

EVOLVER SEMINAR

1-2 December 2015, 15,00-16,30

Politecnico di Torino,
Dipartimento di Scienze Matematiche,
AULA BUZANO

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Evolving surfaces with Surface Evolver

This 3-hour mini-course will be devoted to understand the basic features of Surface Evolver, a powerful interactive software developed by Kenneth Brakke (Susquehanna University). Surface Evolver essentially works by refining and evolving a discrete surface represented as a mesh in Euclidean space, deforming it in the direction of steepest decrease of a certain functional defined by the user. This way, it is an excellent tool to create approximations of solutions to physical problems in which some energy must be minimized. We will focus on the area functional with possible volume constraints, but other functionals will be also discussed. The structure of the course will consist of three parts:

1. Brief introduction to discrete minimization problems, meshes and deformations.
2. Examples. Minimal and constant mean curvature surfaces: Plateau problems, free boundary problems, isoperimetric problems, capillarity problems,... Other problems in Physics.
3. Applications to Science and Engineering.

The course will be self-contained, but some basic knowledge of curves and surfaces is desirable. Participants are encouraged to bring their computers and install the software in advance. The installation procedure and almost all the material covered in the course is available in Kenneth Brakke's website:

<http://facstaff.susqu.edu/brakke/evolver/evolver.html>.