

Universität Hamburg, Fachbereich Mathematik

AG Ang.Math. (Schwerpunkte „Optimierung und Approximation“ und „Differentialgleichungen und Dynamische Systeme“)

Bundesstr. 55 (Geomatikum), 20146 Hamburg

<http://www.math.uni-hamburg.de/spag/angmath/>

# Kolloquium über Angewandte Mathematik

Donnerstag, den 14. Mai 2009, 17 Uhr c.t., Hörsaal 5

Prof. Dr. Miloslav Feistauer (Prague)\*

## „Analysis of the space-time discontinuous Galerkin method for convection-diffusion problems“

### Zusammenfassung/Abstract

The lecture will be concerned with the analysis of space-time discontinuous Galerkin (DG) method for the numerical solution of convection-diffusion problems. Usually the DG method is applied either to the time discretization and combined with conforming finite elements or to the space discretization with continuous time, yielding the method of lines. In the second case the resulting system of ODE's is solved either by the backward or forward Euler method, Crank-Nicolson method or Runge-Kutta schemes. Here we combine the DG time discretization with the DG space discretization with interior and boundary penalty and discuss the derivation of error estimates. The polynomial degrees in space and time can be different and the space meshes can be different on different time levels. In the case of linear convection-diffusion equations we can obtain error estimates uniform with respect to the diffusion coefficient tending to zero. The analysis of the solution of problems with a nonlinear convection is rather difficult and technical and requires special technique for overcoming the nonlinearity.

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\*Prof. Dr. Miroslav Feistauer

Charles University in Prague

Faculty of Mathematics and Physics

Sokolovska 83

186 75 Praha 8 - Karlín – Czech Republic

Tel.: [+420] 2 2191 3388

E-Mail: [feist@karlin.mff.cuni.cz](mailto:feist@karlin.mff.cuni.cz)

Web: <http://www.karlin.mff.cuni.cz/~feist/>

**Kontakt:** Prof. Dr. Michael Hinze, Tel. 040 42838-4079, Raum 115,

E-Mail: [michael.hinze@uni-hamburg.de](mailto:michael.hinze@uni-hamburg.de)