

Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Investigation of vortex saturation for a simultaneously rotating and pitching wing¹ PRIYANKA MAHAJAN, MATTHEW RINGUETTE, JAMES TRZAKOS, JOHN SISTI, State University of New York at Buffalo — We investigate vortex saturation for a flat plate wing that simultaneously rotates and pitches. A vortex is saturated when it attains maximum circulation, which may occur at a non-dimensional time called the formation number. The experiment is done in a water tank and flow visualization is used to obtain the three-dimensional flow structure. We examine plate aspect ratios ranging from 2 to 4 with varying wing geometries and a Reynolds number of approximately 5000, similar to that of a hummingbird. We use digital particle image velocimetry (DPIV) to obtain the flow velocity, vorticity and circulation. The effects of spanwise (root-to-tip) flow and the tip vortex on the overall vortex structure are examined.

¹Supported by the Air Force Office of Scientific Research Grant # FA9550-10-1-0281.

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Date submitted: 09 Aug 2010

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