Automatic Surface Patch Generation on Aircraft Surfaces for Efficient Aerodynamic Analysis using Panel Method

Kevin Song[1], Gyungnam Kim[1], Seobin Son[1], and *Byoungsoo Kim[2]

[1]Graduate School, Department of Aerospace Engineering, Chungnam National University, Korea
[2]Department of Aerospace Engineering, Chungnam National University, 99 Daehak-ro, Yuseong-gu, Daejeon, Korea

*Corresponding author: kbskbs@cnu.ac.kr

In this paper, our research effort to enable automatic surface patch generation on aircrafts is described. Aircraft surface definition is assumed to be given in STL format which is one of those standard neutral formats for model data exchange, and the aircraft configuration is composed of several major components such as main wing, fuselage, control surfaces, etc. Once those surface data for each component are accumulatively imported into our research code, it identifies each component and finds intersecting curves between overlapping components with each other and thereafter boundaries of surface patches are defined automatically. When surface patches are found, the program generates surface panels depending on users' input parameters for panel size control. Some of typical results showing patch generation followed by panel generation and flow calculation will be demonstrated.

Keywords: Surface Patch Generation, Panel Method, Boundary Element Method, Structured Surface Grid, STL data