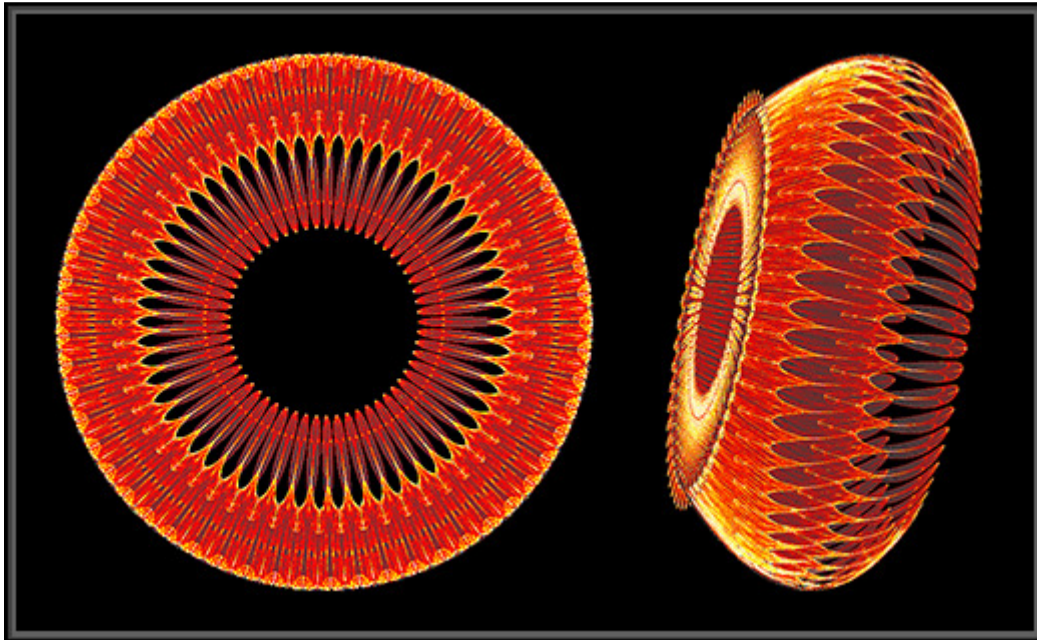


QS SymXaos 3D



Cover Image: Icon, Formula 2 - "Sunflower"

About the Program

This program is a companion to *QS SymXaos*. It adds a third dimensional factor to the Icons 1 and Icons 2 formulae from the book *Symmetry in Chaos*, by Michael Field and Martin Golubitsky (Oxford University Press, 1992). The images can be rotated around each of the three axes. This is a 32-bit Windows program which should continue to work in current 64-bit versions.

Running the Program

Images can be rendered in resolutions of up to 4000 x 4000 pixels. Rendering, pausing and resuming are controlled by the **R** key, or by left or right mouse button clicks. Rendering must be paused to access the menu options. There are two default palettes. You also can select any valid Fractint MAP file. The background can be specified as a triplet of RGB values. The scale factor controls the image window; larger values simulate zooming out and yield smaller images or more quilt components. Images can be rotated successively around the X, Y, and Z axes.

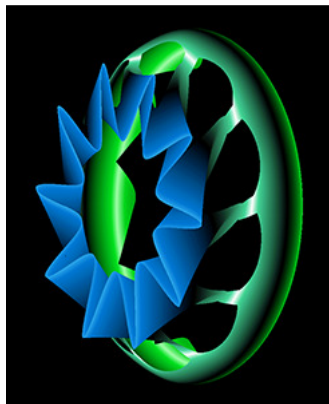
Images can be saved as TARGA files. Parameter sets can be saved as “SX3” files and then can be loaded into the program later. After associating these files with the program, you then can load them by double-clicking on their icons. The program also can load 2-dimensional “SX” files from *QS SymXaos*.

Parameter sets can be entered in the dialog box, or random sets of parameters can be generated for the currently-selected image type. However, chaotic attractors are by nature unpredictable. Many parameter sets will overflow and potentially crash the computer. If the program detects that a parameter set will explode, you will be requested to enter new parameters, or a new random set will be evaluated. Additionally, some sets will converge to a small number of finite points, resulting in images of just a few flickering pixels or some lines. These will not overflow, but will not yield very impressive pictures either. Some of the techniques that can be used to screen for stable and interesting images are described in Appendix 1 of the PDF help file for *QS SymXaos*.

There are two coloring methods. The “hit count” algorithm advances the color of each pixel through a 256-color palette, each time it is hit during iteration of the formula. Therefore it takes time for the colors of the image to emerge, much like a photographic print in developing fluid. So be patient and give the image a chance. However, as iteration continues, progressively more points go beyond 255 hits and are colored with the last palette entry, “overdeveloping” the image. Ultimately, most of the image can assume that one color. To compensate for these trends, palette entries can be redistributed through the normalization and equalization options. Normalization compresses or expands the distribution into the range of 0 to 255. The normalization adjustment menu option allows the amount of normalization to be specified. Equalization is an attempt to spread the color values evenly throughout the image, making better use of the entire palette. Further discussion of these techniques can be found in Appendix 2 of the PDF help file for *QS SymXaos*.

The “z plane” algorithm colors pixels according to the position along the Z axis of their associated iterated points. This gives the images a more “solid” character.

After normalization or equalization, a histogram showing the relative number of pixels which are colored by each palette entry can be displayed.



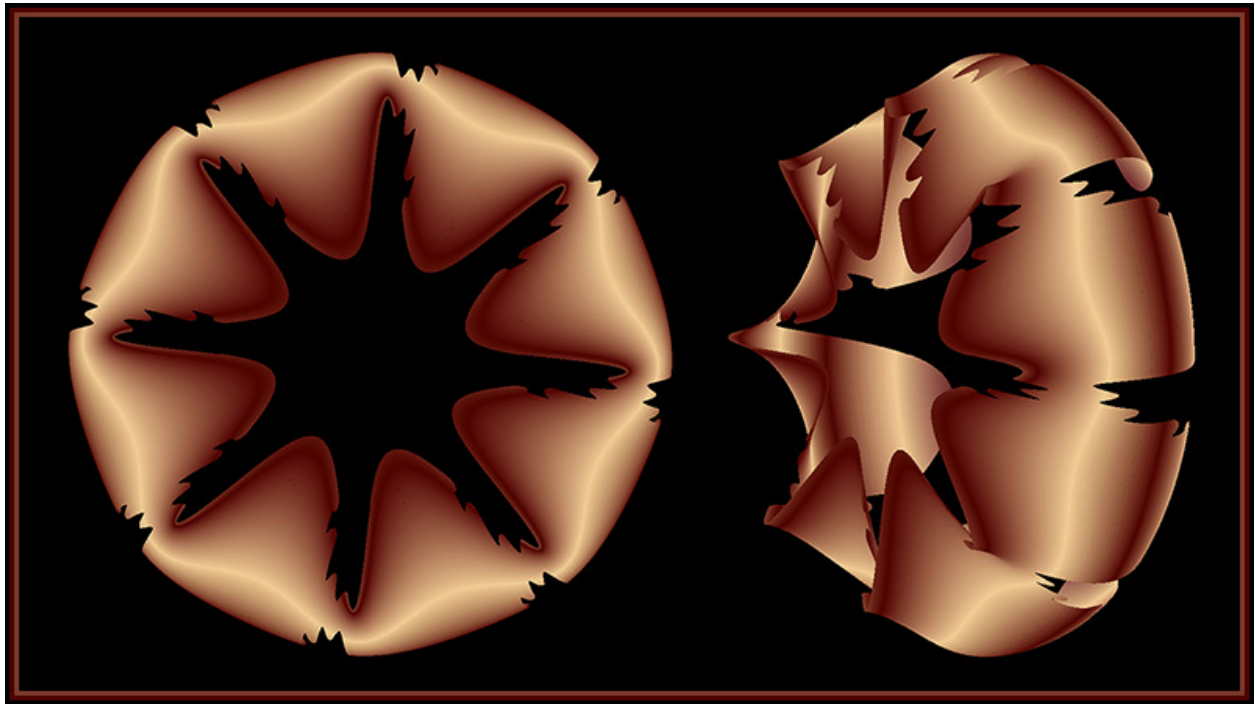
Icon, Formula 1

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Icon, Formula 1