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Thermal Buckling Response of Cylindrical Panels with Higher Order Shear Deformation Theory—a Case Study with Angle-Ply Laminations

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Abstract : An analytical solution before used for static and free-vibration response has been extended for thermal buckling response on cylindrical panel with anti-symmetric laminations. The partial differential equations that govern kinematic behavior of shells produce five coupled differential equations. The basic displacement and rotational unknowns are similar to first order shear deformation theory---three displacement in spatial space, and two rotations about in-plane axes. No drilling degree of freedom is considered. Boundary conditions are considered as complete hinge in all edges so that the panel respond on thermal inductions. Two sets of double Fourier series are considered in the analytical solution process. The sets are selected that satisfy mixed type of natural boundary conditions. Numerical results are presented for the first 10 eigenvalues, and first 10 mode shapes for Ux, Uy, and Uz components. The numerical results are compared with a finite element based solution.

Keywords : higher order shear deformation, composite, thermal buckling, angle-ply laminations
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