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The fully Lagrangian approach to the analysis of particle/droplet dynamics: Implementation into ansys fluent and application to gasoline sprays

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Abstract

The fully Lagrangian approach (FLA) to the calculation of teh number density of inertial partucles in dilute gas-particles flows was incorporated into teh CFD code ANSYS Flunet. The new verion of ANSYS Fluent was applied to moedling dilute gas-particle flow around a cylinder and liquid droplets in a gasoline fuel spray. In a steady-state case, thre predictions of the FLA for the flow around a cylinder and those based on teh equilibrium Eulerian method (EE) are almost the same for small Stokes number (Stk) and small Reynolds number (Re). FLA predicts higher values of the gradients of particle number densities in front of the cylinder compared with the ones predicted by the EE for larger values of Stk and Re. Application of FLA to a direct injection gasoline fuel spray has concentrated on the computation of the number densities of droplets. Results revelaed good agreement between the numerical simulation and exeperimental data.

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Keywords

Eulerian approach, Fully Lagrangian approach, Gas-particle flow, Gasoline fuel sprays, Particle number densities

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