

Lissajous Figures

Lissajous (pronounced *LEE-suh-zhoo*) figures were discovered by the French physicist Jules Antoine Lissajous. He would use sounds of different frequencies to vibrate a mirror. A beam of light reflected from the mirror would trace patterns which depended on the frequencies of the sounds. Lissajous' setup was similar to the apparatus which is used today to project laser light shows.

Before the days of digital frequency meters and phase-locked loops, Lissajous figures were used to determine the frequencies of sounds or radio signals. A signal of known frequency was applied to the horizontal axis of an oscilloscope, and the signal to be measured was applied to the vertical axis. The resulting pattern was a function of the ratio of the two frequencies.

Lissajous figures often appeared as props in science fiction movies made during the 1950's. One of the best examples can be found in the opening sequence of *The Outer Limits* TV series. ("Do not attempt to adjust your picture--*we* are controlling the transmission.") The pattern of criss-cross lines is actually a Lissajous figure.

The Lissajous Lab provides you with a virtual oscilloscope which you can use to generate these patterns. (*You* will control the horizontal. *You* will control the vertical.) The applet also allows you to apply a signal to modulate the hue of the trace, so you can create colorful designs.