Natural vibrations of anisotropicplateswithaninternal curve withhinges

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Abstract

The objective of this paper is to propose a general algorithm to obtain approximate analytical solutions for the study of the free vibrations of a rectangular anisotropic thin plate with an internal curved line hinge and general restraints. In this system, there exists an intermediate condition that requires the continuity of the transverse displacements. It is well known that the difficulty in choosing admissible functions has been the most significant drawback of the Ritz method. To relax the admissibility requirement the Ritz method, with polynomials as coordinate functions, in conjunction with the Penalty Function method is proposed. This study is focus on different problems related the curved hinge and a natural parametrization is used to treat the mentioned curves. The accuracy of the formulation is ensured by comparing some numerical examples with those available in the literature. Cases not previously treated are particularly analyzed. Frequencies parameters and several sets of vibration mode shapes are included, to provide a better understanding of the dynamical behavior of these plates.

Palabras Clave: VibrationAnisotropicplateRitzmethodPenaltyfunctionInternalcurveHinge