
Subject: 3D Fractals

Posted by [bleslie](#) on Sun, 07 Apr 2013 17:26:43 GMT

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I am working on a math paper and I would like to make some models so that I may show various aspects of the fractals I am researching. To better understand what it is I am researching and the nature of the models I am wanting to print, please see the following example:

<https://simonsfoundation.org/multimedia/mathematical-impressions-the-surprising-menger-sponge-slice/>

For my previous research I explored the the Menger slice (<http://mypages.iit.edu/~bleslie/menger.html>) and was able to successfully print out a 3D model of a 4th iteration Sliced Menger Sponge. I have now come up with a method for slicing the platonic fractal set: Tetrahedron, Octahedron, Cube, Icosahedron, and Dodecahedron. I would like to print 3D models of each of the fractals for their first iteration in their sliced form along with their complements (the part being removed from the fractal). In the example video above you can see the complement of the menger sponge and how it is sliced (the cross-star thing towards the end of the video @ minute 5:40). To better explain what I would like printed, let's use the example of the sliced menger sponge with it's corisponding sliced complement. Here you would have four parts: each side of the sliced cube (2 parts) and the two halves of the complements. There is also a fifth part, but I'll explain that below.

What I am wondering is there a way to print the whole thing where all the parts will fit together properly, print the outside and inside parts different colors, and possibly a way to attach/detach the various sliced parts so that they may be shown before and after the slice?

The main thing I wanting to show is the inner volumes of the Icosahedron and Dodecahedron fractals. So that you may better see what I am talking about I have attached a picture of the fractal set, their complements and the slices of each. With the Menger Sponge, Icosahedron Fractal, and Dodecahedron fractal the complement has a second level or an inner volume, so I would like to print them as pieces that may be removed as well. To explain this better I will once again use the Menger Sponge as an example. With the Menger Sponge you can think of the inner volume as the smaller sub-cube at the very center. In the attached picture I refer to it as "Ethos". The inner volumes of the Icosahedron fractal and the Dodecahedron Fractal are similar and are referred to as Pathos and Logos, respectively.

Another factor to consider in the printing of the Icosahedron and dodecahedron fractals is the overlap with the fractal itself. With the Dodecahedron especially there is only a little overlap on the edge of the fractal. There would need to be some sort of overlapping of the model so it would print properly. Currently I have all the models in Mathematica and can export to almost any file format.

Thank you in advance for any help or assistance,

Barrett leslie

File Attachments

1) [fb_background.png](#), downloaded 92 times

Subject: Re: 3D Fractals

Posted by [minhloc](#) on Tue, 09 Apr 2013 13:05:33 GMT

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