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Hydrodynamic performance of multiple bodies swimming in an in-line configuration[1] BIRGITT BOSCHITSCH, PETER DEWEY, ALEXANDER SMITS, Princeton University — Experiments are reported on a pair of airfoils that are harmonically pitched about their leading edges and arranged in an in-line configuration to determine the hydrodynamic effect of drafting behind a neighbor in unsteady bio-inspired propulsion. The thrust production, power consumption, and propulsive efficiency is independently measured for the leading and trailing airfoils at a Reynolds number of 2000 for a range of streamwise airfoil spacings, Strouhal numbers, and oscillation phase differential between the airfoils. To assess the wake interactions between the panels that lead to propulsive performances observed, digital particle image velocimetry (DPIV) is used. These results are compared to an airfoil swimming in an isolated configuration to identify the parameters that lead to a benefit (or detriment) when swimming in-line with a neighbor.

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