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Nonlinear Stability of Static Néel Walls in Ferromagnetic Thin Films

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Abstract

The paper establishes the nonlinear (orbital) stability of static 180-degree Néel walls in ferromagnetic films under the reduced wave-type dynamics for the in-plane magnetization proposed by Capella et al. (Nonlinearity 20:2519–2537, 2007). The result follows from the spectral analysis of the linearized operator around the Néel wall's phase, which features a challenging non-local operator. As part of the proof, we show that the non-local linearized operator is a compact perturbation of a suitable non-local linear operator at infinity, a result that is interesting in itself.

Contents