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Modeling of Magnetostriction in Particulate Composite Materials[1] SHIN FRANKLIN GEORGE, Department of Applied Physics, The Hong Kong Polytechnic University, Hong Kong, China — Beginning with the basic elasticity and magnetostriction equations, we use a self-consistent model to calculate the effective elastic and magnetostrictive behaviors of Nickel/epoxy and Terfenol-D/glass composites. The longitudinal magnetostriction of pure polycrystalline Terfenol-D is deduced from the experimental data of the composite having 60% volume fraction of Terfenol-D; Nickel data is taken from literature. Through numerical calculation, we have obtained the macroscopic longitudinal strains parallel to the applied magnetic field for Terfenol-D/glass composites and both longitudinal and transverse strains for the Nickel/epoxy composites. Goodness of fit for both material systems shows our model is applicable up to very high volume fraction of inclusions.

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