On some aspects of the DGFEM for convection-diffusion problems

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In this paper we shall be concerned first with optimal error estimates for the numerical solution of nonlinear convection-diffusion problems by the discontinuous Galerkin finite element method (DGFEM). The main emphasis will be paid to the analysis of $L^\infty(L^2)$-optimal error estimate using general nonconforming meshes.

In the second part, some applications of the DGFEM to the simulation of compressible flow will be presented. Our goal is to develop sufficiently accurate, efficient and robust numerical schemes allowing the solution of compressible flow for a wide range of Mach numbers.

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