

Abstract Submitted
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Feature tracking for measurement of translational and angular displacements of solid objects in fluid flows with application to saltation
CARLO ZUNIGA ZAMALLOA, A.M. HAMED, LEONARDO P. CHAMORRO,
University of Illinois at Urbana-Champaign — Particle Tracking Velocimetry (PTV) is a well-known technique that is used to obtain translational (Lagrangian) paths of particles within a fluid media. In a number of phenomena, the dynamics of free moving particles is of major significance. In addition to purely translational motions, 3-axis rotation can provide major insights into the dynamics of the particle. This feature can be achieved by tracking optical texture added to the moving particles. In the present work we show how this addition of optical texture to a coarse particle moving in a flow yields accurate angular displacements of the particle by means of feature tracking. The three dimensional rotation is obtained from a rotational matrix that is calculated from correspondence of features between image pairs that are consecutive in time. This technique and its resulting rotational information give rich insights into problems such as saltation of coarse particles.

Carlo Zuniga Zamalloa
University of Illinois at Urbana-Champaign

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