

عنوان مقاله:

Modeling of Bubbly Flow using a Combined Volume of Fluid and Discrete Bubble Model: Investigation on Interphase Forces

محل انتشار:

دوماهنامه مکانیک سیالات کاربردی، دوره 15، شماره 3 (سال: 1401)

تعداد صفحات اصل مقاله: 13

نویسندگان:

H. Yang - *National-Provincial Joint Engineering Laboratory for Fluid Transmission System Technology, Zhejiang Sci-Tech University, Hangzhou, Zhejiang, 310018, China*

J. Xue - *National-Provincial Joint Engineering Laboratory for Fluid Transmission System Technology, Zhejiang Sci-Tech University, Hangzhou, Zhejiang, 310018, China*

L. Li - *National-Provincial Joint Engineering Laboratory for Fluid Transmission System Technology, Zhejiang Sci-Tech University, Hangzhou, Zhejiang, 310018, China*

X. Li - *National-Provincial Joint Engineering Laboratory for Fluid Transmission System Technology, Zhejiang Sci-Tech University, Hangzhou, Zhejiang, 310018, China*

P. Lin - *National-Provincial Joint Engineering Laboratory for Fluid Transmission System Technology, Zhejiang Sci-Tech University, Hangzhou, Zhejiang, 310018, China*

Z. Zhu - *National-Provincial Joint Engineering Laboratory for Fluid Transmission System Technology, Zhejiang Sci-Tech University, Hangzhou, Zhejiang, 310018, China*

خلاصه مقاله:

The gas-liquid two-phase flow with interfacial behaviors and bubble-liquid interactions is widely encountered in industrial processes such as that in gas-liquid reactors. The complicated phase structure makes it difficult to be modeled. The present work proposes a multi-scale mathematical model to simulate the bubbly flow in a square column. The volume of fluid (VOF) method is applied to treat the separated interface, and the discrete bubble model (DBM) is incorporated to handle the dynamics of dispersed bubbles. The hybrid model is validated against the benchmark experimental data to study the accuracy and suitability of the modeling framework for bubbly flows. And the influence of interphase forces on bubbly flow patterns and velocity profiles is investigated. It is found that the employment of both pressure gradient force and Ishii-Zuber drag model provides fairly good agreements with experimental data for velocity profiles.

کلمات کلیدی:

Gas-liquid two-phase flow, Multi-scale model, Volume of fluid, Discrete bubble model

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1460552>

