Buckling Analysis of Composite Shells under Compression and Torsional Loads: Numerical and Analytical Study

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Abstract : Advanced lightweight laminated composite shells are increasingly being used in all types of modern structures, for enhancing their structural efficiency and performance. Such thin-walled structures are susceptible to buckling when subjected to various loading. This paper focuses on the buckling of cylindrical shells under axial compression and torsional loads. Effects of fiber orientation on the maximum buckling load of carbon fiber reinforced polymer (CFRP) shells are optimized. Optimum fiber angles have been calculated analytically by using MATLAB program. Numerical models have been carried out by using Finite Element Method program ABAQUS. Results from analytical and numerical analyses are also compared.

Keywords : buckling, composite, cylindrical shell, finite element, compression, torsion, MATLAB, optimization

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