

Abstract Submitted
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An integrated muscle mechanic-fluid dynamic model of lamprey swimming CHIA-YU HSU, Tulane University, ERIC TYTELL, University of Maryland, LISA FAUCI, Tulane University — In an effort towards a detailed understanding of the generation and control of vertebrate locomotion, including the role of the CPG and its interactions with reflexive feedback, muscle mechanics, and external fluid dynamics, we study a simple vertebrate, the lamprey. Lamprey body undulations are a result of a wave of neural activation that passes from head to tail, causing a wave of muscle activation. These active forces are mediated by passive structural forces. We present recent results from a model that fully couples a viscous, incompressible fluid with nonlinear muscle mechanics. We measure the dependence of the phase lag between activation wave and mechanical wave as a function of model parameters, such as body stiffness and muscle strength. Simulation results are compared to experiments utilizing both real and synthetic lamprey.

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