



基于参数化组件定义的复合材料旋翼桨叶结构优化设计

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Composite Helicopter Rotor Blade Optimization Design Based on Parametric Module Definition

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摘要

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摘要

为提高直升机复合材料旋翼桨叶结构设计效率,依据实际工程应用情况,提出了一种基于参数化组件定义的复合材料旋翼桨叶结构优化设计方法。以C型梁复合材料旋翼桨叶为研究对象,建立以精确的桨叶组件定义参数为设计变量的剖面优化和整体优化模型,通过桨叶的剖面优化确定出整体优化的初值,再由桨叶整体优化实现桨叶结构的最优设计。最后对某型主桨叶进行结构设计实例验证,结果表明该方法能够有效地实现直升机复合材料旋翼桨叶结构优化设计。

关键词: 直升机 复合材料 桨叶 结构设计 优化设计

Abstract:

A composite rotor blade structure optimization design approach based on parametric module definition is presented to improve design efficiency for engineering application. By taking a C-spar composite rotor blade as the research object, both the profile and the overall structure optimization models are built based on parametric module definition. By using the results of the profile optimization, the initial values of the overall structure optimization model are obtained. Then, the overall structure optimization is implemented to obtain the best blade structure. A case study is performed. The results demonstrate that the proposed method can complete the structure design of composite rotor blades efficiently.

Keywords: helicopter composite material blade structure design optimization design

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