Abstract Submitted
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Flow Control Behind Bluff Bodies through the Interaction of an Attached Resonant Flexible Tail[1] SAMUEL SHELLEY, University of Exeter, JOHN SMITH, DSTL, ALASTAIR HIBBINS, ROY SAMBLES, SIMON HORSLEY, University of Exeter — Steady uniform flow, incident upon a bluff body can separate downstream causing a wake to form, this leads to the periodic shedding of vortices behind the body. By adding a thin flexible tail to the rear of the body one may reduce the drag as well as change the vortex shedding frequency (VSF). In this work we model the flow past a cylinder, in the Laminar flow regime, with an attached tail, varying the length and stiffness of the tail to couple the resonant frequencies of the tail to the natural VSF of the structure. We use this to explore how the drag and VSF of the system change as we couple to different vibrational modes of the tail. On increasing tail length, or decreasing tail stiffness progressively on passing where the natural VSF of the cylinder and tail resonances couple we see sharp increases in both the drag and VSF, which both gradually decrease again. The effect of changing the shape of the end of the tail is also investigated by exploring tails with square, rounded and triangular trailing edges. Experiments are being conducted in water at a higher Reynolds number using a tail made out of Neoprene to confirm these modelling results.

[1]DSTL

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