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Machine Learning Model of Flow Interactions in Large Schools¹ KEITH W. MOORED, Lehigh Univ, JONATHAN H. TU, NSWC Carderock — Computations are presented for two, three, four and more foils pitching about their leading edges and aligned side-by-side. A simple superposition model is developed from two-body interactions to predict the thrust, efficiency, and lift acting on three interacting swimmers, by decomposing the three-body interactions into two twobody interactions. However, the simple model fails to capture nonlinearities that are present when the swimmers are in close proximity. To accurately predict the threebody interactions, a machine learning model is developed to capture the residual nonlinearities not predicted by the superposition model. Finally, this model is used to predict the performance of schools with more than three bodies, which is verified with targeted simulations of many-body interactions.

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