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**Effect of cruising speed on the flight performance of a dragonfly wing** SANTOSH MALLAH, SOORAJ PADINJATTAYIL, AMIT AGRAWAL, Department of Mechanical Engineering, Indian Institute of Technology Bombay, Powai, Mumbai 400076, India — The flight dynamics of a dragonfly is significantly affected by its corrugated wing. Two-dimensional numerical simulations have been performed to study the flow around a corrugated wing pitching about quarter chord point. The objective is to understand the effect of variation in Reynolds number (by varying cruising speed) on the bio-inspired corrugated wing, thereby unravelling the flight dynamics of a dragonfly at various cruising speed. Numerical simulations are conducted over a wide range of Reynolds numbers,  $Re = 200 - 3000$ , for various pitching frequencies and pitching amplitude of  $5^\circ$ . The results for corrugated wing are compared against a smooth NACA (National Advisory Committee for Aeronautics)0012 wing. Over the studied Reynolds number range, corrugated wing could not outperform the NACA0012 wing in terms of thrust generation and net thrust has been observed for both the wings. At  $Re = 200$ , the force coefficient for corrugated wing is found to be significantly lower than that for NACA0012. The present study helps understand the influence of cruising speed in the flight dynamics of dragonflies.

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