**Non-Contact Measurement of Ultrasonic Acoustic Field in Water with Cavitation Bubble using Background-Oriented Schlieren Technique**

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We measure the ultrasonic acoustic field in water with cavitation using background-oriented schlieren (BOS) technique, which can easily and quickly obtain the pressure field in a non-contact manner. BOS needs only a background image and a camera to measure the pressure field. In our previous study, we successfully increased the measurable range of pressure of BOS using a background with periodic pattern and Fast Fourier Demodulation (Shimazaki *et al.*, *Exp. Therm. Fluid Sci.*, 2022). Besides, we also successfully conducted a novel vector tomography for BOS to decrease the computational cost and increase the measurement accuracy (Ichihara *et al.*, *Exp. Fluids*, 2022). These enabled us to visualize the temporal acoustic field and plotted the pressure as a function of time, which is the first successful plot using BOS. In this research, we compared the measurement accuracy of the proposed BOS technique with a hydrophone and numerical results in terms of the wave period, wavelength, and maximum pressure in the focused ultrasound field. In the pressure-time plot, the waveform of BOS is similar to that of the hydrophone. The measurement error of the wave period is around 2.4 %, when compared to the theoretical value. For the maximum pressure, the measurement using BOS shows a linear relationship between maximum pressure and voltage. In terms of the wavelength, measurement error of BOS is around 4 %. To compare the field result, numerical simulation of the pressure field of focused ultrasound was performed using the linear two-dimensional wave equation and finite difference methods. The initial condition is set according to the experiments while ignoring the dissipation. The normalized pressure field of the numerical results is similar to that measured by BOS. After obtaining these results, we have successfully measured the ultrasonic acoustic field in water with cavitation using the proposed BOS technique.