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绕翼型低速湍流的数值模拟

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NUMERICAL SIMULATION OF TURBULENT FLOW PAST AIRFOIL AT LOW MACH NUMBER

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摘要 采用求解低速流动的ＳＩＭＰＬＥ算法，用标准Ｋ－ε两方程模型、非线性Ｋ－ε两方程模型和一种改进的Ｋ－ε两方程模型来对绕两种翼型（Ａ翼型和ＧＡＷ－１翼型）在接近失速攻角情况下的低速湍流流动进行了数值模拟。计算结果表明，非线性Ｋ－ε两方程模型和改进的Ｋ－ε两方程模型较好地模拟出了翼型表面上的分离流动特性，较准确地预测出了分离点位置以及翼型的气动力系数，对翼型与机翼的工程设计具有一定的参考价值。

关键词： 湍流 翼型 两方程湍流模型

Abstract： The low mach number turbulent flow past two kinds of airfoils, a airfoil and GAW 1 airfoil, at the attack angle of near stall condition is numerically simulated with SIMPLE algorithm and three turbulence models including the standard K ε two equation turbulence model (SKE), a nonlinear K ε two equation turbulence model (NKE), and a modified K ε two equation turbulence model (MKE). The results show that both the NKE and the SKE successfully simulate the separated flow pattern on the airfoil surface, and accurately predict the location of separation and the aerodynamic force coefficients. Therefore, these two models are of engineering value in the design of the airfoil and the wing.

Keywords： turbulent flow air foil t wo-equat ion tur bulence model

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引用本文:

钱炜祺;蔡金狮. 绕翼型低速湍流的数值模拟[J]. 航空学报, 1999, 20(3): 70-73.

QIAN Wei-qi;CAI Jin-shi. NUMERICAL SIMULATION OF TURBULENT FLOW PAST AIRFOIL AT LOW MACH NUMBER[J]. Acta Aeronautica et Astronautica Sinica, 1999, 20(3): 70-73.