Sensitivity Analysis of an Airfoil using Computational Fluid Dynamics

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COMPUTATIONAL FLUID DYNAMIC ANALYSIS OF AN AIRFOIL

Abstract
In fixed wing aircrafts, the variation of lift coefficient with angle of attack is a major consideration. This project explores the variation of lift force and lift coefficient of an SD2030 airfoil as a function of the angle of attack, Reynolds number, size of the computational domain, and the CFD mesh size. The problem is modeled using the flow simulation (CDF) module of SolidWorks. The outcome has been compared with the available experimental data.

Conclusions
- Changing the computational domain and mesh size in SolidWorks slightly affects the lift coefficient values.
- For higher Reynolds numbers, the lift coefficients are closer to the experimental values (Fig. 8)

Software Operations
• SolidWorks 3D Design
• SolidWorks Flow Simulation
• MS Excel