ABSTRACT

In the present work, a functionally graded carbon nanotube and isotropic material sandwich cylindrical panel behavior was investigated. The functionally graded carbon nanotubes have remarkable mechanical properties. The carbon nanotubes reinforced functionally graded composite materials are expected to be the new generation material having a wide range of unexplored potential applications in various technological areas. This investigation demonstrates the influence of core, top, and lower faces thickness on the natural frequencies and nonlinear vibration of functionally graded panels. For simply supported cylindrical panels strengthened with various volume fractions. Governing equations of motion are obtained from the First-Order Shear Deformation theory of nonlinear in Von Karman–Donnell means. The numerical approach employs the fourth-order Runge-Kutta and Galerkin's procedure.

The results show that the natural frequencies increased while, the panel dynamic response amplitude decreased with an increase in the carbon nano tube volume fraction. The vibration amplitude decreases with the elastic foundation increased. The elastic foundations have a significant impact on the vibration amplitude and the natural frequencies. Also, the panel dynamic response amplitude increases when the panel thickness decreased. The validation of the current study is gained by comparing the results with the studies of M. Mirzaei and Y. Kiani researchers and show good agreement.