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BOUNDARY ELEMENT ANALYSIS OF GREEN AND LINDSAY THEORY UNDER THERMAL AND MECHANICAL SHOCK IN A FINITE DOMAIN

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Abstract

A boundary element formulation based on the Laplace transform method is developed for transient coupled thermoelasticity problems with relaxation times in a two-dimensional finite domain. The dynamic thermoelastic model of Green and Lindsay is selected for the present study. The Laplace transform method is applied to the time domain, and the resulting equations in the transformed field are discretized using the boundary element method. The nodal dimensionless temperature and displacements in the transformed domain are inverted to obtain the actual physical quantities using the numerical inversion of the Laplace transform method. This work considers the Green and Lindsay theory of thermoelasticity with the thermal and mechanical loading in a finite domain. The creation and propagation of elastic and thermoelastic waves in a finite domain and their effects on each other are investigated. Different relaxation times are chosen to briefly illustrate the events that take place in GL theory. Details of the formulation and numerical implementation are also presented.

Details

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