Application of Method of Symmetries at a Calculation and Planning of Circular Plate with Variable Thickness

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Abstract : A problem is formulated for the natural oscillations of a circular plate of linearly variable thickness on the basis of the symmetry method. The equations of natural frequencies and forms for a plate are obtained, providing that it is rigidly fixed along the inner contour. The first three eigenfrequencies are calculated, and the eigenmodes of the oscillations of the acoustic element are constructed. An algorithm for applying the symmetry method and the factorization method for solving problems in the theory of oscillations for plates of variable thickness is shown. The effectiveness of the approach is demonstrated on the basis of comparison of known results and those obtained in the article. It is shown that the results are more accurate and reliable.

Keywords : vibrations, plate, method of symmetries, differential equation, factorization, approximation

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