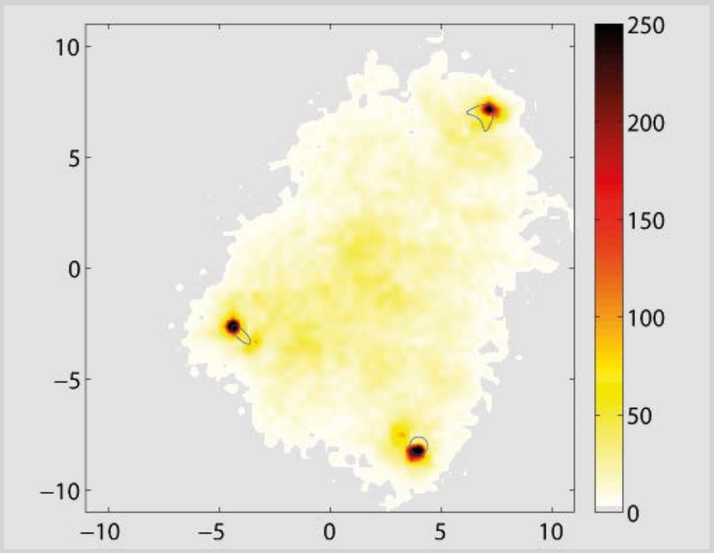

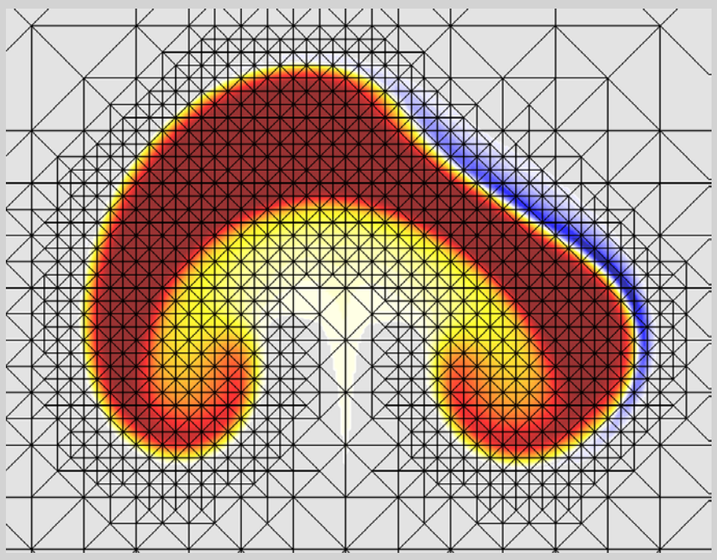

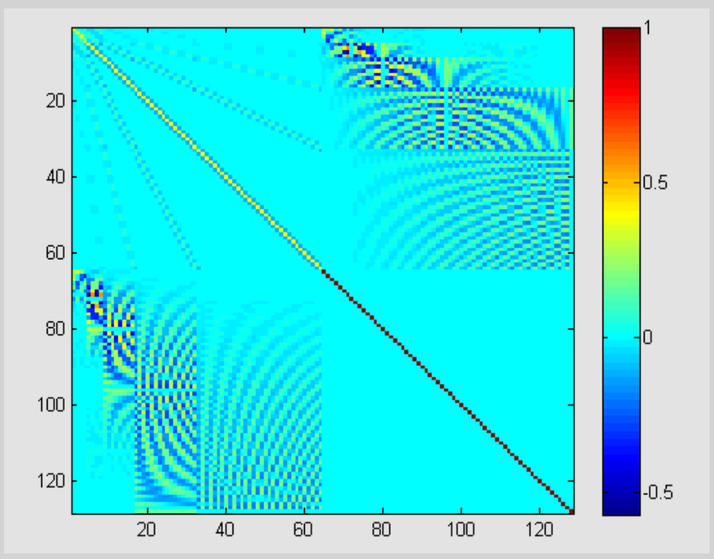

Oberseminar Numerik

am 01.03.18
um 14:00 Uhr
im Hilbertraum (05-432), Staudingerweg 9, 55128 Mainz

Herr Prof. Dr. Sebastian Noelle (RWTH Aachen)

über: *On the derivation of Cockburn and Shu‘s Discontnuous Galerkin scheme*

Herr Klaus Kaiser (RWTH Aachen)

über: *IMEX Methods for Singularly Perturbed Differential Equations*

Abstracts:

On the derivation of Cockburn and Shu's Discontinuous Galerkin scheme
In a landmark paper, Cockburn and Shu (Math. Comp. 1989) introduced the Runge-Kutta Discontinuous Galerkin (RKDG) method for hyperbolic systems of conservation laws. Together with the ENO and WENO schemes, the RKDG method is one of the most powerful and widely used high-order accurate methods for compressible flows. In this talk, we re-derive the RKDG scheme systematically from the weak formulation of conservation laws: we restricting the support of the test functions to a single space-time computational cell, and then pass to the semi-discrete limit. The result is, of course, the original scheme. But the new derivation fills two interesting gaps in the original argument by highlighting an infinitesimal version of the integral law at the cell edges, which survives the semi-discrete limit and guarantees consistency with the weak form. Our derivation leads to a new interpretation of the role of the numerical flux.

IMEX Methods for Singularly Perturbed Differential Equations
Singularly perturbed equations place stringent requirements on the numerical methods used to compute an approximation. One popular method are IMEX time integration schemes, for which the equation is needed to be split into a stiff and a non-stiff part. In this talk we present two splittings for singularly perturbed equations, one of which is based on the singular limit of the equation. We analyze and compare the splittings in terms of stability, efficiency and accuracy. We also give an outlook on IMEX splittings for the isentropic Euler equations.

Hierzu sind alle herzlich eingeladen.

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