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Mechanical and thermal postbuckling of FGM thick circular cylindrical shells reinforced by FGM stiffener system using higher-order shear deformation theory. (English) [Zbl 1358.74031](#)
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Summary: The postbuckling of the eccentrically stiffened circular cylindrical shells made of functionally graded materials (FGMs), subjected to the axial compressive load and external uniform pressure and filled inside by the elastic foundations in the thermal environments, is investigated with an analytical method. The shells are reinforced by FGM stringers and rings. The thermal elements of the shells and stiffeners in the fundamental equations are considered. The equilibrium and nonlinear stability equations in terms of the displacement components for the stiffened shells are derived with the third-order shear deformation theory and Leckhniskii smeared stiffener technique. The closed-form expressions for determining the buckling load and postbuckling load-deflection curves are obtained with the Galerkin method. The effects of the stiffeners, the foundations, the material and dimensional parameters, and the pre-existent axial compressive and thermal load are considered.

MSC:

- 74K25 Shells
- 74D05 Linear constitutive equations for materials with memory
- 74G60 Bifurcation and buckling
- 74E30 Composite and mixture properties
- 74F05 Thermal effects in solid mechanics

Cited in 1 Document

Keywords:

stiffened cylindrical shell; functionally graded material (FGM); postbuckling; elastic foundation; analytical

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