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Scott David Kelly* (scott@kellyfish.net). *Constrained mechanics in idealized models for propulsive vortex shedding.*

A well-developed formalism exists for the analysis of finite-dimensional mechanical systems subject to integrable and nonintegrable velocity constraints that break symmetries. Symmetry-breaking constraints arise naturally in idealized models for vortex shedding from solid bodies in fluids, exemplified by the Kutta condition from classical hydrodynamics. This talk will detail parallels between problems in the self-propulsion of terrestrial robotic vehicles subject to nonintegrable constraints like rolling constraints and problems in the self-propulsion of aquatic vehicles exploiting localized vortex shedding, highlighting the relevance of notions like nonholonomic momentum to both cases. (Received January 28, 2014)