Signal Processing Scheme and the Evaluation for the Five-Sensor Probe Method

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Abstract

Interfacial area concentration is one of the important parameters in the two-phase flow models. Five-sensor probe method is an useful measurement technique to measure the interfacial area cocentration. It is essentially based on the four-sensor probe method but improves it by adapting one more sensor. The passing types of the interfaces through the sensors are categorized into four and independent methods are applied to the interfaces belonging to each category. To verify the applicability of the five-sensor probe method, benchmarking tests are performed for the rectangular visual channel by using the photographic method. The bubble velocity, void fraction, and Sauter mean diameter measured by the probe are also benchmarked. In this study, the design of the five-sensor conductivity probe, the signal processing procedure of the probe signal and the data analysis method by photography are also described.