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Measurement of pressure field in microchannel flow from velocity data obtained from micro-PIV SHINGO OTA, Graduate school of Mechanical Engineering, Tokyo University of Science, Japan, KEN YAMAMOTO, MASAHIRO MOTOSUKE, Department of Mechanical Engineering, Tokyo University of Science, Japan — Dynamics inside and outside of cells and bubbles/droplets in microchannels, *e.g.*, mechanical characteristics of cells and interfacial behavior in multiphase flows, are complicated and difficult to be reproduced by the numerical simulation. To understand these phenomena, a measurement technique that can obtain precise pressure fields of liquid is required. A pressure-field calculation from velocity fields is one possible scenario to obtain the pressure field in microscopic domain where inserting pressure probes is hardly achieved. The present study investigates a reconstruction of pressure fields from velocity fields obtained by micro-PIV based on the Navier-Stokes equation. Fast Fourier transformation (FFT) is used in the pressure-field calculation. And the pressure fields calculated from micro-PIV are compared with CFD results. By preparing artificial particle images with different image resolution, we investigate effects of the image resolution and errors due to the PIV analysis on the accuracy of the pressure-field calculation. As a result, it is shown that the method can reproduce the pressure fields despite the fact that the velocity data contains error. Moreover, the accuracy of both the velocity and the pressure fields can be improved as the increase of the resolution of the artificial particle images.

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