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Discussion

Comments on "determination of the lower natural frequencies of circular plates with mixed boundary conditions"

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The present author takes this opportunity (i) to congratulate with the authors of Ref. [1] for their interesting study, and (ii) to add important references on natural vibrations of circular plates with mixed boundary conditions, not already included in Ref. [1].

Hirano and Okazaki [2] studied transverse free vibrations of a circular plate clamped, simply supported or free on part of its boundary and simply supported, free or clamped, respectively, on the remaining.

A study on vibrations of circular plates having non-uniform edge constraints is reported in Leissa et al. [3], where numerical results are given for the case where the rotational stiffness varies as one cosinusoidal wave; in this paper the Fourier expansion of the variable edge constraints is introduced. Extension of the study to vibrations plates of variable thickness is given in Laura and Ficcadenti [4,5].

Narita and Leissa [6,7] considered elastic translational and rotational constraints that are not uniform around the edge of circular plates; they obtained a series solution by imposing the boundary conditions. Several numerical results on natural vibrations of circular plates with mixed boundary conditions are given.

Gunaratnam and Bhattacharya [8] included the effect of uniform in-plane load in the study of vibrations of circular plates having mixed elastic rotational edge constraints.

Amabili et al. [9] studied free vibrations of a circular plate having elastic constraints variable according to the angular coordinate. The non-uniform translational and rotational stiffness of the constraints are expanded in a Fourier series; the effect of the in-plane load is included and internal constraints are studied. Also an annular, non-uniform, Winkler foundation is considered. Numerical results are given for previously studied cases and for bolted (or riveted) plates fixed by different number of bolts.

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