A 2D Time Domain DRBEM Computer Model for Magneto-Thermoelastic Coupled Wave Propagation Problems

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Abstract

A numerical computer model based on the dual reciprocity boundary element method (DRBEM) is extended to study magneto-thermoelastic coupled wave propagation problems with relaxation times involving anisotropic functionally graded solids. The model formulation is tested through its application to the problem of a solid placed in a constant primary magnetic field acting in the direction of the z-axis and rotating about this axis with a constant angular velocity. In the case of two-dimensional deformation, an implicit-explicit time domain DRBEM was presented and implemented to obtain the solution for the displacement and temperature fields. A comparison of the results is presented graphically in the context of Lord and Shulman (LS) and Green and Lindsay (GL) theories. Numerical results that demonstrate the validity of the proposed method are also presented graphically.

Keywords: magneto-thermo-elasticity, relaxation times, anisotropic, functionally graded solid, dual reciprocity boundary element method

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