Application of a Higher Order Discontinuous Galerkin Method in Computational Aerodynamics

A. V. Wolkov[1], Ch. Hirsch [2] and N. B. Petrovskaya[3]

[1] Central Aerohydrodynamic Institute, Zhukovsky, Moscow Region, 140180, Russia

[2] Vrije Universiteit Brussel, Belgium

[3]School of Mathematics, University of Birmingham, Birmingham, B15 2TT, The United Kingdom

Abstract

We discuss the issues of implementation of a higher order discontinuous Galerkin (DG) scheme for aerodynamics computations. In recent years a DG method has intensively been studied at Central Aerohydrodynamic Institute (TsAGI) where a computational code has been designed for numerical solution of the 3-D Euler and Navier-Stokes equations. Our discussion is mainly based on the results of the DG study conducted in TsAGI in collaboration with the NUMECA International. The capacity of a DG scheme to tackle challenging computational problems is demonstrated and its potential advantages over FV schemes widely used in modern computational aerodynamics are highlighted.