

多相流和计算流体力学

大涡模拟搅拌槽中的液相流动

张艳红, 杨超, 毛在砂

中国科学院过程工程研究所 中国科学院过程工程研究所 中科院过程工程所

收稿日期 2006-12-8 修回日期 2007-5-24 网络版发布日期 2007-10-11 接受日期

摘要 采用大涡模拟湍流模型对有档板的Rushton 桨搅拌槽进行了数值模拟研究。控制方程采用控制容积法进行离散, 对流项用三阶QUICK格式, 扩散项是二阶中心差分。压力-速度耦合方程在交错网格上采用SIMPLE算法进行求解。小尺度流动的模化采用动力学(dynamic)亚格子模型。搅拌桨与挡板之间的相互作用采用改进的内外迭代法进行处理。计算结果和文献值吻合得很好。

关键词 [大涡模拟](#) [搅拌槽](#) [动力学亚格子模型](#) [计算流体力学](#)

分类号

Large eddy simulation of turbulent flow in a stirred tank

Abstract

The turbulent flow field generated in a baffled stirred tank with a Rushton turbine was computed by large eddy simulation (LES). The dynamic subgrid model was used to model the unresolved scales. The spatial discretization of the governing equations was performed on a cylindrical staggered grid. The momentum and continuity equations were discretized by the finite difference method with a third order QUICK scheme for the convective terms. The interaction between rotating impeller and static baffles was accounted for through the improved inner-outer iterative algorithm. The phase-resolved predictions were compared with the experimental data of references and good agreement was observed both for mean resolved fields and turbulence quantities.

Key words [Large eddy simulation](#) [stirred tank](#) [dynamic subgrid-scale model](#) [computational fluid dynamics\(CFD\)](#)

DOI:

通讯作者 杨超 chaoyang71@yahoo.com; chaoyang@home.ipe.ac.cn

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(3393KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [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“大涡模拟”的相关文章](#)
- ▶ [本文作者相关文章](#)

- [张艳红](#)
- [杨超](#)
- [毛在砂](#)