Effect of interphase forces on two-phase liquid: liquid flow in horizontal pipe

ABSTRACT

A two-fluid model (Eulerian-Elurian model) is used to simulate dispersed two-phase immiscible liquids (oil-water) in a horizontal pipe. Effect of interphase forces (drag, lift and turbulent dispersion) is discussed. In the present study water is considered as dispersed and oil as continuous phase. The exchange between the phases is represented using source terms in conservation equations. Standard k-e turbulence model is used to induce turbulence in continuous phase. Comparison between mathematical simulation using CFD code FLUENT 6.2 and experimental data indicates that the interphase forces are important and has a strong effect on flow behaviour. Different drag, lift and turbulent dispersion expressions are evaluated. The CFD simulations are in good agreement with published experimental data.

Keyword: CFD; Dispersed flow; Horizontal pipe; Interphase forces; Oil-water system; Two-phase flow