

Abstract Submitted  
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**Simultaneous measurement of a thickness and wave velocity of a liquid film flow, by using a single-tip optical fiber probe** HAJIME FURUICHI, Graduate School of Engineering, Shizuoka University, TAKAYUKI SAITO, Research Institute of Green Science and Technology, Shizuoka University — We developed a new measurement technique for a liquid film flow, using a single-tip optical fiber probe (S-TOP). The measurement method for a liquid-film thickness is as follows; the S-TOP with a tapered tip was installed parallel to the main stream, and detected a wavy surface; after processing the probe signals, liquid phase fractions were calculated in every installed position of the S-TOP. Moreover, we calibrated the experimental results via our original 3D-ray-tracing numerical-simulation. Analyzing the simulated signals, we found the relationship among the liquid phase fractions, the installed positions and the wave heights. Wave velocities were accurately measured through our original micro-fabricated S-TOP that has two optical-sensors. The experimental and numerical analyses were executed in order to deeply understand the complex signals of the S-TOP. Finally, the simultaneous measurement technique of the thickness and wave velocity was demonstrated. When the liquid phase fraction was 0.52, the installed-position equals the average film thickness. The wave velocity was measured based on the event time of each sensor touching the film surface. A difference in the results of the velocity between the S-TOP and the visualization was less than 10 percent.

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