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Hydrodynamics of foils swimming in a side-by-side configuration[1]
PETER DEWEY, Princeton University, KEITH MOORED, Lehigh University, DANIEL QUINN, Princeton University, ALEXANDER SMITS, Princeton University and Monash University — Experimental and computational results are presented on a pair of hydrofoils undergoing pitch oscillations in a side-by-side configuration. The time-averaged forces and propulsive efficiency are independently measured for each foil for a range of separation distances and oscillation phase differentials between the two foils. The results are compared to an isolated foil to determine if the presence of a second foil can yield an improvement to the propulsive characteristics of the system. While the exact performance of the side-by-side foils is strongly dependent on the separation distance and phase differential between the foils, it is found that under certain configurations an enhancement in net thrust is achieved by the presence of a second foil. The wake patterns shed by the foils as they oscillate are also examined and compared to the propulsive characteristics. A series of four stable wake configurations are observed that depend on the phase differential between the foils.

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