Elastic energy for networks

Friday, 30 October 2020 14:40 (50 minutes)

In the last decades the study of the Willmore functional for surfaces and curves raised the attention of an increasing number of mathematicians.

The reason is twofold: the analysis of the minimization of the Willmore functional presents interesting features and issues from a purely mathematical point of view and on the other hand the energy naturally arises in Mechanics and Materials Science (for instance in the study of biological membranes). In the case of curves, the Willmore functional reduces to the total squared curvature and it is commonly known as elastic energy. In this talk I will give an overview of results related to the minimization of the elastic energy in the class of networks (finite union of curves whose end points meet in junctions).

I will also consider the L^2-gradient flow of the elastic energy of networks which leads to a fourth order evolution law with non-trivial nonlinear boundary conditions. I will give a wellposedness result and I will investigate the long time behaviour of solutions.

Presenter: PLUDA, Alessandra (Università di Pisa)