

Measurement of Two-Phase Flow with the Digital Image Processing Method

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Abstract

This paper discusses the photographic method and digital image processing technique for the measurement of the void fraction in two-phase flow. A software is developed to measure the void fraction and the interfacial area concentration from the image captured by the camcorder connecting to image capture board in the personal computer. From the careful sensitivity study on the edge detection algorithm, the specific sequential combination of the first derivative convolution algorithm is recommended for two-phase flow under the natural light condition. The coexistence of bright part and dark part in a bubble image due to complex lay scattering under natural light condition was treated reasonably. The present image processing technique could be used as one of useful tools for the two-phase flow measurement.

Development of a Mesh-Type Computer Tomography for the Two-phase Flow

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Abstract

This paper is to describe the development of a mesh-type computer tomography for the two-phase flow. The sensor is made of many parallel wires in the orthogonal orientation. A demultiplexer circuits is developed for electrodes to supply driving voltage and for data acquisition system to get the output voltage form the electrode unit. For the reconstruction of image a direct inversion algorithm is adopted. Full automation is provided from the data sensing to the image construction. Through the careful calibration and field tests in the horizontal and vertical two-phase loop, the present sensor detect images for the solitary wave and the slug realistically. This sensor could be a useful tool in the laboratory experiments.