

Abstract Submitted  
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**Feasibility Study on Sparse Processing Particle Image Velocimetry**<sup>1</sup> NAOKI KANDA, KOKI NANKAI, YUJI SAITO, Tohoku University, TAKU NONOMURA, Tohoku University, Presto, JST, KEISUKE ASAI, Tohoku University — The objective of this study is to investigate accuracy and calculation time of the velocity field data estimated from sparse interrogation area of particle images by Kalman filter and PIV. This estimation method is named sparse processing particle image velocimetry (SPPIV). In this study, the PIV measurement is conducted for NACA0015 under the following conditions; the freestream velocity, the angle of attack, the chord and span of this model were 10 m/s, 16 degree, 100 mm and 300 mm, respectively. Ten proper orthogonal decomposition (POD) modes and five interrogation areas were used and the velocity field was estimated by SPPIV. The optimum location of sparse interrogation area is estimated by greedy method. In this experiment, calculation time of estimating velocity field by SPPIV was approximately 1% of conventional PIV method. In the lowest-order POD mode, the estimated POD mode by SPPIV showed approximately same trend as POD mode calculated by Conventional PIV, however POD mode calculated by SPPIV is sometimes quantitatively different from that calculated by conventional PIV. The quality of particle images and the calculation method of optimum location of sparse interrogation areas should be improved for more accuracy in the future.

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