

## Geometric Phases and Swimming in a Perfect Fluid

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The swimming of a deformable fishlike body in an irrotational inviscid flow can be described in terms of geometric phases, or holonomy, over the space of shape changes of the body, [1,2]. However, this irrotational flow model does not account for the generation of dynamic vortex wakes by moving fish, which is central to their locomotion in water on a macroscopic scale. This talk will describe some reduced models, within the perfect fluid idealization, for capturing the dynamic interaction of fish with the wake vorticity.

### References

- [1] Kanso, E., J.E. Marsden, C.W. Rowley and J.B.Melli-Huber [2005], Locomotion of articulated bodies in a perfect fluid, *J. Nonlinear Science*, **15**, 255-289.
- [2] Kanso, E. and J.E. Marsden [2005], Optimal motion of an articulated body in a perfect fluid, *44th IEEE Conf. Decision and Control*, 2511-2516.

**Keywords:** swimming, dynamics, vorticity