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Quasi-Steady Simulation of Insect-Like Flapping Wing BRETT G. COMPTON, J.M. MCDONOUGH, University of Kentucky — The goal of this study is to computationally compare turbulent and laminar quasi-steady, 3-D models of insect flight using a simplified wing planform with roughly the same dimensions and stroke kinematics as the average bumblebee wing. To simulate flapping motion of the wing we use a velocity distribution at the inlet that varies linearly with distance along the span of the wing. Angle of attack is treated by changing the angle of the input velocity vector while keeping the wing stationary, thus simplifying grid generation efforts. A laminar simulation is run on an unstructured grid of $\sim 2.63 \times 10^5$ mesh volumes using the commercial CFD code, *Fluent*; the turbulent simulation is run on a structured grid of similar size and resolution using a research LES code developed by the second author. In both cases we are seeking to reproduce the leading edge vortex (LEV) stabilized with span-wise flow as seen from previous experiments, to compare the time series of coefficients of lift and drag from the laminar and turbulent simulations over one half-stroke, and to analyze validity (or lack thereof) of the quasi-steady approximation.

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