传递现象

矩形喷嘴射流近喷口流场的大涡模拟

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摘要   采用Smagorinsky提出的亚网格应力模型对三维矩形喷嘴射流近喷口处流场进行了大涡模拟，着重研究了较高Reynolds数下小宽高比矩形射流近喷口处流场的流速、脉动量等特征量的分布特性，并与实验结果进行了对比. 气相运动控制方程的离散采用有限容积法，时间步进格式采用二阶精度的隐式Crank-Nicolson差分格式. 模拟结果与实验结果具有较好的一致性.
关键词   大涡模拟   亚网格应力模型   矩形射流
分类号

LARGE EDDY SIMULATION OF FLOW FIELD NEAR NOZZLE OF RECTANGULAR JET

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Abstract

Rectangular jet is common in many engineering situations.To predict the flow field near the nozzle precisely is of great importance because it decides the development of the whole flow field.Although a series of studies have been carried out, it is not very easy to know the flow field clearly due to the complexity of rectangular jet.A large eddy simulation was conducted to investigate the flow field near the nozzle of a rectangular jet with Re=11435.The saddle shape of velocity was proved by simulation.Self-similarity flow mechanism of the streamwise velocity was shown on the central plane of y=0 when $x>6D_e$.The flow field of rectangular jet was similar with a round jet when $x>8D_e$.The simulation results fitted well with experiments.

Key words   large eddy simulation   sub-grid scale model   rectangular jet

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