WINGLETS EFFECT ON THE AEORDYNAMICS OF AIRCRAFT WING; COMPUTATIONAL STUDIES

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Rezumat. *Reducerea fortelor de frecare ale avionului cu aerul a fost de interes major pentru industria aeronautica de mai mult timp. De aceea diferite metode de control ale fluidelor au fost folosite cum ar fi metode pasive si active de control ale fluidelor.Aripioarele folosite la capatul aripilor au fost studiate experimental si computational. Studiile experimentale sunt costisitoare si pretind echipamente specializate. De aceea metodele computationale sunt folosite in studiul prezent folosind metoda de simulare a turbioanelor mari.Studiul prezent arata ca folosirea aripioarelor reduce separarea aerului si fortei de drag, in timp ce contribuie la cresterea fortei de lift.*

Abstract. *Aircraft drag reduction has been of interest to aerospace industry for long time. Therefore, in the past decade different flow control techniques have been used such as active and passive flow control techniques. Winglet design has been explored in the past both experimentally and computationally. Experimental studies pose significant challenges due to the wing-span and costly equipment and facilities. Therefore, this study concerns the computational studies of winglet design using the large-eddy simulation approach. The results show that the winglet design reduces the flow separation and drag force, while the pressure and lift force increases.*

Keywords: Aircraft, Winglet, Wing-tip Vortex, Large-Eddy Simulation

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1. Introduction

Aircraft drag reduction has been of interest for decades to the aerospace industry, particularly related to the aerodynamic performance and cost of operations. The pressure difference between the upper and lower surfaces of the wing generate the tip-vortex as shown in Figure 1. The wing tip-vortex shedding generates high drag

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