PIV measurement of flow around an arbitrarily moving body[1]

YOUNG JIN JEON, HYUNG JIN SUNG, KAIST — PIV image processing methods for measuring flow velocities around an arbitrarily moving body are proposed. A contour-texture analysis based on user-defined textons is applied to determine the arbitrarily moving interface in the 2D PIV. After the interface tracking procedure is performed, the particle images near the interface are transformed into Cartesian coordinates that are related to the distance from the interface. This transformed image always has a straight interface, so the interrogation windows can easily be arranged at certain distances from the interface. Accurate measurements near the interface can then be achieved by applying the window deformation algorithm in concert with PIV/IG. For a tomographic 3D PIV, a volume reconstruction technique from four views is applied to obtain a three-dimensional shape of the interface. Particle motion analysis is made by the MTE MART algorithm. Quantitative evaluations of this method are performed to computer-generated images and actual PIV measurements.

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