Abstract Submitted for the DFD07 Meeting of The American Physical Society

Does the sailfish skin reduce the skin friction like the shark skin?¹ WOONG SAGONG, SANGHO CHOI, CHULKYU KIM, WOO-PYUNG JEON, HAECHEON CHOI, Seoul National University — The shape of shark skin - riblet reduces the skin friction up to 8% in a turbulent boundary layer, as compared to a smooth surface. The sailfish is the fastest sea animal, reaching its maximum speed of 110km/h. On the sailfish skin, we observe a number of V-shaped protrusions pointing downstream. So, we investigate the possibility of skin-friction reduction using this shape. We perform an extensive parametric study by varying the width and height of V-shaped protrusion, the spanwise and streamwise spacings between adjacent ones, and the overall distribution pattern (parallel, staggered and random), respectively. For all the cases considered, drag is either increased or unchanged. Each surface protrusion generates a pair of streamwise vortices, producing low and high shear stresses at the center and side of the protrusion, respectively, but total skin friction is nearly same as or higher than that of a smooth surface. Since this shape is very similar to but opposite in direction to that used in Sirovich & Karlsson (Nature 1997), we perform another experiment on the V-shaped protrusions pointing upstream following their study. Unlike their result, we do not obtain any drag reduction even with random distribution of these V-shaped protrusions.

¹Supported by the National Research Laboratory Program, MOST

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Date submitted: 02 Aug 2007

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