عنوان مقاله:

Free Vibration and Buckling Analyses of Functionally Graded Nanocomposite Plates Reinforced by Carbon Nanotube

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خلاصه مقاله:

This paper describes the application of refined plate theory to investigate free vibration and buckling analyses of functionally graded nanocomposite plates reinforced by aggregated carbon nanotube (CNT). The refined shear deformation plate theory (RSDT) uses four independent unknowns and accounts for a quadratic variation of the transverse shear strains across the thickness, satisfying the zero traction boundary conditions on the top and bottom surfaces of the plate without using shear correction factors. The motion equations are derived from Hamilton's energy principle and Navier's method is applied to solve this equation. The material properties of the functionally graded carbon nanotube reinforced composites (FG-CNTRCs) are assumed to vary along the thickness and estimated with the Mori–Tanaka approach. Effects on the natural frequency and critical buckling load of the FG-CNTRC plates by CNT volume fraction, CNT distribution, CNT cluster distribution, and geometric dimensions of the plate are investigated. Effects of loading conditions on the critical buckling load are also examined.

کلمات کلیدی:

Mori–Tanaka approach, Refined plate theory, Aggregated carbon nanotubes, Free vibration, Buckling

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