

Aerodynamics predictions of a NACA0012 in LES simulations using a high order discontinuous Galerkin solver

Oscar A. Marino¹, Esteban Ferrer^{1,2}, Eusebio Valero^{1,2}, and Jon Errasti¹

¹ ETSIAE-UPM - School of Aeronautics, Universidad Politécnica de Madrid Plaza Cardenal Cisneros 3, E-28040 Madrid, Spain

² Center for Computational Simulation - Universidad Politécnica de Madrid, Campus de Montegancedo, Boadilla del Monte, 28660 Madrid, Spain

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We perform Large Eddy Simulation on a 3D NACA0012 airfoil using high order discontinuous Galerkin spectral element solver at moderate Reynolds numbers, at the order of 10^5 . The aim is to compare the results of a famous explicit Sub Grid Scale model, such as the Smagorinsky model, with the ones get by using implicit LES, where no explicit SGS is used, supplemented with a stabilising split-form energy-stable formulation. We compare global variables such as drag coefficient and pressure coefficient distribution as well as more local variables as the boundary layer velocity profile. Comparison with Direct Numerical Simulation and experimental is performed. We show that both methods achieve good predictions for the global variables, yet having some differences at more local ones.

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