

Abstract Submitted
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Comparing the aerodynamic forces produced by dragonfly forewings during inverted and non-inverted flight¹ NATHAN SHUMWAY, MATEUSZ GABRYSZUK², STUART LAURENCE³, Univ of Maryland-College Park — Experiments were conducted with live dragonflies to determine their wing kinematics during free flight. The motion of one forewing in two different tests, one where the dragonfly is inverted, is described using piecewise functions and simulated using the OVERTURNS Reynolds-averaged Navier-Stokes solver that has been used in previous work to determine trim conditions for a fruit fly model. For the inverted dragonfly the upstrokes were significantly longer than the downstrokes, pitching amplitude is lower than that for the right-side up flight and the flap amplitude is larger. Simulations of dragonfly kinematics of a single forewing are presented to determine how the forces differ for a dragonfly flying inverted and a dragonfly flying right-side up.

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