

反应堆工程

摇摆条件对湍流流动特性的影响

鄢炳火¹; 顾汉洋²; 杨燕华²; 于雷¹

1.海军工程大学 核能科学与工程系, 湖北 武汉430033 2.上海交通大学 核科学与工程学院, 上海200240

收稿日期 修回日期 网络版发布日期:

摘要 利用Fluent软件对摇摆条件下矩形管内的湍流流体进行理论分析, 分析了多种湍流模型和多个参数对流动特性的影响。在摇摆条件下, 矩形管中心区域速度分布趋于均匀化, 但壁面附近的速度梯度增大, 从而使摩擦阻力系数增加。壁面对摇摆条件对湍流流体的影响产生抑制作用。在纵摇条件下, 小长宽比矩形管内速度等高线成哑铃状分布。对于本文的计算流体, 摇摆条件下的湍流摩擦阻力系数与 Re 的0.47次方成反比。

关键词 [摇摆](#) [湍流](#) [矩形管](#)

分类号

Theoretical Research on Effect of Rolling Motion on Turbulent Flow

YAN Bing-huo¹; GU Han-yang²; YANG Yan-hua²; YU Lei¹

1. Department of Nuclear Energy Science and Engineering, Naval University of Engineering, Wuhan 430033, China; 2. School of Nuclear Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, China

Abstract The turbulent flow in rectangular tube at rolling motion was investigated theoretically with Fluent code. The effects of several turbulent models and parameters on the flow were analyzed. At rolling motion, the velocity profile in tube center is more averaged. But the velocity gradient and frictional resistance coefficient on the wall increase. The effect of rolling motion on the turbulent flow can be depressed by the tube wall. At pitching motion, the velocity contour in small length-width ratio tube is in a dumbbell shape. As to the turbulent flow in the paper, the frictional resistance coefficient at rolling motion is in inverse ratio with the power of 0.47 of Reynolds number.

Key words [rolling](#) [turbulent](#) [flow](#) [rectangular](#) [tube](#)

DOI

通讯作者

扩展功能

本文信息

▶ [Supporting info](#)

▶ [\[PDF全文\]\(1110KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

相关信息

▶ [本刊中 包含“摇摆”的 相关文章](#)

▶ 本文作者相关文章

- [鄢炳火](#)
- [顾汉洋](#)
- [杨燕华](#)
- [于雷](#)