# Abstract

The governing equations of elasticity theory for natural vibration and buck- ling of anisotropic plate are derived from Hellinger-Reissner's variational principle with nonlinear relations. Simply supported rectangular hybrid plates are studied with a finite difference method [Timoshenko, S.P. T1, T2 1977]. This method gives a numerical results approximated to the results of [He-xiang LU, Jung-yong LI 2009] with comparison. So the results for natural vibration and stability of hybrid plates presented in this work can be approximate analytical solutions. Furthermore, several types of coupling effects such as coupling between bending and twisting, and coupling between extension and bending, when the layer stacking sequence is asymmetric, are considered by only one set of governing equations.

The objective of this present work is to perform an analysis of dynamic stability and nonlinear behavior of hybrid plates subjected to initial stress based on exact elasticity theory for this purpose, a lot of parameters such as sizing and fiber orientation in hybrid plates are considered.

**Key words**: vibration, buckling, finite difference method, hybrid plate, elasticity theory, initial stress, fiber orientation.