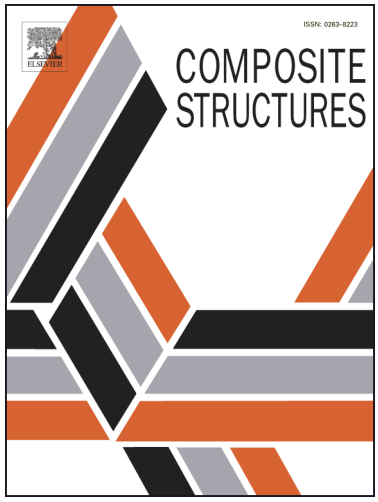

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Abstract

This paper proposes a multi-scale modeling and optimization strategy for the lightweight design of automobile fenders made of three dimensional (3D) woven composite. A Multi-scale modeling approach is developed to predict the mechanical behaviors of the 3D woven composite fender with various design parameters from material and structure. In order to alleviate the computational cost, Kriging modeling technique is adopted to generate the surrogate models of structural responses under multiple load cases. An optimization method integrating modified particle swarm