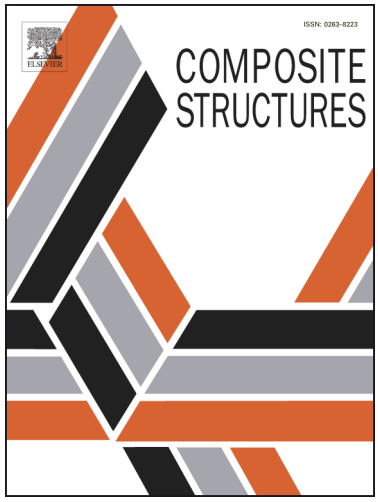

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A design algorithm to model fibre paths for manufacturing of structurally optimised composite laminates

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Abstract

Fibre steering is involved in the development of non-conventional variable stiffness laminates (VSL) with curvilinear paths as well as in the lay-up of conventional laminates with complex shapes. Manufacturability is generally overlooked in design and, as a result, industrial applications do not take advantage of the potential of composite materials. This work develops a design for manufacturing (DFM) tool for the introduction in design of the manufacturing requirements and limitations derived from the fibre placement technology. This tool enables the automatic generation of continuous fibre paths for manufacturing. Results from its application to a plate with a central hole and an aircraft structure – a windshield front fairing – are presented, showing good correlation of resulting manufacturable paths to initial fibre trajectories. The effect of manufacturing constraints is assessed to elucidate the extent to which the structurally optimal design can be reached while conforming to existing manufacturing specifications.

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