

Abstract Submitted
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Aerodynamics of flapping insect wing in inclined stroke plane hovering with ground effect KRISHNE GOWDA V, S. VENGADESAN, Indian Institute of Technology - Madras — This work presents the time-varying aerodynamic forces and the unsteady flow structures of flapping insect wing in inclined stroke plane hovering with ground effect. Two-dimensional dragonfly model wing is chosen and the incompressible Navier-Stokes equations are solved numerically by using immersed boundary method. The main objective of the present work is to analyze the ground effect on the unsteady forces and vortical structures for the inclined stroke plane motions. We also investigate the influences of kinematics parameters such as Reynolds number (Re), stroke amplitude, wing rotational timing, for various distances between the airfoil and the ground. The effects of aforementioned parameters together with ground effect, on the stroke averaged force coefficients and regimes of force behavior are similar in both normal (horizontal) and inclined stroke plane motions. However, the evolution of the vortex structures which produces the effects are entirely different.

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