Abstract

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A Thick Plate Problem in the Theory of Generalized Thermoelastic Diffusion

In this work, the problem of a thermoelastic thick plate with a permeating substance in contact with one of the bounding planes is considered in the context of the theory of generalized thermoelastic diffusion with one relaxation time. The bounding surface of the half-space is taken to be traction free and is subjected to a time-dependent thermal shock. The chemical potential is also assumed to be a known function of time on the bounding plane. Laplace transform techniques are used. The solution is obtained in the Laplace transform domain by using a direct approach. The solution of the problem in the physical domain is obtained numerically using a numerical method for the inversion of the Laplace transform based on Fourier expansion techniques. The temperature, displacement, stress, and concentration as well as the chemical potential are obtained. Numerical computations are carried out and represented graphically