

A MODEL FOR MAGNETOELASTIC INTERACTION WITH SPECIAL REFERENCE TO GIANT MAGNETOSTRICTIVE BEHAVIOUR

Anouar Belahcen¹, Reijo Kouhia^{2*}, Paavo Rasilo³ and Matti Ristinmaa⁴

¹ Aalto University, Electrical Engineering, P.O. Box 13000, FI-00076 Aalto, Finland, anouar.belahcen@aalto.fi

² Tampere University of Technology, PO Box 600, FI-33101 Tampere, Finland, reijo.kouhia@tut.fi

³ Tampere University of Technology, Electrical Energy Engineering, P.O. Box 692, FI-33101 Tampere, Finland, paavo.rasilo@tut.fi

⁴ Lund University, Solid Mechanics, P.O. Box 118, SE-22100, Sweden, matti.ristinmaa@solid.lth.se

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In this paper a macroscopic magnetoelastic constitutive model for giant magnetostrictive materials, like Terfenol and Galfenol is developed. The model is developed by using the Lagrangian description having the right Cauchy-Green deformation tensor and the magnetic induction vector as state variables in the Helmholtz free energy expression, in line to the studies in [1, 2, 3] and utilizing the theory of invariants [4]. Special emphasis is given to model the significant stress dependency of the magnetic behaviour of giant magnetostrictive materials.

A finite element implementation of the proposed model is developed and has been used to model magnetostrictive energy harvesting device.

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