ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

14. Mathematical Aspects of Computer Science

1991 MS Classification: 5, 6, 15
Francis, George, U Illinois at Urbana-Champaign, USA
The Making of the Optiverse
An eversion turns a sphere inside-out without ripping or pinching its surface. In the 40 years since Smale proved its possibility, designing concrete eversions have preoccupied topologists, artists and computer graphicists.

Our eversion, shown in the VideoMath Festival, differs from all the previous ones in that it is computed automatically. We start with a Kusner-Morin halfway model, which is a symmetrically immersed sphere of lowest elastic bending energy for its symmetry class. Using Brakke's Surface Evolver we flow the surface down the Willmore energy gradient. The self-intersections dissappear as we arrive at embedded spheres of absolutely minimal bending energy.

This illustrated presentation deals with problems we solved in building the software for the CAVE^{sctm} immersive virtual environment.