

عنوان مقاله:

Free Vibration Analysis of Functionally Graded In-compressible Plates Using Higher-Order Shear and Normal Deformable Plate Theory

محل انتشار:

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خلاصه مقاله:

The free vibration of functionally graded incompressible rectangular plates is investigated analytically for simply supported boundary condition. Expanding all three displacement components and hydrostatic pressure in the thickness direction using the Legendre polynomials and considering the effects of transverse shear and normal deformations, the governing equations of motion are derived using the principle of virtual work. The power law distribution is used to explain the variation of mechanical and physical properties through the thickness of the functionally graded incompressible plate. The natural frequencies and the corresponding mode shapes are obtained up to the fifth-order expansion. The numerical results are given in detail and compared with the existing works. It has been shown that the natural frequencies obtained from the present theory match the elasticity analytical solutions for thick plates.

کلمات کلیدی:

Free vibration; Analytical solution; Functionally graded incompressible plate; Shear and normal theory

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