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Three-Dimensional Vortical Structures of a Round Impinging Jet Measured by Scanning Stereo-PIV JUN SAKAKIBARA, TOSHIO HORI, Department of Engineering Mechanics and Energy, University of Tsukuba — A scanning stereo-PIV system was used to measure the 3D distribution of 3C velocity in a turbulent round jet impinged on a flat plate at normal incidence. The water jet was formed by a round nozzle with an exit diameter of D= 5 mm in an octagonal tank filled with water. The impingement plate was located at x=45D distant from the nozzle exit, and the jet Reynolds number was set at $Re \approx 1000$. A laser light sheet illuminated the flow field and was scanned in the direction normal to the sheet. Two C-MOS cameras captured the particle images, and stereo-PIV method was adopted. The measurement volume ($\approx$80 $\times$ 80$\times$ 60 mm^3) containing 50 velocity planes was located around the stagnation point. Three-dimensional vortical structures were visualized by iso-surfaces of vorticity magnitude. Convection of the vortex filament in both shear layer and core of the jet were clearly observed. Production of the squared vorticity by the mean strain is quite dominant near the wall, although the turbulent strain contributes in the region away from the wall. Decomposition of the mean strain into the individual terms indicates that the radial and azimuthal straining plays a key role in amplification of the vorticity, while the mean compression in the direction noraml to the wall made a negative contribution to the production.

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