

Granular coefficient of restitution using coupled kinetic theory of granular flow and discrete element method

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Abstract

The granular coefficient of restitution (CoR) is an empirical data of simulations using two-fluid model with kinetic theory of granular flow (KTGF). The CoR relates with binary inelastic collisions of discrete particles. In present study, an approach of coupled KTGF for Euler granular phase and discrete element method (DEM) for discrete particles is proposed. The granular CoR is computed from the binary collisions of discrete particles using DEM. The momentum transfer between the Euler gas phase and the discrete particles is calculated from the momentum transfer coefficient between the Euler gas phase and Euler granular phase. The viscous force of discrete particles of DEM is computed from the turbulent model of Euler gas phase. A correlation of granular CoR is proposed as a function of granular volume fractions. The simulated axial velocities of Euler granular phase and discrete particles are in agreement with experiments in a spout fluidized bed.

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