邊界限制有缺陷複合層板之熱挫屈分析

The thermal buckling of an initially imperfect and moderately thick laminated composite plate with in-plane immovable and out-of-plane elastic restrains in a uniform temperature field is studied in the thesis. In the thermal buckling analysis, a simple higher-order shear deformation plate theory is applied and the initial imperfection is considered in the strain-displacement relations accordingly. With the use of energy method, governing equations and boundary conditions for the composite plate are then derived. After the introduction of non-dimensional parameters and the use of double Fourier series displacement functions which satisfy the boundary conditions, a set of non-linear algebra equations is obtained. The thermal buckling temperature can then be found by obtaining the lowest eigen-value of the non-linear equation set. Finally, the effects of various quantities of laminated composite plates, such as number of layers, lamination angles, aspect ratios, thickness- to-length ratios, modulus ratios, thermal expansion coefficients, initial imperfections, and out-of-plane elastically restrained boundary conditions on the thermal buckling are thoughtfully examined.