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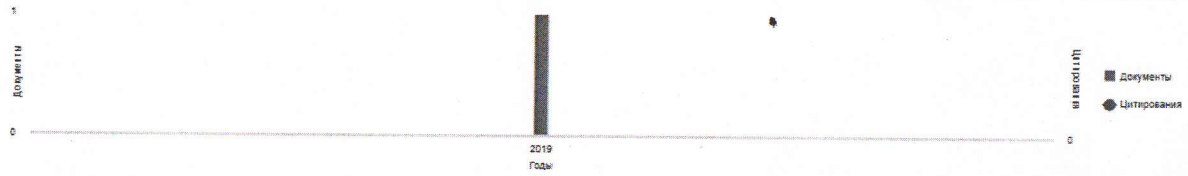

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Specified Calculation of Steady-State Oscillations of Circular Transtropy Plates of Medium Thickness

Abstract:

Specified calculation of steady-state oscillations of circular transtropy plates of medium thickness was performed. The calculation considers transverse displacement deformation and transverse compression effect. Compared to other plate models, such clarifications highly increase calculation accuracy of their stress-strain state. While considering the influence of tangential loads and inertia forces, they do not change equations structure nor increase their order. Obtained equations deal with specification via certain parameters, which depend on characteristics of plate anisotropy and geometry. The calculation order of the equations remains the same, stresses and forces stay similar as in other plate models. At the same time, their accuracy highly increases and becomes close to the results of elasticity theory spatial problem. In case of hinged round plate, the solutions for the free oscillation frequencies are found. Obtained numeric results are compared with corresponding results of classic theory of Kirchhoff's thin plates. On the basis of these comparisons, the conclusions about significant influence of transverse displacement and compression effects on the magnitude of oscillation frequencies in the direction of their significant decrease are made. This effect is especially noticeable at low transverse physical characteristics of the plate. This conclusion coincides with corresponding results, which were obtained in the monograph of V.T. Grinchenko for a thick plate in a spatial setting.

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