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Bootstrapping Dip Test for PIV Outlier Identification and Correction[1] ANDREE SUSANTO, CHAN-SENG PUN, DANA DABIRI, University of Washington — A PIV outlier detection and correction method is proposed that does not directly rely on local statistics. A bootstrapping method uses interpolation to generate a distribution of points for each vector component. Statistics are obtained by applying the Hartigan's dip test for bimodality on the distribution points to estimate the mode for each vector component. Significant difference between the estimated modes and outliers is observed; non-spurious vector components are close to the estimated modes. The bootstrapping dip test outlier detection scheme is then repeated until no more vector components are rejected. Two approaches to replace the detected vector components are considered. First, the corresponding mode values are replaced with the detected components, second the remaining vector components are used to re-interpolate the field. Validation includes parametric studies based on the number of undetections and overdetections on simulated fields to determine the optimal sets of parameters. Applications of the optimum parameters to a turbulent jet flow and a synthetic Rankine Vortex flow, both obtained from the PIV Challenge website are shown and details of this methodology is discussed.

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