Gas-Liquid Flow Void Fraction Identification Using Slippage Number Froud Mixture Number Relation in Bubbly Flow

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Abstract : Characterizing and modeling multi-phase flow is a complicated scientific and technical phenomenon represented by a variety of interrelated elements. Yet, the introduction of dimensionless numbers used to grasp gas-liquid flow is a significant step in controlling and improving the multi-phase flow area. SL (Slippage number), for instance is a strong dimensionless number defined as a the ratio of the difference in gravitational forces between slip and no-slip conditions to the inertial force of the gas. The fact that plotting SL versus Frm provides a single acceptable curve for all of the data provided proves that SL may be used to realize the behavior of gas-liquid flow. This paper creates a numerical link between SL and Froud mixing number using vertical gas-liquid flow and then utilizes that relationship to validate its reliability in practice. An improved correlation in drift flux model generated from the experimental data and its rationality has been verified. The method in this paper is to approach for predicting the void fraction in bubbly flow through SL/Frm relation and the limitations of this method, as well as areas for development, are stated.

Keywords : multiphase flow, gas-liquid flow, slippage, void farction
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