

Abstract Submitted
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Cessna-172R Airplane in Cruise and Landing Configurations: A Numerical Study of the Wing Loads and Wake PANKAJ JHA¹, The Pennsylvania State University — The present work deals with the analysis of flight test data on a Cessna 172R airplane near University Park airport in Pennsylvania. Several tests pertaining to rate-of-climb, cruise, stall and landing were performed. Those of aerodynamic nature will be discussed. The wing loads for the cruise as well as landing configurations with various flap angles were computed using a vortex method considering horse-shoe and bound vortices. The stall speed and maximum lift coefficient of the airplane for these flap settings at a particular altitude were determined. The comparison against the processed flight data was generally very good. A detailed study will be presented. A CFD approach inspired by the author's work (Jha et al, 2013) to model wind turbine blades and wakes and classical aerodynamics problems was taken to model the airplane wings. The simulation results were also compared against the flight data. In addition, these simulations facilitated visualization and analysis of flow features of interest, like wing tip trailing vortices and their turbulence characterization.

¹Graduate Research Assistant, Aerospace Engineering

Pankaj Jha
The Pennsylvania State University

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