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Wall shear measurements of turbulent flow over backward facing step NGUYEN THIEN DUY, WELLS JOHN CRAIG, Ritsumeikan University, Japan, NGUYEN CHUONG VINH, Monash University — This paper is aimed to generalize our recent developments of an extension of particle image velocimetry (PIV) measurement technique, named as Interfacial PIV (noted as IPIV). It enables us to deal with near-wall flows over curved walls by means of conformal transformation. In addition, if the displacement of tracer in wall-normal direction is less than its diameter, IPIV could instantaneously and precisely measure the wall shear gradient as well as draw out the tangential velocity profile. Our integration of measured velocity gradients upward from wall could provide a continuous profile with single pixel resolution. In this communication, we extend our wall shear measurement technique to stereo-PIV setup. Validation of IPIV wall shear measurement to 2-dimensional and 3-dimensional synthetic images of turbulent flows over a wavy bed is performed. In practice, experiment with backward-facing step (BFS) at a low Reynolds number of 2800 is examined. A system of two two-component PIV (2CPIV) coupled with a stereo-PIV (SPIV) is conducted to inquire the flow structure. Applications of IPIV to our 2CPIV and SPIV experimental images are also described.

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