Variational Models for Material Voids: Dimension Reduction and Homogenization

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Abstract

In this talk, I present variational models for materials with voids in both geometrically linear and nonlinear elasticity. Specifically, we consider functionals featuring elastic bulk terms and a surface contribution proportional to the surface area of the voids within the material. We first discuss a relaxation result that leads to an additional surface term related to the phenomenon of collapsing voids. We then present applications to the derivation of plate theories via dimension reduction, as well as to effective homogenization limits for heterogeneous materials.