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A semi-analytical method for vibration analysis of functionally graded carbon nanotube reinforced composite doubly-curved panels and shells of revolution

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ABSTRACT

The object of this paper is to present a novel semi-analytical method and its associated applications for linear vibration analyses of functionally graded carbon nanotube reinforced composite (FG-CNTRC) doubly-curved panels and shells of revolution on with arbitrary boundary conditions. Distribution of the carbon nanotubes through the thickness of the structures may be uniform or functionally graded and four types of the CNTs distribution are considered in this paper. Properties of the composite media are determined by a refined rule of mixtures approach which contains the efficiency parameters. The translation and rotation displacements of the doubly-curved structures are uniformly expressed as the superposition of a standard cosine Fourier series and several auxiliary functions introduced to eliminate all potential discontinuities of the

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