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Analysis of Influence of Cylinder Shell Thickness on Distribution Character of Dynamic Characteristics of Free Vibrations

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Abstract

The free vibrations of circular cylindrical shells with various thickness-to-midsurface radius ratios and different combinations of clamped and hinged edges of the shell are studied using the finite element method. The dependence of the natural frequency vibrations on the increase in the shell thickness is analyzed. The symmetric and asymmetric modes of free vibrations, frequencies, and modes of the vibrations corresponding to bending, torsion, tension-compression, and shear deformations are considered. Significant attention is paid to validation of the reliability of the numerical results. © The Author(s), under exclusive licence to Springer Nature Switzerland AG 2026.

Author keywords

circular cylindrical shell; different boundary conditions; finite element method; free vibrations; ratio of the shell thickness to the radius

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