualisation area into an infinite flat line at the gain level of the aforementioned handle control.

CURVE EFFECTS

The curve can be entirely modified by several effects. The Transpose effect (O) shifts the entire curve left or right by a given amount of semitones. The Overall Gain effect (P) shifts the entire curve up or down by a given amount of decibels. And the Gain Scale effect (Q) applies a multiplier to the gains and slopes of all bands as to vertically exaggerate, diminish, flatten or invert the shape of the curve.

FILTER PARAMETERS

As the ideal equalisation curve (C) can substantially differ from the actual equalisation curve (D) the frequency resolution of the filter can be increased to make the actual equalisation curve come closer to the ideal curve. This is done by changing the value of the Resolution knob (R). By default when the Resolution knob is set to 1.0 the filter has a duration of 23 ms (half of that duration adds up to the delay, as displayed in the information text (K)), which grants it a maximum resolution of about 43 Hz. If the resolution is turned to its maximum of 8 then the filter has a duration of 186 ms, giving it a maximum resolution of 5 Hz.

However the resolution setting also scales up the size of the input buffer so that the level of CPU use remains about the same when changing the resolution. To lower the delay at the expense of CPU efficiency the Delay knob (S) can change the size of the input buffer.

As the information text (K) shows, both parameters affect the delay between the input and the output sound. SplineEQ reports this delay to the host every time it changes, however many hosts only take into consideration the delay reported when the plugin initialises and disregard any update. If the delay has been changed dramatically it can be useful to reload your project as SplineEQ will then report the delay based on the saved resolution and delay parameters, and therefore the host will compensate for the correct amount of delay.

LIMITER

The Limiter knob (T) limits the loudness of the output by a threshold given in decibels as a measure to prevent any overly loud sounds from coming out of SplineEQ. When samples are detected over the threshold the volume of the output is lowered to that threshold and this lowering of the volume is sustained for at least a few seconds. When the limiter is actively lowering the volume of the output the Limiter knob lights up in a white-cyan colour. At the value of 60 dB the limiter is disabled.

VISUALISATION

The colours scheme of the spectral visualisation and of the visualisation area can be changed using the Colour knob (W) and the Gain knob (X). The Colour knob has four modes. The default mode, RGB, displays the spectral profile of the sound in red, green and blue over a black background. The CMY mode uses a cyan, magenta and yellow scheme over a black background. The RGBW and CMYW modes do the same except over a white background and change the colour of many elements in the visualisation area. The Gain knob changes the intensity of the spectral visualisation to better visualise fainter sounds or to make the spectral visualisation appear less flashy. By turning the gain all the way to zero the spectral visualisation is entirely disabled and doesn't even get computed which can save some CPU.

II. Presets

DESCRIPTION

SplineEQ uses a proprietary format for loading and saving presets, which is done using the Open (U) and Save (V) buttons. Presets are loaded by locating the preset file and opening it. A pack of presets can be found on SplineEQ's [download webpage](#).

FORMAT

SplineEQ presets files use a .dat extension and are in human-readable text formation with Unix line codings. This means that presets can be edited or even created by hand using a text editor. Each line of a preset file represents each active band with its name-index (represented by an alphabetic index going from A for the first band to BH for the last and 60th band), gain in dB, frequency in Hz and slope in dB/octave. The last three lines give the values for the transpose, overall gain and gain scale parameters.