Oberseminar Mathematische Strömungsmechanik

Institut für Mathematik der Julius-Maximilians-Universität Würzburg

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Divergence-free discontinuous Galerkin method for ideal compressible MHD

Abstract:

Some PDE models like MHD and Maxwell's equations contain magnetic field as a dependent variable which must be divergence-free due to the non-existence of magnetic monopoles. This is an inherent constraint satisfied by the solutions of these PDEs due to their curl structure. Numerical schemes may not preserve this constraint unless they are specifically designed for this purpose. A staggered storage of variables is useful to satisfy such constraints by a numerical scheme. In this talk, I will describe a discontinuous Galerkin method which automatically satisfies the divergence constraint. The numerical flux used in such DG methods must satisfy a consistency condition between the 1-D and multi-D Riemann solvers, and we construct HLL-type schemes for MHD that exhibit such consistency. Some form of limiter is required to control spurious numerical oscillations especially for MHD and this is achieved by a divergence-free reconstruction scheme. I will show some results for MHD and Maxwell's equations.

Raum 40.03.003 (Mathematikgebäude Ost)	Dienstag, der 4. Juni 2019 um 13 Uhr

Zu diesem Vortrag sind Sie herzlich eingeladen.

gez. Christian Klingenberg