



Improvement of Background Oriented Schlieren Method focused on Amplitude by Wavelet Transform

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Abstract

The BOS method is the visualization method of density variation in the flow field. The BOS method is simpler and cheaper to visualize than the schlieren method. The primary purpose of this study is to propose WA-BOS (a simpler BOS method focused on the amplitude of the Wavelet transform). Output images by WA-BOS and WP-BOS (BOS method focused on the phase of the Wavelet transform) and the Schlieren image were compared to verify the validity of the output images. Also, output images by the captured image lost periodic information partially were verified, in order to confirm the validity for the image processing for the deviation out of the domain of phase. Targets of visualizing are the supersonic jet and the shock wave ejected from the shock tube. The measurement system consists of an LED, a sine pattern background image and a high-speed camera. As a result, the supersonic jet and the shock wave ejected from the shock tube are visible in the visualized image that was obtained by WA-BOS and WP-BOS. Also, it is found that WA-BOS can visualize a supersonic phenomenon without containing an error.

Keywords: Flow Visualization, BOS, Wavelet Transform,
Image Processing, Shock Wave