APCOM & ISCM
11-14th December, 2013, Singapore

Three-Dimensional Free Vibration Analysis of FGM Plates on Elastic Foundation

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Free vibration of functionally graded material rectangular plates on elastic foundation is studied based on the three-dimensional linear theory of elasticity. The three displacements of the plates are expanded by a triplicate series of Chebyshev polynomials multiplied by appropriate functions to satisfy the essential boundary conditions. The elastic foundation is modeled as a two-parameter Pasternak foundation. The natural frequencies are obtained by the Ritz method. Rapid convergence is observed in this study. A parametric study of the natural frequencies of power-law FGM plates with different support conditions, volume fraction ratio, thickness to side ratios and aspect ratios of the plate and the foundation stiffness is presented.

Keywords: Free Vibration, FGM Plates, Elastic Foundation, Ritz Method.