

The Impact of Grid Geometry on the Accuracy of Higher Order Finite-Volume and Finite Element Schemes

N.B.Petrovskaya*, A.V.Wolkov[†]

Abstract

We discuss the issues of a higher-order finite-volume and finite-element discretization on anisotropic grids. It will be shown that high order finite-volume schemes are inferior to finite-element schemes in terms of accuracy when stretched meshes are considered. The poor accuracy of finite-volume schemes is discussed based on the idea of numerically distant points that are present in a reconstruction stencil on stretched meshes.

*School of Mathematics, the University of Birmingham, Edgbaston, Birmingham, B15 2TT, United Kingdom (n.b.petrovskaya@bham.ac.uk)

[†]Central Aerohydrodynamic Institute (TsAGI), Zhukovsky, Moscow reg., 140180, Russia, (wolkov@progtech.ru)