

Abstract Submitted  
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**The Effect of Caudal Fin Shape on the Hydrodynamics of Swimming**<sup>1</sup> MOHSEN DAGHOOGHI, IMAN BORAZJANI, Mechanical and Aerospace Engineering Department, University at Buffalo SUNY — The caudal fin is thought to be the main thrust generator in body/caudal fin swimmers because the largest undulations occur at the caudal fin. The shape of the fin could possibly be one of the most important factors in thrust generation for such swimmers. However, investigating this experimentally is quite challenging due to the issues in controlling and measuring forces on different appendages of live fish. We can investigate the effect of caudal fin shape through controlled numerical simulations. We construct virtual swimmers with different caudal fin shapes but with the same projected area. We attach trapezoidal and heterocercal shapes of caudal fins (e.g. observed in trouts and sharks, respectively) to a mackerel body and test these swimmers beside the original mackerel with a homocercal tail. We prescribe the same carangiform kinematics to all virtual swimmers and carry out self-propelled simulations under similar conditions, i.e., the undulations are prescribed while motion of the center of mass is calculated. The simulations are continued until the quasi-steady state is reached, in which the swimmers are compared in terms of different performance measures.

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Iman Borazjani

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