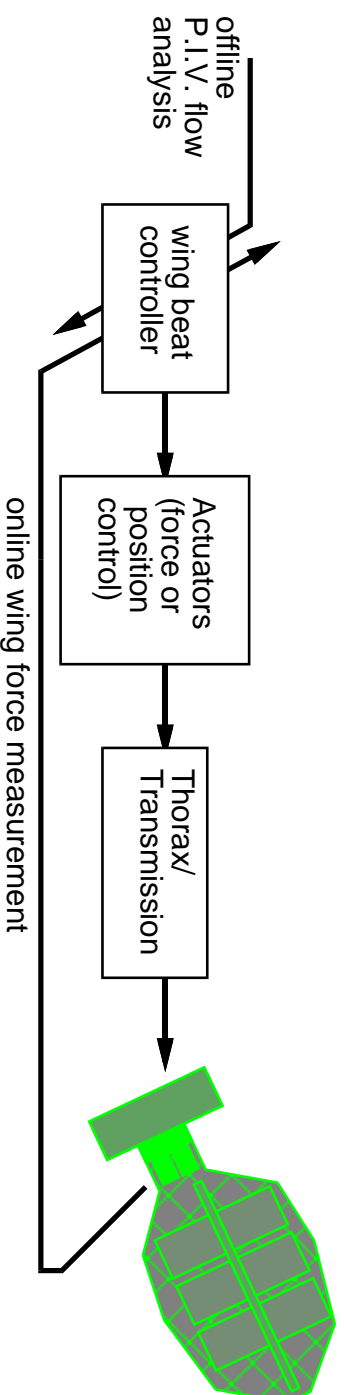


Control and Integration of MFI

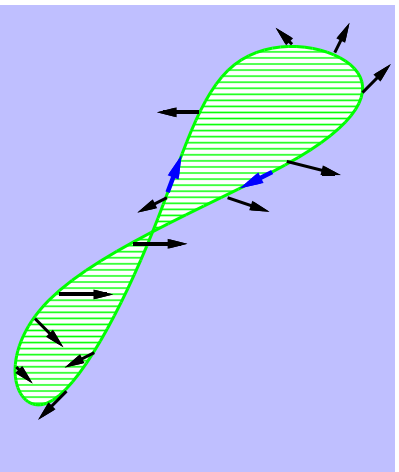
Ron Fearing (ronf@eecs.berkeley.edu)

- MFI Control System Overview
- Open-loop wing drive (insect mockup)
- Thorax / resonant mode drive
- Learning Wing and Flight Control (S. Sastry)
- Integration of MFI sub-systems

Wing Control System Overview

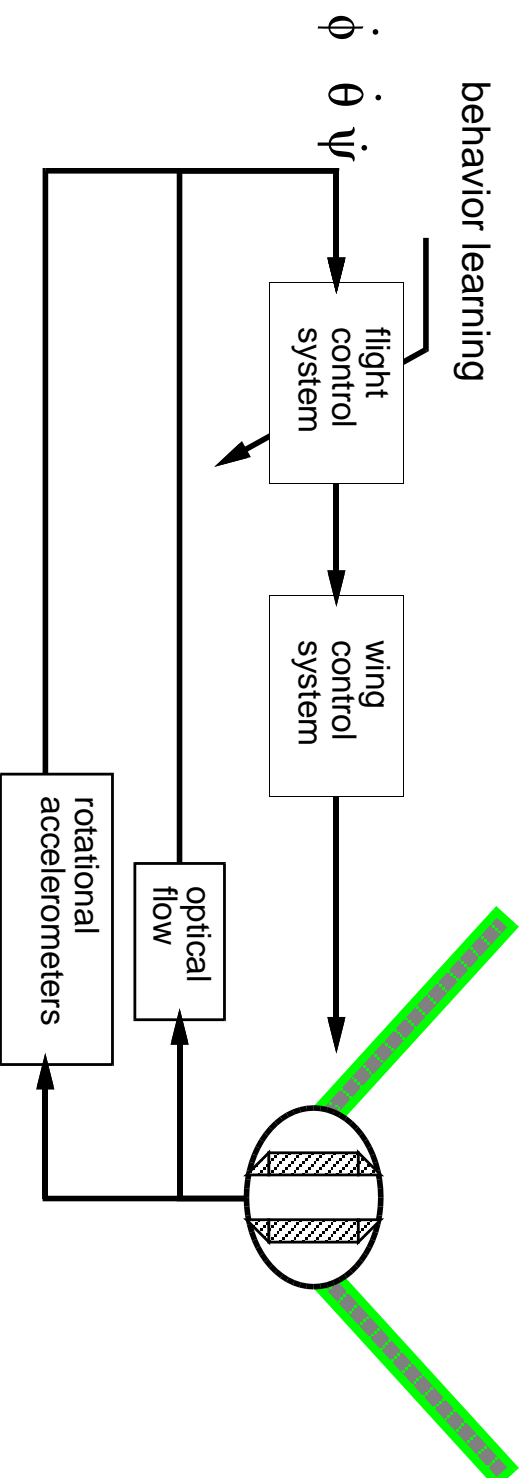


Cartoon of instantaneous wing forces during wing stroke:

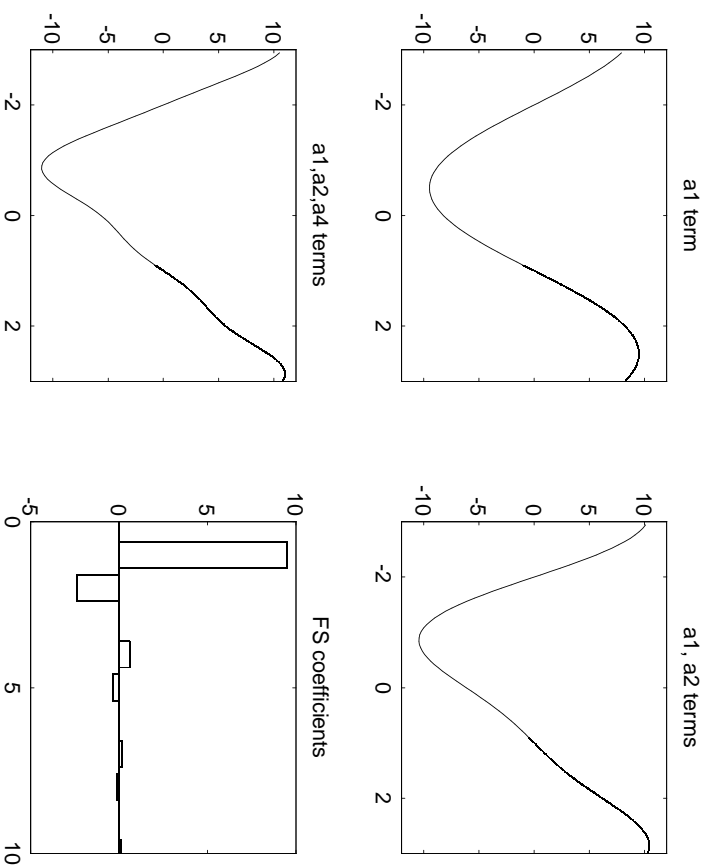


$$\text{net force} = \oint \vec{F}(s) ds$$

Flight Control System Overview



Open-loop Wing Drive



2 voice coil actuators per wing, 1.5 mm deflection at 100 Hz
fundamental and second harmonic give 2:1 stroke asymmetry