

Title: Application of hp-adaptive discontinuous Galerkin method to compressible flow simulation

Author: Karol Tarčák

Department: Department of Numerical Mathematics

Supervisor: prof. RNDr. Vít Dolejší, Ph.D., DSc.

Abstract: In the present work we study an residuum estimate of discontinuous Galerkin method for the solution of Navier-Stokes equations. Firstly we summarize the construction of the viscous compressible flow model via Navier-Stokes partial differential equation and discontinuous Galerkin method. Then we propose an extension of an already known residuum estimate for stationary problems to non-stationary problems. We observe the behavior of the proposed estimate and modify an existing hp-adaptive algorithm to use our estimate. Finally we apply the modified algorithm on test cases and present adapted meshes from the numerical experiments.

Keywords: discontinuous Galerkin method, adaptivity, error estimate