

微型電動飛行器之研究

蔡博章, 鄭哲昌, 朱斌章

機械工程學系

工學院

bjtsai@chu.edu.tw

摘要

The fixed wing design and aerodynamic analysis, a CAD/CAE/CAM module window design/ fabrication platform is established as well. Aircraft flying test is successful. An electrical micro model aircraft with 16cm chord length, 20cm span width, aspect ratio 1.258 and 200~250 gram weight is built. The flow field aerodynamic simulation and solutions by using the CFD code; STAR-CD are studied and investigate aerodynamics characteristics of a fixed wing; Clark Y type micro aerial aircraft under a low aspect ratio and Re flow. Results show flow will have separation and reattachment to form so called "bubble" phenomena when the angle of attack rise over $\pm 10^\circ$. 3D vertical rudder is installed will increase the lift coefficient slightly than that of one without vertical rudder. Uniform pressure distribution of upper and low surfaces results in a stable flying. Water tunnel test show c_l and c_d between simulation and experiment are pretty consistent, and low pressure bubble at $2/3$ chord length is observed. the fixed wing design and aerodynamic analysis, a CAD/CAE/CAM module window design/ fabrication platform is established as well. Aircraft flying test is successful.

關鍵字：Micro electrical aerial vehicle, Aerodynamic, Angle of attack