

عنوان مقاله:

Lagrangian Particle Tracking in Velocity-Vorticity Resolved Viscous Flows by Subdomain BEM

محل انتشار:

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خلاصه مقاله:

A numerical study of particle motion in a cubic lid driven cavity is presented. As a computational tool, a boundary element based flow solver with a Lagrangian particle tracking algorithm is derived. Flow simulations were performed using an in-house boundary element based 3D viscous flow solver. The Lagrangian particle tracking algorithm is capable of simulation of dilute suspensions of particles in viscous flows taking into account gravity, buoyancy, drag, pressure gradient and added mass. The derived algorithm is used to simulate particle behaviour in a cellular flow field and in a lid driven cavity flow. Simulations of particle movement in a cellular flow field were used to validate the algorithm. The main goal of the paper was to numerically simulate the flow behaviour of spheres of different densities and different diameters, as experimentally observed in work of Tsorng et al. The study of slightly buoyant and non-buoyant particles in a lid driven cavity was aimed at discovering cases when particles leave the primary vortex and enter into secondary vortices, a phenomenon described in the work of Tsorng et al. A parametric study of this phenomenon was performed. The presented computational results show excellent agreement with experiments, confirming the accuracy of the developed computational method.

کلمات کلیدی:

Dispersed two phase flow, Lagrangian particle tracking, Cellular flow, Lid driven cavity, Boundary element method

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