

Dimension reduction in the context of structured deformations

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The theory of structured deformations shows good potential to deal with mechanical problems where multiple scales and fractures are present. Mathematically, it amounts to relaxing a given energy functional and to show also the relaxed one has an integral representation.

In this seminar, I will focus on a problem for thin objects: the derivation of a 2D relaxed energy via dimension reduction from a 3D energy, incorporating structured deformations in the relaxation procedure. I will discuss the two-step relaxation (first dimension reduction, then structured deformations and vice versa) and I will compare it with another result in which the two relaxation procedures are carried out simultaneously. An explicit example for purely interfacial initial energies will complete the presentation.

These results have been obtained in collaboration with G. Carita, J. Matias, and D.R. Owen.