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Author: Ms. Jin Yu
Beijing Institute of Structure and Environmental Engineering(BISE), China, krisy2000@163.com

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

Abstract

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 At last, using OpenGL to realize the process of the dynamic visualization. By some numerical examples, the effects of stacking sequence of the skin including [0/0/90/90] 2s [90/90/0/0] 2s[0/90]4s and [90/0]4s 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. Key words: advanced grid stiffened structure (AGS); post-buckling; stacking sequence of the skin; delamination onset and growth.