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عنوان مقاله:

The influences of various types of auxetic structures on the stability of sandwich toroidal shell segments

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خلاصه مقاله:

In this study, stability analysis of sandwich toroidal shell segments (TSSs) with carbon nanotube reinforced composite (CNTRC) face sheets featuring various types of auxetic cores, surrounded by elastic foundations under radial pressure is presented. Two different types of auxetic structures are considered for the core, including re-entrant auxetic structure and graphene origami-enabled auxetic structure. The nonlinear stability equilibrium equations of the longitudinally shallow shells are formulated using the von Kármán shell theory, in conjunction with Stein and McElman approximation while considering Winkler-Pasternak's elastic foundation to simulate the interaction between the shell and elastic foundation. The Galerkin method is employed to derive the nonlinear stability responses of the shells. The numerical investigations show the influences of various types of auxetic-core layers, CNT-reinforced face sheets, as well as elastic foundation on the stability of sandwich TSSs.

کلمات کلیدی:

stability analysis, carbon nanotube-reinforced composite; various auxetic structures; radial load; elastic foundation.; toroidal shell segment

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