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Study of Magnus Effect Using Rotating Cylinder on Airfoil at Different Locations

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The need for improving the aerodynamic efficiency and delaying the formation of stall over the wing has been of concern in the realm of aviation. The main intention of the project is to improve these two parameters. The configuration used for analysis consists of a NACA (National advisory committee for aeronautics) 2412 airfoil of chord length 0.982m with a cylinder of 0.064m diameter at 0.15c (chord), 0.3c, and 0.45c as our models. The models were designed in SOLIDWORKS and analysis is executed using ANSYS Fluent. The turbulence model used is Spalart Allmaras with a freestream velocity of 10m/s and the RPM of the cylinders is -25000 (clockwise). The influence of various parameters like horizontal and vertical distances from the leading edge and chord line is investigated. The rotating cylinder configurations are compared with the bare airfoil's aerodynamic characteristics, pressure and velocity contours.

Biography

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