

# Direction Reversal in Flapping Flight and Shape Changing Locomotion

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April 28, 2008

## **Abstract**

I will discuss two fluid-body interaction problems. The first relates to the experiments of Moret and Zhang (NYU Applied Math Lab, 2008) on a wing with active heaving but passive pitching. The experiments have indicated the existence of a bistable region in flapping frequency where either "forward" or "backward" flight may be achieved. I will discuss numerical simulations that are used to better understand the physical phenomenon of direction reversal, which also predicts other modes of behavior. Second, I will discuss a range of closely related behaviors (hovering, ratcheting, and bursting) that may be achieved by shape changing bodies in fluid, where simple analytical models are shown to match the dynamics explored in numerical simulations.