عنوان مقاله:

Modified couple stress model for thermoelastic microbeams due to temperature pulse heating

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خلاصه مقاله:

In this research, vibration frequency analysis of a microbeam under a temperature pulse is investigated. In view of the modified couple stress theory and generalized Lord-Shulman (LS) hyperbolic heat conduction model with a single relaxation time, the thermoelastic coupled equations for clamped microbeams have been determined. The analytical terminologies for temperature, deflection, axial displacement, dilatation, flexure moment, couple stress, and axial stress in the microbeam have been acquired utilizing Laplace transform technique. Furthermore, examinations have been displayed in graphs to figure the effect of particular boundaries, for example, the couple stress and pulse of temperature on every one of the thoughts about factors. The couple stress parameter significantly affects all the field distributions. The higher temperature pulses show many disagreements between the results of the present couple stress model and the classical LS one. Alternate estimations of thermal relaxation time have been utilized to the curves anticipated by two unique theories of thermoelasticity that gotten as exceptional instances of the current LS model. Numerical inferences explain that evaluation of deflection anticipated by brand new theory is lower than that of classical LS one.

کلمات کلیدی:

Thermoelasticity, couple stress theory, microbeam, temperature pulse, clamped edges