11th. World Congress on Computational Mechanics (WCCM XI)
5th. European Conference on Computational Mechanics (ECCM V)
6th. European Conference on Computational Fluid Dynamics (ECFD VI)
July 20 - 25, 2014, Barcelona, Spain

WAKE-INTEGRAL METHOD FOR DRAG PREDICTION

A. Carre*[a], M. Cordero-Gracia[a], M. Gómez[a] and J. Ponsin[b]

[a] Universidad Politécnica de Madrid
School of Aeronautics
Pza. Cardenal Cisneros 3, E-28040 Madrid, Spain
ad.carre@alumnos.upm.es
marta.cordero@upm.es
mariola.gomez@upm.es

[b] Instituto Nacional de Técnica Aeroespacial
Fluid Dynamics Branch
Cta. Ajalvir, 4, E-28850 Madrid, Spain
ponsinj@inta.es

Key words: *Computational Fluid Dynamics (CFD), Drag Extraction, Farfield Methods, Adaptive Mesh.*

Aerodynamic drag is a critical magnitude on aircraft performance. Despite the improvements on CFD techniques (numerical solutions, mesh generation, physical models, etc), it still being one of the most difficult prediction magnitude. It is partially due to the complexity of physical models, but also some exclusively numerical effects arise (mesh influence, numerical dissipation, discretization errors, etc).

Farfield drag extraction tools provide an alternative to classical near field approach, offering the possibility of decomposing drag contributions based on their physical source and improving mesh independence. Trefftz plane methodology has been implemented and tested. Results show appreciable improvements regarding mesh dependency and numerical effects correction compared to previous developments.

REFERENCES

[1] K. Kusunose. *Drag Prediction Based on a Wake-Integral Method. AAIA 98-2723*, pp. 501-514, 1998.

[2] J. Ponsin *Development Of A Farfield Drag Extraction Tool: DragOn.* Technical report INTA AT/TNO/4410/002/INTA/09

[3] E. C. Maskell. *Progress Towards a Method for the Measurement of the Components of the drag of a Wing of Finite Span*, Royal Aircraft Establishment, 1973, TR 72232