

Lift enhancement of NACA 4415 airfoil using biomimetic shark skin vortex generator

ABSTRACT

An experimental study was conducted to investigate the aerodynamic performance of the NACA 4415 airfoil with and without passive vortex generators. The measurement has been carried out for three considered cases: smooth airfoil for baseline case, airfoil with triangular vortex generator and also airfoil with shark skin shape vortex generator. Both the triangular and shark skin vortex generators were located at 50% of chord from leading edge of the airfoil with a 20° counter-rotating incident angle. The experiments were conducted with Reynold's number of 100,000. Overall, the results indicate that the lift and drag coefficients, and lift-to-drag ratio, for the airfoil with sharkskin vortex generator are comparatively higher than the other airfoils at some angles of attack. The findings can be applied in optimizing shark skin shape vortex generator for the airfoil performance enhancement.

Keyword: Lift coefficient; Drag coefficient; NACA 4415; Shark skin vortex generator; Triangular vortex generator