A Dual-Reciprocity Boundary Element Simulation of Axisymmetric Dual-Phase-Lag Heat Conduction in Nonhomogeneous Media

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Abstract   A dual-reciprocity boundary element method is proposed for simulating numerically axisymmetric dual-phase-lag heat conduction in nonhomogeneous thermally isotropic media. The properties of the media, such as thermal conductivity and specific heat, are assumed to vary continuously in space. To check its validity and assess its accuracy, the proposed method is first applied to solve some specific test problems with known solutions. It is then used to simulate the axisymmetric dual-phase-lag heat conduction in a particular nonhomogeneous medium subject to a concentrated surface heating. The effects of the dual phase lags and the spatial variations of the thermal properties of the medium on the temperature distribution are examined.

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