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Title of the talk

An ε-regularity theorem for Griffith minimizers in $\mathbb{R}^N$ under a separating condition

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Abstract

The Griffith functional arises from the theory of linear elastic fractures. It is variational approach aiming at explaining the propagation of a crack in an elastic body. Let Ω be a bounded open set of $\mathbb{R}^n$, which stands for the reference configuration of a linearly elastic body. The Griffith functional is defined by

$$\mathcal{G}(u,K) := \int_{\Omega \setminus K} |e(u)|^2 \, dx + \mathcal{H}^{n-1}(K),$$

among the pairs (u,K) where $u\colon \Omega \to \mathbb{R}^n$ is piecewise smooth satisfying a Dirichlet condition, K is the discontinuity set of u and the matrix $e(u) := (Du + Du^T)/2$ is the symmetric gradient of u. One can interpret u as a displacement, $e(u)$ as a linear strain tensor and K as a crack.

The Griffith functional is a vectorial variant of Mumford-Shah however it provides a lot of suprising new difficulties as one works with the symmetrized gradient instead of the full gradient. Thus, many known techniques

for Mumford-Shah do not apply to Griffith. The goal of the talk is to present a ε-theorem for Griffith minimizers in $\mathbb{R}^N$, proved in collaboration with Antoine Lemenant.