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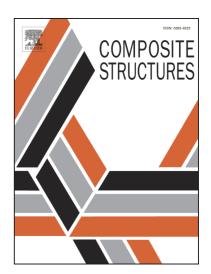
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ACCEPTED MANUSCRIPT

STACKING SEQUENCE OPTIMIZATION IN COMPOSITE TUBES UNDER

INTERNAL PRESSURE BASED ON GENETIC ALGORITHM ACCOUNTING FOR

PROGRESSIVE DAMAGE

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Abstract

Due to the large number of design variables for laminate composite structures, the use of an

optimum stacking sequence is a key step in the design of a structure with the most suitable

mechanical properties. This work presents a genetic algorithm (GA) for the optimization of

the stacking sequence to improve strength of a cylindrical shell under internal pressure. The

GA, which is associated to a meso-scale damage model, was written in Fortran and later

linked to a Finite Element (FE) package to simulate composite damage and failure. Two

scenarios were considered: i) without restriction, where an ideal situation is simulated; and ii)

with manufacturing restrictions, accounting for limitations on feasible winding angles. The

results show that progressive failure analysis generates asymmetric and unbalanced laminates

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