

Chipot, Michel**The appearance of microstructures in problems with incompatible wells and their numerical approach.** (English) [Zbl 0937.65070](#)

Numer. Math. 83, No. 3, 325-352 (1999).

During the past decade a lot of attention has been devoted to problems of calculus of variations which integrand experiences wells or minima. In particular one has been interested in problems with no minimizer. In this case, one observes, instead, the existence of minimizing sequences having oscillations for example in their gradients. The interest of such issues grew in particular from the possible applications in material science. Oscillations appear when, for instance, one tries to load a material existing in multiple natural states or phases. The oscillations of the minimizing sequences contribute to explain the behavior of this material in its search for reaching a minimum of energy.

The goal of the paper is to analyze the creation of microstructure in problems of calculus of variations with wells. More precisely, the author considers a case with strong incompatibility between the wells. This forces the minimizing sequences to use other gradients than the wells in a puzzling way. Using a P_1 finite element method the author is able to single out discrete minimizing sequences and to give energy estimates in terms of the mesh size.

Reviewer: [G.S.Stavarakakis \(Chania\)](#)**MSC:**[65K10](#) Numerical optimization and variational techniques[49J20](#) Existence theories for optimal control problems involving partial differential equationsCited in **1** Review
Cited in **6** Documents**Keywords:**

microstructures; incompatible wells; oscillations; material science; minimizing sequences; finite element method; energy estimates

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