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Abstract Submitted
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Turbulence growth and its dependency of wake vortices on excitation frequency by local body-force around two-dimensional hump[1] AIKO YAKENO, JAMSTEC, YOSHIAKI ABE, Imperial College London, TAKU NONOMURA, SOSHI KAWAI, Tohoku University, KOZO FUJII, Tokyo University of Science — We investigated details of wake vortex dynamics to cause turbulence increase and early flow-reattachment under excitation forcing by a plasma actuator setting around a 2D hump numerically. The local body-force was homogeneous in the spanwise direction and bursting temporally. That actuation generates two-dimensional roll vortices and other turbulence motions such like three-dimensional rib structure in downstream. These dynamics depended on the excitation frequency. We tried to discuss multi-scaled vortices separately with considering the temporal phaseaveraged statistics of the excitation frequency and others, those are related to roll vortices and others with rib structure between rolls. It was found that the maximum value of non-periodic fluctuation in downstream correlated with flow-reattachment performance more than that of periodic fluctuation of roll vortices. The amplitude becomes large around separation position in early reattachment cases. The spacial growth rates of peak values in the wall-normal direction are same for high frequency cases, K-H instability modes, however not true for low frequency cases. In high frequency cases, amplitude in the early state of separation plays a significant rule to increase it in downstream.

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