

## Re: Functional Geometry for fishes

**Source:** <http://coding.derkeiler.com/Archive/Lisp/comp.lang.lisp/2005-01/1641.html>

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**From:** GP lisper (*spambait\_at\_CloudDancer.com*)

**Date:** 01/24/05

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On Mon, 24 Jan 2005 04:28:53 +0000 (UTC), <fb@frank-buss.de> wrote:

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> *Regarding the picture: Would be nice to enhance the program to produce a  
> more exact reproduction of the original picture, filled with color, with  
> curved lines and recursive to level n (see "Square Limit"):*

Well, if you examine the Escher picture, you can see at least 2 different 'fish'. Henderson claimed that there are 4, but I couldn't find 2 more. In the second paper, Henderson describes a 'triangle effect' (the second fish is the first fish with this triangle merged into one wing), which alas, is also visible in your graphics (p,q,r,s are incomplete apparently). Adding color will only enhance the triangles. Escher covered them up rather well by two-tone shading and partial line segments to trick your eye.

The second papers discussion of there actually being a single curved line segment that generates the outline of the fish is the more interesting piece (IMO). That curve is drawn about a right triangle, with some simple operations occurring, but the key `rot45` appears on the hypotenuse. Following up this concept with a line generator which is then mapped onto the right triangle for the tessellations, in common lisp with `.ps` (or `.pdf`) output would be neat.

Thanks for providing some interesting reading and thinking Frank!

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Everyman has three hearts;  
one to show the world, one to show friends, and one only he knows.