

Abstract Submitted  
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**Nonlinear resonance control of unsteady hydrodynamic actuators**<sup>1</sup> PROMODE R. BANDYOPADHYAY, ALBERICO MENOZZI, Naval Undersea Warfare Center, Newport, RI, ANURADHA ANNASWAMY<sup>2</sup>, MIT, Cambridge, MA — The nonlinear resonance properties of inferior olive neurons, that are responsible for restoring balance in animals, are considered for control of periodic flapping foils. The approach is motivated by a need to make the unsteady foils of a recently demonstrated Biorobotic Autonomous Underwater Vehicle at NUWC fault tolerant because many foils work in phase to allow the vehicle undertake precision maneuvering motions. Limit cycle properties are used to restore variables such as roll, pitch bias and frequency subsequent to pulse or impulse disturbances. Stabilization is demonstrated in a full scale foil in a water tank.

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