

NAME

epicycle – draws a point moving around a circle which moves around a circle which...

SYNOPSIS

epicycle [*--display host:display.screen*] [*--root*] [*--window-id number*][*--window*] [*--mono*] [*--install*] [*--noinstall*] [*--visual viz*] [*--colors N*] [*--foreground name*] [*--color-shift N*] [*--delay microseconds*] [*--holdtime seconds*] [*--linewidth N*] [*--min_circles N*] [*--max_circles N*] [*--min_speed number*] [*--max_speed number*] [*--harmonics N*] [*--timestep number*] [*--divisor_poisson probability*] [*--size_factor_min number*] [*--size_factor_max number*] [*--fps*]

DESCRIPTION

The epicycle program draws the path traced out by a point on the edge of a circle. That circle rotates around a point on the rim of another circle, and so on, several times. The random curves produced can be simple or complex, convex or concave, but they are always closed curves (they never go in indefinitely).

You can configure both the way the curves are drawn and the way in which the random sequence of circles is generated, either with command-line options or X resources.

OPTIONS

- display** *host:display.screen*
Specifies which X display we should use (see the section DISPLAY NAMES in X(1) for more information about this option).
- root** Draw on the root window.
- window-id** *number*
Draw on the specified window.
- window**
Draw on a newly-created window. This is the default.
- mono**
If on a color display, pretend we're on a monochrome display. If we're on a mono display, we have no choice.
- install**
Install a private colormap for the window.
- noinstall**
Don't install a private colormap for the window.
- visual** *viz*
Specify which visual to use. Legal values are the name of a visual class, or the id number (decimal or hex) of a specific visual. Possible choices include

default, best, mono, monochrome, gray, grey, color, staticgray, staticcolor, truecolor, grayscale, greyscale, pseudocolor, directcolor, *number*

If a decimal or hexadecimal number is used, **XGetVisualInfo(3X)** is consulted to obtain the required visual.
- colors** *N*
How many colors should be used (if possible). The colors are chosen randomly.
- foreground** *name*
With **--mono**, this option selects the foreground colour.
- delay** *microseconds*
Specifies the delay between drawing successive line segments of the path. If you do not specify **--sync**, some X servers may batch up several drawing operations together, producing a less smooth effect. This is more likely to happen in monochrome mode (on monochrome servers or when **--mono** is specified).

- holdtime** *seconds*
When the figure is complete, *epicycle* pauses this number of seconds.
- linewidth** *N*
Width in pixels of the body's track. Specifying values greater than one may cause slower drawing. The fastest value is usually zero, meaning one pixel.
- min_circles** *N*
Smallest number of epicycles in the figure.
- max_circles** *N*
Largest number of epicycles in the figure.
- min_speed** *number*
Smallest possible value for the base speed of revolution of the epicycles. The actual speeds of the epicycles vary from this down to *min_speed / harmonics*.
- max_speed** *number*
Smallest possible value for the base speed of revolution of the epicycles.
- harmonics** *N*
Number of possible harmonics; the larger this value is, the greater the possible variety of possible speeds of epicycle.
- timestep** *number*
Decreasing this value will reduce the distance the body moves for each line segment, possibly producing a smoother figure. Increasing it may produce faster results.
- divisor_poisson** *probability*
Each epicycle rotates at a rate which is a factor of the base speed. The speed of each epicycle is the base speed divided by some integer between 1 and the value of the **--harmonics** option. This integer is decided by starting at 1 and tossing a biased coin. For each consecutive head, the value is incremented by one. The integer will not be incremented above the value of the **--harmonics** option. The argument of this option decides the bias of the coin; it is the probability that that coin will produce a head at any given toss.
- size_factor_min** *number*
Epicycles are always at least this factor smaller than their parents.
- size_factor_max** *number*
Epicycles are never more than this factor smaller than their parents.
- fps** Display the current frame rate and CPU load. **--timestep** option multiplied by the timestep-CoarseFactor resource. The default value of 1 will almost always work fast enough and so this resource is not available as a command-line option.

USER INTERFACE

The program runs mostly without user interaction. When running on the root window, no input is accepted. When running in its own window, the program will exit if mouse button 3 is pressed. If any other mouse button is pressed, the current figure will be abandoned and another will be started.

HISTORY

The geometry of epicycles was perfected by Hipparchus of Rhodes at some time around 125 B.C., 185 years after the birth of Aristarchus of Samos, the inventor of the heliocentric universe model. Hipparchus applied epicycles to the Sun and the Moon. Ptolemy of Alexandria went on to apply them to what was then the known universe, at around 150 A.D. Copernicus went on to apply them to the heliocentric model at the beginning of the sixteenth century. Johannes Kepler discovered that the planets actually move in elliptical orbits in about 1602. The inverse-square law of gravity was suggested by Boulliau in 1645. Isaac Newton's *Principia Mathematica* was published in 1687, and proved that Kepler's laws derived from Newtonian gravitation.

BUGS

The colour selection is re-done for every figure. This may generate too much network traffic for this program to work well over slow or long links.

ENVIRONMENT**DISPLAY**

to get the default host and display number.

XENVIRONMENT

to get the name of a resource file that overrides the global resources stored in the RESOURCE_MANAGER property.

XSCREENSAVER_WINDOW

The window ID to use with `--root`.

SEE ALSO

X(1), `xscreensaver`(1)

COPYRIGHT

Copyright © 1998, James Youngman. Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation. No representations are made about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

AUTHOR

James Youngman <jay@gnu.org>, April 1998.