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大迎角水平振动翼型绕流的数值模拟

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NUMERICAL SIMULATION OF FLOWS PAST A LONGITUDINALLY OSCILLATING AIRFOIL AT HIGH INCIDENCES

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摘要

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摘要 从无量纲函数形式的N-S方程出发,数值计算了大迎角水平振动翼型的粘性绕流问题,得到近场涡结构及非定常演化过程。探讨了振动频率、振幅及迎角对流场涡结构及翼型升、阻特性的影响。结果表明,振动频率及振幅增加有助于提高翼型的平均升力;过大的迎角不利于升力提高。

关键词: 动态失速 非定常流 分离流 涡运动

Abstract: Viscous flows past a longitudinally oscillating airfoil at high incidences are investigated for solving the unsteady N-S equations. The emphasis of this study is put on revealing complicated vortex structures in the near wake and their influence upon the force acting on the body for different oscillating frequencies, amplitudes and incidences. The computed results show that larger oscillating frequency and amplitude other than higher incidence have a beneficial effect on the averaging lift.

Keywords: dynamic stall unsteady flow separation flow vortex motion

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