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Locomotion in a planar ideal fluid by a singly actuated elastic body SCOTT KELLY, RODRIGO ABRAJAN-GUERRERO, UNC Charlotte — An aquatic vehicle with a single internal degree of freedom can propel itself by exploiting symmetry-breaking phenomena like vortex shedding, but the manipulation of added-mass effects to achieve locomotion in an ideal fluid — essentially exploiting rather than breaking finite- and infinite-dimensional symmetries — requires a swimming body to execute changes over time in at least two independent shape parameters. Such parameters may be under direct control, and prior work has addressed the design of optimal gaits for swimmers in ideal fluids under this assumption, but may also evolve dynamically as a result of partial actuation and body elasticity. This talk will describe the planar locomotion of a singly actuated jointed robot exploiting limit cycles arising in its internal shape as a result of periodic actuation.

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