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Dynamic characteristics of laminated composite CNT reinforced MRE cylindrical sandwich shells using HSDT

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Abstract

The vibration and damping characteristics of the laminated composite cylindrical sandwich shell with carbon nanotube reinforced magnetorheological elastomer (CNT-MRE) core is presented in this article. Higher order shear deformation theory (HSDT) based on finite element (FE) formulation is employed to derive the governing equations of motion of the laminated composite cylindrical CNT-MRE sandwich shell. The present HSDT model of the cylindrical CNT-MRE sandwich shell is validated with the ABAQUS model in terms of natural frequencies on cantilever boundary condition. The influence of CNT reinforcement in the MRE layer of the cylindrical sandwich shell is also studied through the structural rigidity. The detailed parametric investigations are performed to study the influence of magnetic field intensities, thickness ratio, radius of curvature and ply orientation on the stiffness and damping behavior of composite cylindrical

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