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飞行器亚、超音速气动载荷数值计算

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NUMERICAL CALCULATION FOR SUBSONIC AND SUPERSONIC AERODYNAMIC LOAD AROUND VEHICLE

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摘要 应用Greem函数法数值模拟飞行器的气动载荷。给出了求解亚、超音速定常和非定常载荷的统一方法。数值模拟中采用双曲四边形代替四边形元素;采用联合流场概念改进诱阻计算;并用计算机绘图原理核查输入的几何参数是否正确。以矩形翼及双三角翼航天飞机(089B模型)为例进行了数值模拟,结果与试验数据符合较好。

关键词： 亚音速流 超音速流 气动载荷 数值计算 Green函数

Abstract： A numerical method for calculating subsonic and supersonic loads around vehicle is developed. By applying the Green function method, a unified method for evaluating the load of subsonic and supersonic steady and unsteady potential flow is obtained. The 089B model being used as an example, the surface of the vehicle (including wake) is divided into small quadrilateral elements replaced by hyperboloidal elements. This yields a set of linear algebraic equations relating to unknown potential. Then the pressure distribution is evaluated by the finite difference method for polential. Numerical results show that the method given in this paper is not only general for using, but also considerably accurate for calculation. It can be applied to calculate vehicle aerodynamic loads.

Keywords： suhsonie flow supersonic fow aerodynamic loads numerical calculation Greenfunction

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