

prof. dr hab. Tadeusz Iwaniec z Syracuse University

Monotone hopf-harmonics

Abstract

Monotone Hopf-harmonics have resulted, as an alternative to harmonic mappings, from the variation of the Dirichlet-energy subject to homeomorphic deformations of 2D-elastic plates and thin films. Much of the forgoing is motivated by the principle of non-interpenetration of matter in the mathematical models of Nonlinear Elasticity. Theoretical prediction of failure of bodies caused by cracks is a good motivation that should appeal to both: Mathematical Analysts and Researchers in the Engineering Fields. Among several mathematical phenomena we shall see that cracks and fractures propagate along vertical trajectories of the associated Hopf quadratic differential. It is at the heart of the present lecture to show that monotone Sobolev mappings are legitimate deformations of hyperelastic materials. We make this clear by means of recent results and examples.