Title: Discontinuous Galerkin method for solving compressible viscous flow

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Abstract: The subject of this PhD thesis is the numerical simulation of the interaction of two-dimensional compressible viscous flow and a vibrating airfoil. We consider a solid airfoil with two degrees of freedom which can rotate around the elastic axis and oscillate in the vertical direction. The numerical simulation of this problem consist of the discontinuous Galerkin finite element method solving Navier-Stokes equations coupled with a system of nonlinear ordinary differential equations describing the airfoil motion. The time-dependent domain is taken into account with the aid of the Arbitrary Lagrangian-Eulerian(ALE) formulation. Theoretical part of this paper is concerned with error estimates of the space-time discontinuous Galerkin method for scalar nonstationary equations with nonlinear convection and nonlinear diffusion.

Keywords: convection-diffusion problems, discontinuous Galerkin method, interaction of a fluid with a vibrating airfoil, ALE method