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Post-processing of PIV records to allow derivative computation.

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ABSTRACT :

Particle Image Velocimetry provides raw data which needs post-processing to improve their quality and to allow derivative computation. This process includes: the spurious vector detection, the correction or removal of these vectors and the filling of the velocity maps in order to avoid holes. The recent developments of CCD have allowed to record a lot of images during a PIV test campaign. These images lead to a large number of velocity maps that have more or less spurious vectors depending on the quality of the records. A manual post-processing is then impossible. This paper proposes an automatic procedure to remove the spurious data based on a comparison between the raw vector and an "estimation". This estimator is a median filter applied to the surrounding velocity field. This procedure only requires an a priori estimation of the percentage of validated vectors in the map. After this procedure, each map is left with a certain number of holes. An adaptive and iterative interpolation method is then used, based on a 5 x 5 window interpolation filter. The maximum order of the filter is 7. The interpolated map obtained can then be used to compute the velocity gradients.