RESEARCH PAPERS

模拟变形液滴和气泡运动的改进水平集算法

杨超, 毛在砂

Institute of Process Engineering, Chinese Academy of Sciences, Beijing 100080, China

摘要　An improved level set approach for computing the incompressible two-phase flow with significantly deformed free interface is presented. The control volume formulation with the semi-implicit method for pressure-linked equations consistent(SIMPLEC) algorithm incorporated is used to solve the governing equations on a staggered grid.Several improvements concerning the computational grid, interface update, reinitialization procedure etc. are tested and found to be effective in promoting the convergence and numerical stability. The motion of a bubble or drop in a liquid with large density ratio, viscosity ratio and surface tension is numerically simulated. The computational results are in good agreement with the reported experimental data.

关键词　 level set approach　 bubble　 drop　 flow　 simulation
分类号

DOI:

An Improved Level Set Approach to the Simulation of Drop and Bubble Motion

YANG Chao, MAO Zaisha

Institute of Process Engineering, Chinese Academy of Sciences, Beijing 100080, China

Abstract An improved level set approach for computing the incompressible two-phase flow with significantly deformed free interface is presented. The control volume formulation with the semi-implicit method for pressure-linked equations consistent(SIMPLEC) algorithm incorporated is used to solve the governing equations on a staggered grid.Several improvements concerning the computational grid, interface update, reinitialization procedure etc. are tested and found to be effective in promoting the convergence and numerical stability. The motion of a bubble or drop in a liquid with large density ratio, viscosity ratio and surface tension is numerically simulated. The computational results are in good agreement with the reported experimental data.

Key words level set approach; bubble; drop; flow; simulation

通讯作者:
杨超
作者个人主页: 杨超; 毛在砂