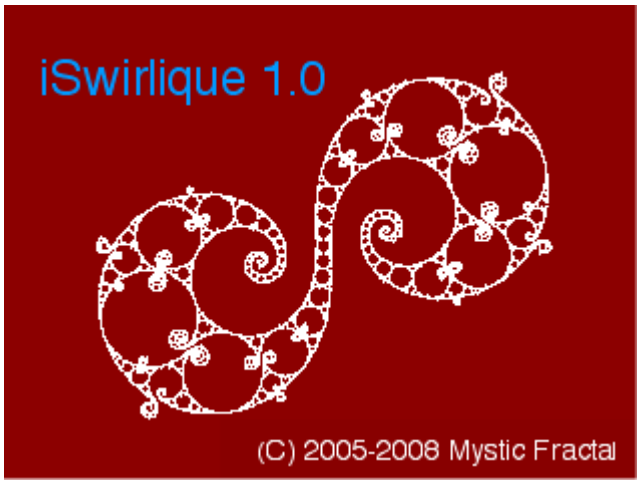

iSwirlique Application Help

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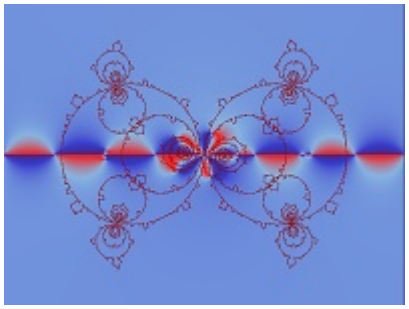

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2 File menu

File menu commands

The File menu offers the following commands:

New	Creates a new drawing.
Open	Opens an existing drawing.
Close	Closes an opened drawing.
Save	Saves an opened drawing using the same file name.
Save As	Saves an opened drawing to a specified file name.
Export options	Save options for 3-D format, OBJ or POV.
Load Text Format [SWT]	Load a data file in text (platform independent) format.
Save Text Format [SWT]	Save a data file in text (platform independent) format.

2.1 File New command

New command (File menu)

Use this command to create a new drawing window in iSwirlique. The image and data for the opening picture are used to create the new window.

You can open an existing data/image file with the Open command.

2.2 File Open command

Open command (File menu)

Use this command to open an existing data/image file in a new window. Use the Window menu to switch among the multiple open images.

You can create new images with the New command.

2.2.1 File Open dialog box

File Open dialog box

The following options allow you to specify which file to open:

File Name
Type or select the filename you want to open. This box lists files with the extension you select in the List Files of Type box.

Drives
Select the drive in which iSwirlique stores the file that you want to open.

Directories
Select the directory in which iSwirlique stores the file that you want to open.

Network...
Choose this button to connect to a network location, assigning it a new drive letter.

2.3 File Close command

Close command (File menu)

Use this command to close the window containing the active image. If you close a window without saving it, you lose all changes made since the last time you saved it.

2.4 File Save command

Save command (File menu)

Use this command to save the active drawing to its current name and directory. When you save a drawing for the first time, iSwirlique displays the Save As dialog box so you can name your drawing. If you want to change the name and directory of an existing drawing before you save it, choose the Save As command.

2.5 File Save As command

Save As command (File menu)

Use this command to save and name the active drawing. iSwirlique displays the Save As dialog box so you can name your drawing.

To save a drawing with its existing name and directory, use the Save command.

2.5.1 File Save as dialog box

File Save As dialog box

The following options allow you to specify the name and location of the file you're about to save:

File Name
Type a new filename to save a drawing with a different name. iSwirlique adds the extension .dfs.

Drives
Select the drive in which you want to store the drawing.

Directories
Select the directory in which you want to store the drawing.

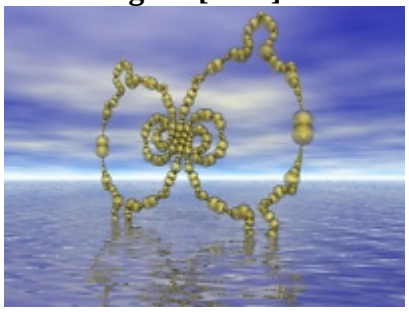
Network...
Choose this button to connect to a network location, assigning it a new drive letter.

2.6 Export options

Save Kleinian set as 3-D object(s) in POV or OBJ format.

2.6.1 Save [OBJ] command

Save Figure [OBJ] command (File menu)

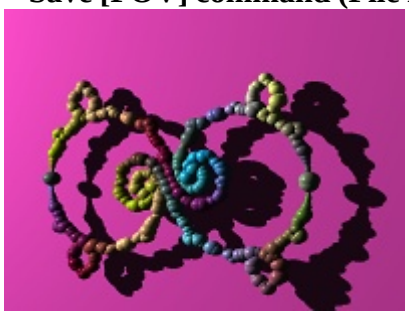


When the active figure is a circle or cyclinder plot, then this command is enabled and may be selected. After naming the object file through a file requester, the current figure is redrawn and the cylinder or circle plot will be written to a Wavefront obj file as triangle faces and vertices. No color information or surface normals are written. This is useful to export a fractal for use in Bryce or another program that supports the Wavefront format.

Caveats: this is capable of generating very large files. The way to reduce file size is to reduce cylinder or spherical forms by increasing epsilon and/or decreasing the circle size. Use the smoothing option in Bryce to round off cylinder shapes in the imported object, if possible. (Smaller object files take less time to smooth.)

2.6.2 Save [POV] command

Save [POV] command (File menu)



When the active figure is a circle or cylinder plot (See Fractal Variables window), then this command is enabled and may be selected. After naming the object file through a file requester, the current figure is redrawn and line segments are written as spherical or cylindrical objects in native POV_Ray format. Each object is given different color which is selected linearly from the current palette. A sample scene is provided with each file written, though the absolute placement of the Kleinian "ring" may need to be adjusted manually.

2.6.3 Obj Mesh Setup command

Obj Mesh Setup command (File menu)

Here you edit or view the parameters for simplifying meshes when outputting in Wavefront [obj]. Max input faces and max input vertices determine how much memory is set aside as buffers for processing the meshes. Increase or decrease from the default values as the size of the mesh warrants, or as system memory permits. The "min radius" variable controls how small individual spheres or cylindrical objects in a mesh may be. Objects smaller than the minimum radius are omitted from the exported mesh. Kleinian sets can contain a large amount of spheres when the sphere primitive is used and all of these increase the size of the mesh proportionately, even the ones that may not be visible. The weld factor controls how close adjacent triangle vertices of a mesh may be before they are merged into one vertex. This effectively flattens adjacent triangles or "collapses" them and reduces mesh size. Use a small enough weld factor that produces an evenly simplified mesh without destroying the integrity of the smallest elements of the mesh. Use the smoothing routine in Bryce to restore the mesh to optimum smoothness and curvature.

2.7 Load Text Format [SWT]

Load a data file in text (platform independent) format.

2.8 Save Text Format [SWT]

Save a data file in text (platform independent) format.

3 Edit menu

Edit menu commands

The Edit menu offers the following commands:

Undo	Undo last edit or action.
Fractal Variables	Edit fractal variables.
Size	Sets the image size.
Palette Editor	Edit palette.
Background Filter	Use complex formula for image background

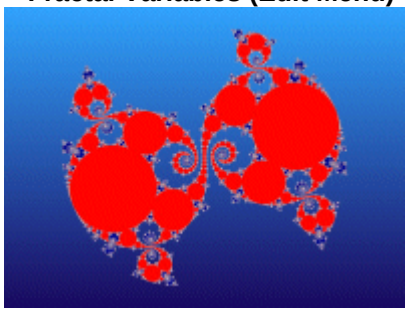
3.1 Edit Undo command

Undo command (Edit menu)

Use this command to undo the last action.

3.2 Fractal Variables

Fractal Variables (Edit Menu)



This is the main window for defining the type of Kleinian curve to be drawn and the traces and limit variables that define the curve itself.

Function is the drop-down edit control for selecting each curve supported by iSwirlique. This can be one of Grandma's curves, a Jorgensen curve, Maskit or Riley group. The first two "Grandma" curves are designed to be connected curves which require that Zoom X be a large value (100 is a good starting value) to display the entire curve. (These are the main curves illustrated in Indra's Pearls and since they are well connected you can use the fill tool in Paint Shop Pro or PhotoShop to highlight in and out areas.) With values less than 10 the curves begin to be magnified and less of the curve is displayed. This acts as a zoom on the center of the curve. The Jorgensen, Maskit and Riley recipes produce infinite repeating curves, so it is necessary to reduce Zoom X to display a good-sized image of the curves. A value of 5-10 is

a good place to start with these curves.

The higher the Max Level the more detail is displayed in a curve, but the longer it takes to examine all of the branches that make up that curve, so plotting time is increased proportionately. When the curves are generated randomly through the Demo menu, some curves become chaotic with Max Level set to much above 20. Epsilon also defines resolution in a curve, smaller making for a finer curve, and longer plotting. Practical values range from .1 to .001. Some Grandma curves remain stable with large Max Level and smaller epsilon, but there is no guarantee of this when the curve traces are chosen randomly.

Trace A and Trace B are complex variables that are used to enter values for traces that duplicate curves drawn in Indra's Pearls, or you can experiment with your own values, or let the program generate random sets of traces through the Demo menu. Be sure to experiment with holding one or more of the trace values to a fixed value when doing a random search. The Random/Batch window has options to do this.

Line Gap is a rough gage that iSwirlique uses to determine how far apart the points can be when connecting then by lines. Any successive points that are less than Epsilon*LineGap are connected by a line. Some curves are more disjointed than others, so you don't want to connect every successive point. If some points in a curve are connected at sharp angles you may want to decrease the line gap to eliminate those lines. As Epsilon is decreased you may have to increase LineGap to keep all the points connected.

The circle and cylinder plot boxes are used with the 3-D export options, and as an alternate way of plotting Kleinan sets. (Only filled circles are displayed in iSwirlique.) Use a different Ratio value from the default 1.0 to export line segments as ellipsoids and conic forms. Use 0.0 with the cylinder plot to export cones. The Size variable controls the relative size of individual spheres or conic sections.

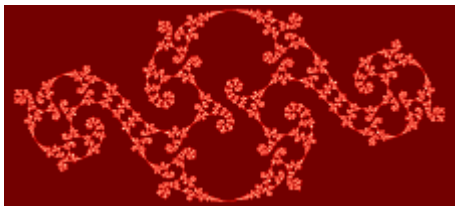
3.3 Size

Size (Edit menu)

This allows you to set the drawing area for a picture, independent of the Windows screen size. It also shows which size is currently in use. The custom setting allows for any size up to 800X800. The minimum size for an image is 30X30. Note: the actual image aspect (Kleinian set) is fixed at 1/1, and images are scaled to fit the drawing window horizontally. Some images require that the drawing window be resized vertically to contain all of the curve.

3.4 Edit Palette

Edit Palettes



Use the palette editor to modify the palette in use.

There are copy and spread options to smooth or customize the existing palette in iSwirlique.

With iSwirlique, a palette is actually 65000+ colors, with each succeeding color (except the last) followed by 255 colors that are evenly spread from one color to the next. The color for the limit set is defined either by index #1, when no background filter is used, or the zero index when the background filter is non-blank.

Use the RGB-slider controls to edit any color in the palette. Select Copy to copy any color to another spot in the palette. Select Spread to define a smooth spread of colors from the current spot to another spot in the palette. Copy and Spread take effect immediately when you select another spot with the mouse button. You can cancel the operation with the Cancel button. In iSwirlique, colors do not cycle smoothly when you adjust the RGB sliders. This would be too slow with true color. The Map button is used to apply color changes to an image after you are done adjusting the sliders.

Use Reset to reset the colors of the palette in use, to where it was before it was cycled or modified. Note: if you change palettes with one of the function keys, any modifications to a previous palette are unaffected by the Reset button.

Use Reverse to reverse the order of the colors in the palette. This affects only those colors in the start-color to end-color range. Useful for reversing divide-by-eight palettes, etc., for orbit-trap pictures that require a reversed palette.

Use Neg to create a palette that is the complement of the current palette.

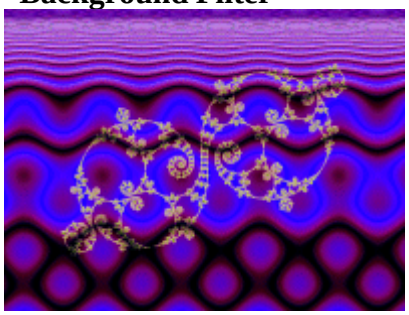
Use SRG to switch the red and green components of all palette colors.
Use SRB to switch the red and blue components of all palette colors. You can use these buttons to form eight different palettes by repeatedly switching red, green and blue components.

Use the Random Palette button to create a random palette with smooth color spreads.

Note: unless you click on Reset before exiting the editor, changes are permanent to the palette edited, no matter which way you close the editor.

3.5 Background Filter...

Background Filter



Here you define a background filter based on a complex function. The function is used to fill the background with a texture instead of a solid background. The function can be any formula, up to 80 characters, that uses the variables x, y and z. X and y are the horizontal and vertical components of each pixel. Z is the complex form x+yi. The Magnify slider is used to control the intensity of the filter. When the coloring filter formula is defined, the full palette (minus the last five or ten colors) can be used to create mixed textures. Note: when a background filter is used in conjunction with a flood fill option, the inside or outside background (non-filled portion) of the image is set to color index 254, the next to last color in the palette. You can generate a formula randomly with the Random button. This will also give you examples of the correct syntax to use.

Parser Information

Functions (capital letters are optional, and parenthesis are necessary around complex expressions)

The following information takes the form "standard function" ---"form used by iSwirlique to represent standard function".

sine z --- sin(z) or SIN(Z) ; where Z can be any complex expression
hyperbolic sine z --- sinh(z) or SINH(Z)
arcsine z --- asin(z) or ASIN(Z)
cosine z --- cos(z) or COS(Z)
hyperbolic cosine z --- cosh(z) or COSH(Z)
arccosine z --- acos(z) or ACOS(Z)
tangent z --- tan(z) or TAN(Z)
hyperbolic tangent z --- tanh(z) or TANH(Z)
arctangent z --- atan(z_) or ATAN(Z)
cotangent z --- cotan(z) or COTAN(Z)
arccotangent z --- acotan(z) or ACOTAN(Z)
e^z --- exp(z) or EXP(z) -- the exponential function
natural log of z --- log(z) or LOG(Z)
absolute value of z --- abs(z) or ABS(Z)
square root of z --- sqrt(z) or SQRT(Z)
z squared --- sqr(z) or SQR(Z)

real part of z --- real(z) or REAL(Z)
imaginary part of z --- imag(z) or IMAG(Z)
modulus of z --- mod(z) or MOD(Z) or |z| -- (x*x + y*y)
conjugate of z -- conj(z) or CONJ(z) -- (x-yi)
polar angle of z -- theta(z)

Math operators

+ --- addition
- --- subtraction
* --- multiplication
/ --- division
^ --- power function

Constants

e --- e or E -- 1e^1 -- 2.71828, read/write.
i --- i or I -- square root of -1,read/write.

4 Image menu

Image menu commands

The Image menu offers the following commands:

Draw	Draw the picture.
Plot to File	Plot image to file.
Fill Inside/Outside/None	Apply flood fill option to image.

4.1 Image Draw command

Draw command (Image menu)

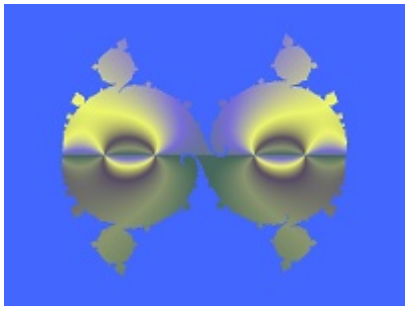
Use this command to draw or redraw the image for the current fractal variables. Clicking inside the draw window with the left-mouse button stops all plotting.

4.2 Plot to File

This command is used to write bitmap images larger than the screen to a png-formatted file. Select the width of the target image from the displayed radio buttons. The height of the image is based on the image aspect of the active draw window, or Target Height=Target_Width*draw_height/draw_width. Note: an image data file [dfs] is not generated with this option, so you still need to save the current data file using the Save or Save As commands.

4.3 Fill Inside/Outside/None

Fill Inside/Outside/None



Here you have the option of filling either the inside or outside of the limit set, or neither. When the inside command is selected a flood fill (border-limited) is applied to the inside of the set. When the outside command is selected a flood fill is applied to all the pixels outside of the Kleinian set. If a background filter is selected, the fill consists of the background filter pattern, else a smooth fill is applied using the last color index (255). In this case, the non-filled background color uses color index 254 (instead of index 0) which should differ from color index 255 to enable the flood fill to work properly. These options are usable with videos and the Plot to File command.

5 Video Menu

The Video Menu offers the following commands:

Write Movie	Write frames to QuickTime movie file.
Add Frame	Add current image to frame buffer.
Edit Frames	Edit frame buffer.
Reset Frames	Reset current frame buffer.
Load Frames [QFRM]	Load frame buffer.
Save Frames [QFRM]	Save frame buffer.

5.1 Write Movie

With this command the video frame buffer is written to a QuickTime movie. First you choose the width of the video, up to 2048 (height is determined by the current image aspect or height=width*aspect.) A file requester is then opened to choose the name and location of the movie, then the frames are written sequentially in the mov format. Variables are scaled between buffer frames to create the illusion of motion or morphing. The movie is written in the highest quality possible, so there are minimal compression artifacts. (The movie can be compressed later in a program like iMovie to reduce file size, if necessary.) Most variables that have a numerical value can be scaled between frames.

5.2 Add Frame

iSwirlique uses a frame buffer to compose an animation. You add key frames to the buffer with this command. Each key frame is identical to the active image. Change variables between key frames to create the illusion of motion or morphing. You can edit the frames with the frame editor.

5.3 Edit Frames

Here you can edit any frames in the video buffer. Buttons are supplied to access all the image parameter editors, such as Fractal Variables, Palette and Background Filter. The Move button allows you to move a frame from one spot in the buffer to another. You can change the frame image being edited by using the Frame slider or Edit box. After changing frames, use the Preview button to display the current frame being edited. In most cases the frame preview is automatically updated when you change an image parameter using the editor or type buttons. The Delete button allows you to delete all but two of the frames, the minimum number of frames to create a movie. (If you want to delete all the frames and start over with a new frame buffer, use the Video/Reset Frames command.)

5.4 Reset Frames

Delete the current frame buffer. The number of video frames is reset to zero.

5.5 Load Frames [SFRM]

Load a frame buffer that has been previously saved by iSwirlique. The buffer replaces any existing frame buffer.

5.6 Save Frames [SFRM]

This command saves the current frame buffer in a [sfrm] file. A file requester is opened that allows you to choose the location and name of the frame library. The frame buffer files can also be used as image libraries, similar to Fractint's par and frm formats. The frames contain all the information to reproduce an image at any supported size.

6 Demo menu

Demo menu commands

The Demo menu offers the following commands, which illustrate various features of iSwirlique:

Random Grandma #1	Generate random Grandma's parabolic commutator groups
Random Grandma #2	Generate random Grandma's four-alarm two-generator groups
Random Grandma #3	Generate random Grandma's parabolic commutator (variation of G1)
Random Grandma #4	Generate random Grandma's parabolic commutator (variation of G1)
Random Jorgensen #1	Generate random Jorgensen parabolic groups #1
Random Jorgensen #2	Generate random Jorgensen parabolic groups #2
Random Jorgensen #3	Generate random Jorgensen parabolic groups (variation of J2)
Random Jorgensen #4	Generate random Jorgensen parabolic groups (variation of J1)
Random Maskit	Generate random Maskit parabolic groups
Random Riley	Generate random Riley parabolic groups
Batch Mode	Repeat random fractal and save to file.

6.1 Random Grandma #1

Random Grandma #1

This command generates a random Kleinian curve based on Grandma's parabolic commutator

groups recipe. Parameters are randomized according to the settings in the Random/Batch window. The random search looks for the first non-chaotic grouping and plots it. Any curve that appears chaotic in the first 50 points is skipped.

6.2 Random Grandma #2

Random Grandma #2

This command generates a random Kleinian curve based on Grandma's four-alarm two-generator groups recipe. Parameters are randomized according to the settings in the Random/Batch window. The random search looks for the first non-chaotic grouping and plots it. Any curve that appears chaotic in the first 50 points is skipped.

6.3 Random Grandma #3

Random Grandma #3

This command generates a random Kleinian curve based on a variation of Grandma's parabolic commutator groups recipe. Parameters are randomized according to the settings in the Random/Batch window. The random search looks for the first non-chaotic grouping and plots it. Any curve that appears chaotic in the first 50 points is skipped.

6.4 Random Grandma #4

Random Grandma #4

This command generates a random Kleinian curve based on a variation of Grandma's parabolic commutator groups recipe. Parameters are randomized according to the settings in the Random/Batch window. The random search looks for the first non-chaotic grouping and plots it. Any curve that appears chaotic in the first 50 points is skipped.

6.5 Random Jorgensen #1

Random Jorgensen #1

This command generates a random Kleinian curve based on Danish mathematician Tropels Jorgensen's recipe. Parameters are randomized according to the settings in the Random/Batch window. As this is an infinitely repeating horizontal curve, adjust ZoomX to a small value, less than 10, to see more of the curve. The random search looks for the first non-chaotic grouping and plots it. Any curve that appears chaotic in the first 50 points is skipped.

6.6 Random Jorgensen #2

Random Jorgensen #2

This command generates a random Kleinian curve based on the alternate form of Danish mathematician Tropels Jorgensen's recipe. Parameters are randomized according to the settings in the Random/Batch window. As this is an infinitely repeating horizontal curve, adjust ZoomX to a small value, less than 10, to see more of the curve. The random search looks for the first non-chaotic grouping and plots it. Any curve that appears chaotic in the first 50 points is skipped.

6.7 Random Jorgensen #3

Random Jorgensen #3

This command generates a random Kleinian curve based on a variation of Danish mathematician Tropels Jorgensen's alternate recipe. Parameters are randomized according to the settings in the Random/Batch window. As this is an infinitely repeating horizontal curve, adjust ZoomX to a small value, less than 10, to see more of the curve. The random search looks for the first non-chaotic grouping and plots it. Any curve that appears chaotic in the first 50 points is skipped.

6.8 Random Jorgensen #4

Random Jorgensen #4

This command generates a random Kleinian curve based on a variation of Danish mathematician Tropels Jorgensen's recipe. Parameters are randomized according to the settings in the Random/Batch window. As this is an infinitely repeating horizontal curve, adjust ZoomX to a small value, less than 10, to see more of the curve. The random search looks for the first non-chaotic grouping and plots it. Any curve that appears chaotic in the first 50 points is skipped.

6.9 Random Maskit

Random Maskit

This command generates a random Kleinian curve based on Bernard Maskit's recipe. Parameters are randomized according to the settings in the Random/Batch window. As this is an infinitely repeating horizontal curve, adjust ZoomX to a small value, less than 10, to see more of the curve. The random search looks for the first non-chaotic grouping and plots it. Any curve that appears chaotic in the first 50 points is skipped.

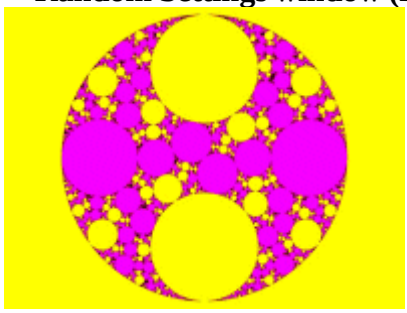
6.10 Random Riley

Random Riley

This command generates a random Kleinian curve based on Robert Riley's recipe. Parameters are randomized according to the settings in the Random/Batch window. As this is an infinitely repeating horizontal curve, adjust ZoomX to a small value, less than 10, to see more of the curve. The random search looks for the first non-chaotic grouping and plots it. Any curve that appears chaotic in the first 50 points is skipped.

6.11 Random Settings

Random Settings window (Demo menu)



Here you set parameters for random-generated images.

There are radio boxes that allow you to customize how random variables are processed to create new Kleinian fractals:

Trace A.re -- (default on) check to randomize the real part of Trace A
Trace A.im -- (default on) check to randomize the imaginary part of Trace A
Trace B.re -- (default on) check to randomize the real part of Trace B
Trace B.im -- (default on) check to randomize the imaginary part of Trace B
Max Level -- (default on) check to set Max Level to a default value
Epsilon -- (default on) check to set Epsilon to a default value
Zoom X -- (default on) check to set Zoom X to a default value

Any box that is unchecked means that value is unchanged during the random search for new fractals.

7 Help Topics

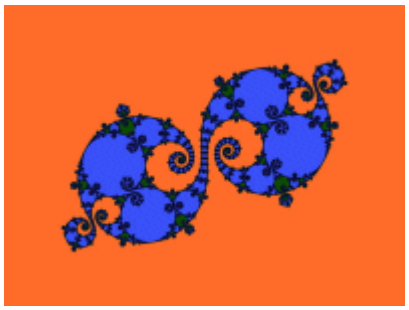
Help Topics

Getting Started	Tutorial for new users of iSwirlique.
Bibliography	Sources for fractal information and complex numbers.
About iSwirlique	Displays the version number and author info for this application.

7.1 Getting Started

Getting Started

Welcome to iSwirlique!



This is a short tutorial that will cover basic commands and background material necessary for a new user to create an initial picture with iSwirlique.

To generate a Kleinian curve manually open the Fractal Variables window via the Edit/Fractal Variables command and enter the trace values as desired, plus any other adjustments to the fractal variables. Click on Apply to start the plotting process. The curve is computed once for scaling purposes, then a second time to actually plot the curve. If you have entered trace variables that result in a chaotic curve, which results in an abnormally long calculation time, you may have to stop the calculating process by clicking in the draw window. You may also want to stop the calculating process to enter a smaller Max Level value or larger Epsilon to speed up the preliminary drawing. Generally a larger Max Level value and smaller Epsilon value result in a more detailed curve, but increase plotting/calculation time proportionately. Some curves become chaotic with Max Level values much above 20.

To generate a Kleinian curve randomly, select one of the random options in the Demo menu. The program will adjust trace variables automatically or as the setup in the Random/Batch window allows. For some random searches you may want to set a trace to a standard value like 2+.05i and randomize the other. The program will hunt for a non-chaotic curve that follows a fairly sequential path. If the curve meanders excessively (non-sequentially) in the first 50 points the curve is considered chaotic and the program will pick another set of variables to plot. No plotting occurs until the extent of the curve is known, and then the points are scaled to fit horizontally in the draw window. Some curves may require that the verical height of the draw window be increased to contain the entire curve. You can also reduce the Zoom X variable to plot only a horizontal slice of the curve. This can have the effect of lengthening the curve in the vertical direction which would also require an adjustment to the vertical height of the draw window.

iSwirlique allows you to Undo the last command in most cases.

This completes the Getting Started tutorial. The Bibliography lists additional reference material for a better understanding of the fractal types and functions contained in iSwirlique.

7.2 Bibliography

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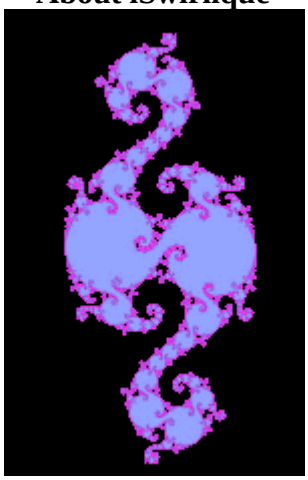
7.3 About iSwirlique

About iSwirlique



>>>>> iSwirlique v1.00 © 2005-2008 by Terry W. Gintz

iSwirlique plots Kleinian limit sets based on the "depth-first search" algorithm and the two-generator '"recipes" in the book Indra's Pearls, (c) 2002 Cambridge University Press, by David Mumford, Caroline Series and David Wright.

iSwirlique requires a true-color video adapter for best results.

Acknowledgements: Many special thanks to Jos Leys for steering me through the cliffs and canyons of Indra's pseudo-code and helping me along when I got stuck translating the essential details into "C++" ... Also I would like to thank Bob Margolis for first drawing my attention to the wonderful world of Indra's Pearl's and Jos Ley's extraordinary Kleinian galleries.

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For a short history of my other programs, see Chronology.

7.3.1 Chronology

Chronology

History of the programs:

In September 1989, I first had the idea for a fractal program that allowed plotting all complex functions and formulas while attending a course on College Algebra at Lane College in Eugene, Oregon. In November 1989, ZPlot 1.0 was done. This Amiga program supported up to 32 colors, 640X400 resolution, and included about 30 built-in formulas and a simple formula parser.

May 1990 -- ZPlot 1.3d -- added 3D projections for all formulas in the form of height fields.

May 1991 -- ZPlot 2.0 -- first 236-color version of ZPlot for Windows 3.0.

May 1995 -- ZPlot 3.1 -- ZPlot for Windows 3.1 -- 60 built-in formulas. Added hypercomplex support for most built-in formulas.

May 1997 -- ZPlot 24.02 -- first true color version of ZPlot -- 91 built-in formulas. Included support for 3D quaternion plots, Fractint par/frm files, Steve Ferguson's filters, anti-aliasing and Paul Carlson's orbit-trap routines.

June 1997 -- ZPlot 24.03 -- added Earl Hinrichs Torus method.

July 1997 -- ZPlot 24.08 -- added HSV filtering.

December 1997 -- Fractal Elite 1.14 -- 100 built-in formulas; added avi and midi support.

March 1998 --Split Fractal Elite into two programs, Dreamer and Medusa(multimedia.)

April 1998 -- Dofo 1.0 -- supports new Ferguson/Gintz plug-in spec.

June 1998 -- Dofo-Zon -- redesigned multi-window interface by Steve Ferguson, and includes Steve's 2D coloring methods.

August 1998 --Dofo-Zon Elite -- combination of Fractal Elite and Dofo-Zon

October 1998 -- Dofo-Zon Elite v1.07 -- added orbital fractals and IFS slide show.

November 1998 -- Dofo-Zon Elite v1.08 -- added lsystems.

April 1999 -- Split Dofo-Zon Elite into two programs: Fractal Zplot using built-in formulas and rendering methods, and Dofo-Zon to support only plug-in formulas and rendering methods.

May 1999 -- Fractal Zplot 1.18 -- added Phong highlights, color-formula mapping and random fractal methods.

June 1999 -- completed Fractal ViZion -- first version with automatic selection of variables/options for all fractal types.

July 1999 -- Fractal Zplot 1.19 -- added cubic Mandelbrot support to quaternion option; first pc fractal program to render true 3D Mandelbrots.

September 2000 -- Fractal Zplot 1.22 -- added support for full-screen AVI video, and extended quaternion design options.

October 2000 -- QuaSZ (Quaternion System Z) 1.00 -- stand alone quaternion/hypernion/cubic Mandelbrot generator

November 2000 -- Added octonion fractals to QuaSZ 1.01.

March 2001 -- Cubics 1.0 -- my first totally-3D fractal generator.

May 2001 -- QuaSZ 1.03 -- added Perlin noise and improved texture mapping so texture tracks with animations.

June 2001 -- Fractal Zplot 1.23 -- added Perlin noise and quat-trap method.

July 2001 -- QuaSZ 1.05 -- improved performance by converting many often-used dialogs to non-modal type.

October 2001 -- FraSZle 1.0, QuaSZ formula and algebra compatible version of Fractal Zplot

November 2001 -- DynaMaSZ 1.0, the world's first Dynamic Matrix Systems fractal generator

January 2002 -- MiSZle 1.1 -- generalized fractal generator with matrix algebra extensions

May 2002 -- DynaMaSZ SE 1.04 (unreleased version)-- scientific edition of DMZ, includes support for user-variable matrix dimensions (3X3 to 12X12)

January 2003 -- Pod ME 1.0 -- first stand-alone 3-D loxodromic generator, Hydra 1.0 -- first 3-D generator with user-defined quad types and Fractal Projector a Fractal ViZion-like version of DMZ SE limited to 3X3 matrices

May 2003 -- QuaSZ 3.052 -- added genetic-style function type and increased built-in formulas to 180. Other additions since July 2001: generalized coloring, support for external coloring and formula libraries, and Thomas Kroner's loxodromic functions.

May 2003 -- FraSZle and Fractal Zplot 3.052 -- added random 3D orbital fractals, new 3D export methods, upgraded most frequently-used dialogs to non-modal type and added genetic-style function type. FZ now based on FraSZle except for built-in formula list and Newton support.

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