Layer reduction technique by using generalized interlaminar shear stress continuity theory in the analysis of composite

許家興、李春穎

E-mail: 8407564@mail.dyu.edu.tw

ABSTRACT

This research is based on the multiple-layer approach,the governing equations of a composite cylindrical shell in static loading are formulated by using the principle of minimum total potential energy. Since both the continuity conditions of displacement and interlaminar shear stresses through the thick- ness and on the surfaces are satisfied exactly by assumed displacement fields,a valid stress field can be calculated directly from the constitutive equations.A mixed single-layer and multiple-layer approach using the generalized interlaminar shear stress continuity theory in cylindrical coordinate is presented in part one of this text. The colsed-form solutions of some selected munerical examples show good accuracy for both thick and thin laminated shells by comparing with elasticity solutions.In part two of this text,a layer reduction technique deriving from the generalized interlaminar shear stress continuity is used in the analysis of composite shells.By the results of the munerical examples studied,it is found that, in spite of the munber of plies in the laminate,six sublaminates used in this layer reduction analysis can give the predicated stresses within 6% of accuracy.

Keywords : I.S.S.C.T ; Hermite cubic shape function ; layer reduction ; variation

Table of Contents