

Abstract Submitted  
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**Hamiltonian mechanics and planar fishlike locomotion**<sup>1</sup> SCOTT KELLY, University of North Carolina at Charlotte, HAILONG XIONG, University of Illinois at Urbana-Champaign, WILL BURGOYNE, United Launch Alliance — A free deformable body interacting with a system of point vortices in the plane constitutes a Hamiltonian system. A free Joukowski foil with variable camber shedding point vortices in an ideal fluid according to a periodically applied Kutta condition provides a model for fishlike locomotion which bridges the gap between inviscid analytical models that sacrifice realism for tractability and viscous computational models inaccessible to tools from nonlinear control theory. We frame such a model in the context of Hamiltonian mechanics and describe its relevance both to the study of hydrodynamic interactions within schools of fish and to the realization of model-based control laws for biomimetic autonomous robotic vehicles.

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