Mathematics > Numerical Analysis

Linear free flexural vibration of cracked functionally graded plates in thermal environment

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In this paper, the linear free flexural vibrations of functionally graded material plates with a through center crack is studied using an 8-noded shear flexible element. The material properties are assumed to be temperature dependent and graded in the thickness direction. The effective material properties are estimated using the Mori-Tanaka homogenization scheme. The formulation is developed based on first-order shear deformation theory. The shear correction factors are evaluated employing the energy equivalence principle. The variation of the plates natural frequency is studied considering various parameters such as the crack length, plate aspect ratio, skew angle, temperature, thickness and boundary conditions. The results obtained here reveal that the natural frequency of the plate decreases with increase in temperature gradient, crack length and gradient index.

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