Abstract

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An Internal Penny Shaped-Crack in an Infinite Thermoelastic Solid

In this work, we solve a dynamical problem for an infinite thermoelastic solid with an internal penny-shaped crack, which is subjected to prescribed temperature and stress distributions. The problem is solved using the Laplace and Hankel transforms. The boundary conditions of the problem give a set of four dual integral equations. The operators of fractional calculus are used to transform the dual integral equations into a Fredholm integral equation of the second kind, which is solved numerically. The inverse Hankel and Laplace transforms are obtained using a numerical technique. Numerical results for the temperature, stress, and displacement distributions, as well as for the stress intensity factor, are shown graphically.