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Blow-up limits for Griffith minimizers

Thursday, June 27, 2024 4:00 PM (1 hour)

The so called Griffith functional has been introduced to model the equilibrium state of a fracture in linearized elasticity. According to this model the equilibrium state of a fracture is defined as a minimizer of the functional G(u,K) := $\int_{\Omega\setminus K} |e(u)|^2 \, \mathrm{d}x + \mathcal{H}^{N-1}(K), among pairs (u,K) such that K is a subset of dimension (N-1) of \Omega \subset \mathbb{R}^N$ (the fracture), $u\colon \Omega\setminus K \to \mathbf{R}^N$ is a C^1 function (a displacement field) which satisfies a Dirichlet condition at the boundary $\partial\Omega$ and the matrix $e(u) := (Du + Du^T)/2$ is the symmetric part of the gradient of u.

The goal of this talk is to present a recent regularity result on Griffith minimizers and, in particular, a joint work with with Camille Labourie on blow-up limits and their (partial) classification in the plane.

For this purpose, we developed a new approach to the uniform concentration property of Dal Maso, Morel and Solimini in the vectorial case. The particular novelty of our proof is to avoid the use of the co-area formula, not available in the vectorial context.

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