

Vibration Characteristics of Functionally Graded Thick Hollow Cylinders Using Galerkin Method

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Abstract : In the present work, the study of vibration characteristics of a functionally graded thick hollow cylinder is investigated. The cylinder natural frequencies are obtained using Galerkin finite element method. The functionally graded cylinder is assumed to be made from many subcylinders. Each subcylinder is considered as an isotropic layer. Material's properties in each layer are constant and functionally graded properties result by exponential function of layer radius in multilayer cylinder. To validate the FE results code, plane strain model of functionally graded cylinder are also modeled in ABAQUS. Analytical results are validated for both models. Also, a good agreement is found between the present results and those reported in the literature.

Keywords : natural frequency, functionally graded material, finite element method, thick cylinder

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