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Free Vibrations of a Corrugated Closed Cylindrical Shell

O. Ya. Grigorenko ✉, M. Yu. Borisenko & O. V. Boichuk

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The frequencies and modes of free vibrations of a thin closed corrugated circular cylindrical shell with different clamped and free-ends boundary conditions and different physical and mechanical parameters are determined using the finite-element method. The test problem for an open corrugated elliptical cylindrical shell is solved. The solution demonstrates good agreement (less than 2.5%) between the calculated natural frequencies and the frequencies determined by other authors using the spline-collocation method in combination with the discrete-orthogonalization method. The frequencies of the corrugated shell are compared with those for a circular shell of equivalent mass. The dependence of the natural frequencies of a corrugated shell on the boundary conditions and the physical and mechanical characteristics of its material is established. Symmetric and antisymmetric vibration modes are determined for all the corrugated shells considered.

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Author information

Authors and Affiliations

S. P. Timoshenko Institute of Mechanics, National Academy of Sciences of Ukraine, 3 Nesterova St., Kyiv, 03057, Ukraine
O. Ya. Grigorenko & M. Yu. Borisenko

Mykolayiv National Agrarian University, 9 Georgiya Gongadze St., Mykolaiv, 54020, Ukraine
O. V. Boichuk

Corresponding author

Correspondence to O. Ya. Grigorenko.

Additional information

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