

Phase-field approaches in elastic inverse problems

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Abstract

In this talk I will present some recent results on geometrical inverse problems related to the shape reconstruction of cavities and inclusions in a bounded linear isotropic medium by means of boundary measurements. We adopt the point of view of the optimal control, that is we rephrase the inverse problems as a minimization procedure where the goal is to minimize, in the class of Lipschitz domains, a mis-fit boundary functional or an energy-type functional with the addition of a regularization term which penalizes the perimeter of the cavity/inclusion to be reconstructed. The optimization problem is addressed by a phase-field approach, approximating the perimeter functional with a Modica-Mortola relaxation.