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基于气动数值模拟的翼型反设计方法

赵小虎, 阎超

北京航空航天大学流体力学研究所, 北京, 100083

AERODYNAMIC INVERSE DESIGN METHOD OF AIRFOIL VIA CFD

Zhao Xiaohu, Yan Chao

Institute of Fluid Dynamics, Beijing University of Aeronautics and Astronautics, Beijing, 100083

摘要

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摘要

将计算流体动力学(CFD)与反设计技术相结合,通过数值求解欧拉方程,对翼型绕流流场作出数值模拟,再用几何和流动控制方程,反复迭代求得满足给定流场的翼型。以NACA0012为初始翼型,RAE-2822为目标翼型,选取两种工况,都取得了满意的结果。

关键词: 反设计 翼型 计算流体动力学

Abstract:

An aerodynamic inverse design method is developed which couples computational fluid dynamics(CFD) with numerical optimization. Starting from an initial baseline configuration, an airfoil shape which satisfies the given pressure distribution is found by solving the geometric and flow control equations using the CFD. The design method is tested for several transonic airfoils. The results demonstrate that the method can be an attractive design tool for aerodynamic design.

Keywords: inverse design airfoil computational fluid dynamics(CFD)

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