The optimization of ply stacking sequence for composite laminate plate with constant thickness

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ABSTRACT

Composite materials in mechanical, aerospace and other branches of engineering are increasingly used due to their excellent weight saving and the ease of failing. But in design, the ply stacking sequence design is a time consuming job because it can only be done manually and the result can barely satisfied. In this thesis, a binary integer programming of branch and bound optimization method was provided to solve the ply stacking sequence. The optimization objective function was chosen as shear stress of out of plane direction in the edge of constant thickness composite plate, which caused the delamination in the edge. In this research, the out of plane shear stress is computed by the finite element analysis. The six-ply and eight-ply constant thickness and symmetric composite plate were computed as the examples of the optimization algorithm. This research accomplished the automation of the stacking sequence of the composite structural design for constant thickness plate.

Keywords : Composite material ; Interlaminar stresses ; Stacking sequence ; Branch and bound

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