

Transition Behavior in Large Deflection of Elastically-Bossed Sensor Plate
under Initial Tension

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Abstract

The transition behavior of an elastically-bossed layered plate under pretension in large deflection due to lateral load is studied. The nonlinear governing equation reduces to a modified Bessel equation for the lateral slope, following a linear consideration. Analytical solutions for the geometrical responses were developed and were found to be expressible in terms of both the first and the second kinds of modified Bessel functions. The deflection at the center of the plate as a function of initial tension was evaluated that shows the transition behavior for various inplane boss size and relative boss thickness, as a parametric study.

Keyword : Large Deflection, Initial Tension, Elastic Boss, von Karman Plate Theory