

Implementation of a Low-Cost Instrumentation for an Open Cycle Wind Tunnel to Evaluate Pressure Coefficient

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Abstract : Wind tunnel experiments for aerodynamic profiles display numerous advantages, such as: clean steady laminar flow, controlled environmental conditions, streamlines visualization, and real data acquisition. However, the experiment instrumentation usually is expensive, and hence, each test implies a incremented in design cost. The aim of this work is to select and implement a low-cost static pressure data acquisition system for a NACA 2412 airfoil in an open cycle wind tunnel. This work compares wind tunnel experiment with Computational Fluid Dynamics (CFD) simulation and parametric analysis. The experiment was evaluated at Reynolds of 1.65×10^5 , with increasing angles from -5° to 15° . The comparison between the approaches show good enough accuracy, between the experiment and CFD, additional parametric analysis results differ widely from the other methods, which complies with the lack of accuracy of the lateral approach due its simplicity.

Keywords : wind tunnel, low cost instrumentation, experimental testing, CFD simulation

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