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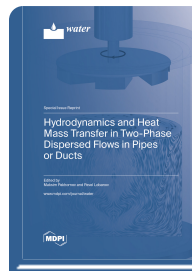
Hydrodynamics and Heat Mass Transfer in Two-Phase Dispersed Flows in Pipes or Ducts

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Two-phase gas–liquid flows are frequently encountered in the energy, nuclear, chemical, geothermal, oil and gas and refrigeration industries. Two-phase gas–liquid flows can occur in various forms, such as flows transitioning from pure liquid to vapor as a result of external heating, separated flows behind a flow's sudden expansion or constriction, dispersed two-phase flows where the dispersed phase is present in the form of liquid droplets, or gas bubbles in a continuous carrier fluid phase (i.e. gas or liquid). Typically, such flows are turbulent with a considerable interfacial interaction between the carrier fluid and the dispersed phases. The interfacial heat and mass transfer is very important in the modeling of such flows. The variety of flow regimes significantly complicates the theoretical prediction of hydrodynamics of the two-phase flow. It requires the application of numerous hypotheses, assumptions, and approximations. Often, the complexity of flow structures makes it impossible to theoretically describe its behavior, and so empirical data are applied instead. The correct simulation of two-phase gas–liquid flows is of great importance for safety's sake and the prediction of energy equipment elements.

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