# Stability Analysis of Functionally Graded Materials Plates/Panels

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## ABSTRACT:

The present work deals with the stability analysis of shear deformable functionally graded material rectangular plates/panels subjected to thermo-mechanical loads. The material properties of the functionally graded plate/panels are assumed to vary continuously through the thickness, according to a simple power law distribution of the volume fraction of the constituents. An analytical approach based on fast converging Chebyshev polynomials is presented. The formulation is based on first-order shear deformation plate theory and von-Karman nonlinearity. The temperature dependent thermal and mechanical properties of FGM plate/panels are considered. The changes of critical buckling temperature due to effects of temperature field, volume fraction distributions and span to thickness ratio are studied. The post-buckling response of the FGM plate, subjected to in-plane edge compressive mechanical loading in x-direction and thermally induced loading due to a uniform varying temperature rise across the thickness has been carried out analytically. It is observed that volume fraction greatly affects the critical temperature of the plate.

**Keywords:** FGM plate, first order shear deformation theory, von-Karman nonlinearity, thermal buckling, Chebyshev polynomials.