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HIGH-ACCURACY FINITE-VOLUME METHODS ON UNSTRUCTURED MESHES FOR AVIATION APPLICATIONS

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ABSTRACT

In the era of tremendous advance of Discontinuous Galerkin, the idea is to assess the existing higher-accuracy finite-volume (FV) based methods for unstructured meshes and their capacity in applied aerodynamics and aeroacoustics problems. Within the huge family of FV methods, we will focus on the most accurate algorithms, in particular the methods using high-order quasi-1D reconstructions [1]-[2] and k-exact polynomial schemes [3]-[4].

The FV-schemes modifications and specific implementations needed in aviation and other industrial applications concerning unsteady turbulent flows in complex moving geometries will be comprehensively discussed. First of all, the progress in shock capturing techniques will be evaluated. The dynamic mesh adaptation will be analysed as a means to improve accuracy. The scope of topics will also include scale-resolving LES-based models, immersed boundary methods, efficient time advancing (mainly implicit and multirate schemes), sliding meshes, and their massively parallel versions.

Predictions of complex turbulent flows performed using the developed highly accurate FV methods will be welcome.

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