

Abstract Submitted
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Performance of an unsteady plate with a two-dimensional body attached upstream¹ RODRIGO LISAZO, TYLER VAN BUREN, DANIEL FLO-RYAN, DEVON HARTSOUGH, EMILE OSHIMA, CLARENCE W. ROWLEY, Princeton University, ALEXANDER SMITS, Princeton University and Monash University — We present results from experiments and simulations on a biologically-inspired two-dimensional heaving and pitching rigid plate. Two cases are considered: an isolated pitching plate actuated sinusoidally at the leading edge, and a pitching plate attached at the trailing edge of a stationary, streamlined two-dimensional panel. Experiments were conducted in a water channel facility equipped with a six component load cell and particle image velocimetry (PIV). Simulations were performed using an immersed boundary method. Of particular interest are (1) the impact of leading edge separation on propulsive efficiency, (2) the influence of the incoming boundary layer on the trailing vortex structure and (3) the effects of the unsteady motion on the behavior of the boundary layer.

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