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A nonlocal problem arising in the study of magneto-elastic interactions

The energy of magneto-elastic materials is described by a nonconvex functional. Three terms of the total free energy are taken into account: the exchange energy, the elastic energy and the magneto-elastic energy, usually adopted for cubic crystals. We focus our attention on a simplified one dimensional problem with penalty and study the stationary problem and the gradient flow of the associated Ginzburg–Landau type functional. We prove existence and uniqueness of a classical solution which tends asymptotically (for subsequences) to a stationary point of the energy functional.

This is a joint work with M. Chipot, V. Valente and G. Vergara Caffarelli.