

论文

槽道湍流近壁区多尺度输运特性研究

贾宏涛¹;许春晓¹;崔桂香²

清华大学航天航空学院¹

清华大学工程力学系, 100084²

收稿日期 2006-3-28 修回日期 2006-6-1 网络版发布日期 2007-3-6 接受日期

摘要 利用槽道湍流直接数值模拟的数据库和离散正交子波, 对近壁湍流的多尺度输运特性进行了研究. 通过在流向和展向分别进行子波多尺度分解, 得到了近壁区湍动能在流向和展向多尺度传输的不同性质, 发现流向传输以能量的反传为主, 而在展向能量存在明显的正传, 并且当过滤尺度较大时以正传为主. 近壁湍流能量传输的各向异性为进一步构造各向异性大涡模拟亚格子模式提供了必要的参考.

关键词 [正交子波](#) [壁湍流](#) [多尺度输运](#)

分类号 [0357.5](#)

Multi-scale energy transfer in near-wall region of turbulent channel flow

Hongtao Jia Chunxiao Xu Guixiang Cui

Abstract

The multi-scale energy transfer in near-wall turbulence is studied by orthonormal wavelets and the database of channel turbulence obtained by direct numerical simulation. By a multi-scale decomposition of the flow field in streamwise and spanwise directions, the difference of energy transfer between these two directions is investigated. It is found that the energy transfer in the streamwise direction is dominated by back scatter, while in the spanwise direction, there is an obvious forward transfer, which is not confined in the viscous sublayer only like that in the streamwise direction. With a larger filter width, the forward energy transfer in the spanwise direction becomes dominant.

Key words [orthogonal wavelets](#) [wall turbulence](#) [multi-scale energy transfer](#)

DOI:

通讯作者 许春晓 xucx@tsinghua.edu.cn

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(941KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“正交子波”的相关文章](#)

▶ [本文作者相关文章](#)

· [贾宏涛](#)

· [许春晓](#)

· [崔桂香](#)