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THE EFFECTS OF STACKING SEQUENCE OF THE SKIN AND STIFFENER UPON THE DELAMINATION GROWTH PROCESS FOR COMPOSITE ADVANCED GRID STIFFENED STRUCTURES (AGS)

Abstract

A numerical method had been developed to study delamination onset and growth characteristics during post-buckling process for the delaminated composite advanced grid stiffened structures subjected by uniform axial compressive load. First, a finite element post-buckling analysis model was established based on the first-order shear deformation theory in conjunction with Von-Karman nonlinear geometry theory; Second, the total energy release rate criterion combined with the virtual crack closure technique and the self-adaptive grid moving technology were used to analysis the delamination growth process, which considered the contact effect of front contours of the delamination . By some numerical examples, the effects of stacking sequence of the skin including [0/0/90/90]2sand [0/90]4supon the delamination growth process were discussed. The effects of distribution form of the stiffener which has the same weight upon the delamination growth process were also discussed. The analysis method and conclusions provided in the paper would be valuable to estimate the load capability and optimal design for composite advanced grid stiffened structures.