

Limits of Sobolev Homeomorphisms and Energy-minimal Deformations

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Sobolev homeomorphisms and their limits are widely studied in Geometric Function Theory (GFT) and mathematical models of Nonlinear Elasticity (NE). It is at the heart of the present lecture to convince you that the weak limits of Sobolev homeomorphisms are legitimate deformations of hyper-elastic materials. As we seek greater knowledge about the energy-minimal deformations in NE, the questions of existence and injectivity (motivated by the principle of non-interpenetration of matter) become ever more quintessential. Nonlinear PDEs and topology of monotone mappings come into play. Theoretical prediction of failure of bodies, caused by cracks, should appeal to both: **Mathematical Analysts and Researchers in the Engineering Fields** In case of the materials with Dirichlet stored-energy, to illustrate, cracks propagate along vertical trajectories of the associated Hopf quadratic differential. I will summarize, in the briefest possible terms, our recent advances with Jani Onninen. It goes back to the concept of Direct Method in the Calculus of Variations introduced by David Hilbert and Stanisław Zaremba the first President of the Polish Mathematical Society whose 100-anniversary we celebrate today.

Bibliografia

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