

Modeling of Magnetostriction in Ferromagnetism

Mouna Kassan, Gilles Carbou¹, Mustapha Jazar²

SUMMARY

The applications of ferromagnetic materials are more and more numerous: hard disks, recording heads, ferromagnetic paints, nanoelectronics, etc. We are interested in magnetostriction, ie the influence of mechanical constraints on the magnetization of the ferromagnetic material.

The model, described in [1], is a coupling of the Landau-Lifschitz equation with the elasticity equation. We first establish global existence results in time of the weak solutions of this coupling with mixed boundary conditions for the deformation.

A time averaging method from [2] allows to rigorously obtain a quasi-static model which is a coupling of the Landau-Lifschitz equation with an elliptical equation for the deformation. Finally, we derive by asymptotic analysis a two-dimensional model of thin ferromagnetic plate which will be more easily calculable than the initial three-dimensional model.

Keywords: Magnetostriction, weak solutions, quasi-stationary model, plates, ...

References

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¹Université de Pau et des Pays de l'Adour
email: gilles.carbou@univ-pau.fr

²Lebanese University Laboratoire de Mathématiques et Applications
email: mjazar@laser-lb.org