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Comprehensive Analysis of Two Fluid Models for Turbulent Gas-Solid and Liquid-Solid Flow OMAR RENZO PIMINCHUMO MARINOS, DONALD J. BERGSTROM, University of Saskatchewan — In the Eulerian Two Fluid Model (TFM) formulation, the transport equation for the disperse phase consisting of solid particles is obtained from the Kinetic Theory of Granular Flow (KTGF). The transport equation for the carrier phase, either gas or liquid, closely resembles the single-phase Reynolds Averaged Navier-Stokes equation. Although successful predictions have been obtained for gas-solid flow, simulations of liquid-solid flow typically show less agreement with the experimental data. The present work compares a TFM developed for gas-solid flow with a recent TFM developed for liquid-solid flow: both describe the stresses of the solid phase using the KTGF. The main focus of the study is the difference in the predictions for the mean velocity, fluctuating velocity and volume fraction profiles, compared to experimental data for dilute liquid-solid flow in a vertical pipe. An outcome of the present research is a modification to the TFM which improves the predictions of the previous formulations. The modification considers changes to the model relations for the solid viscosity, granular temperature conductive coefficient and the source term intended to incorporate interstitial fluid effects.

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