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Drag Reduction with Blowing and Suction from a Pair of Oblique Slots on the Wall JOON AHN, The University of Tokyo, KAORU IWAMOTO, Tokyo University of Science, KOJI FUKAGATA, NOBUHIDE KASAGI, The University of Tokyo — We introduce a pair of oblique blowing and suction of zero net-mass-flux on the wall to reduce the drag by inducing negative Reynolds stress. It is applied to the channel flow at the bulk Reynolds numbers of 300 (laminar) and 2,800 (turbulent). Blowing and suction are made on one wall at an inclination angle set at 10 degrees. The magnitude of blowing and suction is the half of bulk velocity of the main flow. We also simulate the flows inside the blowing and suction slots by employing an immersed boundary method. The laminar flow results show that sub-laminar drag should be achievable. The pumping power to drive a constant mass flow rate is reduced by 9.8% for the turbulent flow, although the blowing/suction is applied to only 10% surface area of one wall. Detailed analysis including the energy balance will be discussed in the presentation.

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