DrawJong 1.2
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About DrawJong:

DrawJong is a visualizer based on a chaotic attractor known as the De Jong Attractor. It can be modeled by solving two equations:

$$x_n = sin(a*y_{n-1}) – cos(b*x_{n-1})$$
$$y_n = sin(c*x_{n-1}) – cos(d*y_{n-1})$$

a, b, c, and d are known as the coefficients of the equation. These can be changed under DrawJong's “Figure” menu. If you would like to read more about this system, visit http://paulbourke.net/fractals/peterdejong/

In addition to its visual capabilities, DrawJong is also a complex, two-oscillator chaotic wave terrain synthesizer with frequency modulation (FM). To generate sound, all of the x values of the De Jong equation are loaded into one wavetable, while all of the y values are loaded into another. These two wavetables can be scanned by oscillators of varying table sizes, and these two oscillators can modulate each other's frequencies.

How to Use:

When you first start up DrawJong, you will see the De Jong equation rendered in orange. It's x values are rendered across the top as a waveform, while the y values are on the bottom. You should see six buttons: Figure, Colors, Synth, Screenshot, Help, and Credits.

Figure:

These controls affect the geometry and rendering of the De Jong attractor.

- “Points” controls the number of data points computed and rendered. If you are on a first generation iPad, you should lower this value, as this is the most processor-intensive setting.
- The four “Coefficients” control the geometry of the visuals, and also greatly affect the sound.
- “Position” moves the figure around in space.
- “Line Mode” uses lines instead of points to render the De Jong attractor. This will not affect the sound in any way, but provides different aesthetics.
- “Animated Mode” turns on a modified version of the algorithm that constantly updates the location of every point. This version is very noisy, and works best at low frequencies.

- “Gesture Controls” enables touch-screen control of the figure:
- **One-finger swipe controls Coefficients A (x-axis) and B (y-axis).**
  Two-finger swipe controls Coefficients C (x-axis) and D (y-axis).
  Pinch to scale figure size.
  Double tap with one finger to randomize the background color.
  Double tap with two fingers to randomize the particle colors.

Colors:
These controls affect the colors of both the De Jong figure and the background.

- “R,” “G,” and “B” affect the red, blue, and green components, respectively.
- “Alpha Blending” will make the individual points of the figure slightly transparent. Colors will build up in areas of high point density. Use this for a more three-dimensional image. However, if you want black points, you will have to turn off alpha blending.
- “Waveform Colors” will enable the coloration of the top and bottom waveforms. The color of these waveforms follows the color of the particles.

Synth:
These controls affect the sound generating engine in DrawJong.

- “Frequency” controls the number of times the current table is scanned per second by the oscillators. This shouldn't be confused with “pitch,” as the wavetables being scanned are extremely complex. The top slider for each frequency is a “coarse” slider, which changes frequency at a much greater rate than the “fine” slider, which is below it.
- “Gain” controls the volume of each oscillator.
- “FM Mode” sets whether the oscillators modify each other's frequencies. “None” means the oscillators won't affect each other. “X->Y” means that X will modulate Y, and “Y->X” means that Y will modulate X. The amount of modulation present is set with the “Modulation Depth” slider. While explaining FM Synthesis is beyond the scope of this manual, if you are interested, I highly recommend reading the Wikipedia article and moving on from there.
- “Table Sizes” determine the size of each oscillator's wavetable, in samples. In general, a small wavetable will provide you with less noisy, more stable waveforms with distinct pitches, while larger tables become extremely noisy. However, larger wavetables can be very sonically interesting at lower frequencies. Experiment!
- “Display” changes whether or not the wavetables are rendered

visually.

Please note that you can drag the current table across the waveform! To do this, drag from the table's left edge (The tables are the blue or red boxes on top of the waveform).

Screenshot

This button will save a copy of the currently rendered figure to your iPad's photo album. Your sound may stutter while the image is being saved. If you don't want the waveforms to be saved with your image, you can turn them off with the “Display” setting under “Sound”.

Help

This is the manual that you are currently reading!

Credits

DrawJong could not have been made without the people listed here.