Linear and Nonlinear Vibration of a Beam with Constant Curvature

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Abstract

This paper presents an analysis of approximate methods for the vibration analysis of curved panels, focusing on their accuracy and reliability compared to exact solutions. The primary approximate approach utilizes static condensation, based on the assumption that longitudinal inertia (stretch due to bending) is negligible. We investigate the influence of boundary conditions and geometric parameters on veering phenomena. Additionally, an alternative approximation method is introduced and assessed alongside the classic approach and exact solutions. Key parameters affecting accuracy are examined to determine each method's suitability under various conditions. The performance of approximate methods is evaluated in both linear and nonlinear cases, highlighting their practical applicability.

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