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**Optimal schooling formations using a potential flow model** ANDREW TCHIEU, MATTIA GAZZOLA, ETH Zurich, ALEXIA DE BRAUER, Université Bordeaux 1, PETROS KOUMOUTSAKOS, ETH Zurich — A self-propelled, two-dimensional, potential flow model for agent-based swimmers is used to examine how fluid coupling affects schooling formation. The potential flow model accounts for fluid-mediated interactions between swimmers. The model is extended to include individual agent actions by means of modifying the circulation of each swimmer. A reinforcement algorithm is applied to allow the swimmers to learn how to school in specified lattice formations. Lastly, schooling lattice configurations are optimized by combining reinforcement learning and evolutionary optimization to minimize total control effort and energy expenditure.

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