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Structure of backward facing step flow in low Reynolds number controlled by synthetic jet array with different injection velocities SANEYUKI TAKANO, Tokyo University of Science — This study presents detailed structure of separated flow downstream of a backward facing step affected by a non-uniform periodic disturbance along spanwise direction induced by synthetic jet array. The Reynolds number based on the step height ranged from 300 to 900. The frequency of the synthetic jet actuation was selected within the acceptance frequency range of separating shear layer. The periodic disturbance generates periodic transverse vortices whose size and shape change corresponding to the strength of the disturbance. The effect of different injection velocities in the synthetic jet array from those of adjacent jets on the transverse vortex structure and resulting reattachment process is discussed based on the wall shear stress measured by the Micro Flow Sensor (MFS) and flow visualization. Near wall behavior of the transverse vortex above the MFS was related to the sensor output. The results show that non-uniform injection velocity manipulated in the jet array induces difference in the distorted vortex structure and reattachment process in spanwise direction, which strongly depend on the Reynolds number and injection velocities of the synthetic jets.

Saneyuki Takano
Tokyo University of Science

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