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Energy scaling of singular-perturbation models involving higher-order laminates

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Abstract

Motivated by the appearance of complex microstructures in the modelling of shape-memory alloys, we study the energy scaling behaviour of some N-well problems with surface energy given by a singular higher-order term. In the case of absence of gauge invariances (e.g. with respect to the action of SO(n) or Skew(n)), we provide an ansatz-free lower bound which relies on a bootstrap argument in Fourier space and gives evidence of the higher order of lamination involved. The upper bound is provided by iterated branching constructions. In the end, we show how a similar approach can be used in the determination of a lower bound for a more realistic model, namely the geometrically linearized cubic-to-tetragonal phase transition, in which a second order lamination is forced by the presence of affine boundary conditions. This is a joint work with Angkana Rüland.