ORIGINAL PAPER

Modelling of a Three Dimensional Thermoelastic Half Space with Three Phase Lags using Memory Dependent Derivative

Debkumar Ghosh[1] · **Ashis Kumar Das[2]** · **Abhijit Lahiri[1]**

Abstract
A mathematical model for a three dimensional isotropic half-space has been formulated to inspect lagging behaviours due to the presence of phase lags in context of memory dependent derivative, as an extension of several existing thermoelastic models like- Green-Naghdi-III, Lord Shulman, and Fourier's Law etc. The analytical and procedural work has been done in integral transform domain preceded by eigenvalue approach to find the solution from the governing equations. Numerical computations and graphical representation of distribution of non-dimensional stress components, temperature with the effect of three phase lag, kernel function and time-delay has been performed with the help of the efficient mathematical software.

Keywords Half space · Three phase lag · Memory dependent derivative · Generalized thermoelasticity · Vector–matrix differential equation · Integral transform

List of Symbols

x_i	Space variables
λ, μ	Lame's Constant
u_i	Displacement components
τ	Relaxation Time
C_E	Specific heat at constant strain
τ_q, τ_v, τ_T	Three-phase-lag
t	Time variable
ρ	Density of the material

✉ Debkumar Ghosh
  debkumarghosh2020@gmail.com

  Ashis Kumar Das
  akdasgeology@gmail.com

  Abhijit Lahiri
  debkumarghosh2020@gmail.com

1   Department of Mathematics, Jadavpur University, Kolkata 700 032, India

2   Department of Geology, Asutosh College, 92 S. P.Mukherjee Road, Kolkata 700 026, India

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