

Abstract Submitted
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An Experimental Investigation of Flow past a Wing at high Angles of Attack VIPUL DALELA, RINKU MUKHERJEE, Indian Inst of Tech-Madras — The aerodynamic characteristics for post-stall angles of attack past a single and/or multiple 3D wing(s) have been studied using a novel decambering technique assuming the flow to be steady. It is expected that the location of separation as well as the strength of the separated flow is unsteady. The objective of this work therefore is to investigate flow at high angles of attack considering unsteady behavior.

The numerical technique used for this purpose that accounts for loss in camber due to flow separation is termed as decambering. Two linear functions are used to define the decambering for the steady case, located at the leading edge and anywhere between 50%-80% chord.

Wind tunnel experiments are to be conducted to study the unsteady nature of separated flow using flow visualization techniques. An estimation of the unsteady wake will be of paramount importance. It is expected to get an experimental corroboration for the numerical decambering. A NACA 4415 wing section is being tested for a range of Reynolds numbers. It is observed from the preliminary results that the drag becomes more dominant after increasing the Reynolds number from $Re = 0.093 \times 10^6$ to $Re = 0.128 \times 10^6$ resulting a gentle decrease in the lift coefficient, C_l .

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