Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Effect of Reynolds number on the thrust generation of a pitching Prandtl-D root-ns foil RAMSHIVADHAN GUPTA, MILIND DEOTALE, Department of Mechanical Engineering, Lokmanya Tilak College of Engineering, Koparkhairane, Navi Mumbai 400709, India — The Prandtl-D root-ns (NASA Preliminary Research Aerodynamic Design to Lower Drag) foil inspired from flight of birds, designed by NASA is intended to develop future low drag foils. The flow around a Prandtl-D root-ns foil pitching about its quarter chord point is studied numerically using Ansys-Fluent. The objective is to understand the effect of variation in Reynolds number on the thrust generation of a Prandtl-D root-ns foil. Numerical simulations are conducted over a range of Reynolds numbers, Re = 200 - 2000, for various Strouhal numbers at a pitching amplitude of 5^o. In order to further test the thrust generation performance of Prandtl-D root foil, the obtained results are compared with NACA (National Advisory Committee for Aeronautics) series foil NACA0012. The Prandtl-D root-ns foil is observed to perform better compared to NACA0012 foil, in terms of thrust generation. The reduction in viscous component of drag for the Prandtl-D root-ns foil compared to NACA0012 foil is responsible for enhancement in thrust generation. The results of the present study will help to design high performance under water vehicles.

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Date submitted: 15 Aug 2020 Electronic form version 1.4