



Einladung zum Oberseminar Wissenschaftliches Rechnen

Julius-Maximilians-Universität Würzburg
Lehrstuhl für Wissenschaftliches Rechnen IX

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Numerical methods for hyperbolic equations and their applications in science and engineering

In this talk we present recent advances in high order finite volume and discontinuous Galerkin (DG) finite element schemes for the numerical solution of nonlinear systems of hyperbolic partial differential equations.

It is well known that nonlinear hyperbolic conservation laws may lead to discontinuous solutions after finite time even when starting from perfectly smooth initial data. However, the equations also contain smooth features like acoustic, electromagnetic or gravitational waves, as well as small scale features such as vortices in turbulent flows. Sometimes hyperbolic equations are also endowed with stationary differential constraints, such as the well-known divergence-free condition of the magnetic field. It remains therefore still a major challenge even nowadays to design accurate and robust enough numerical methods that are able to deal with all these intrinsic features of hyperbolic equations at the same time. In this talk we present our numerical approach to tackle these challenges.

We also show the applicability of the proposed methods to a very broad class of problems, ranging from compressible gas dynamics and solid mechanics within a novel unified first order hyperbolic model of continuum mechanics over magnetized plasma flow to the Einstein field equations of general relativity.

Ort: Seminarraum SE41, Humboldt-Bau (Emil-Fischer-Str. 41) **Zeit:** Donnerstag, 06.08.26, 10:00 Uhr

Zu diesem Vortrag laden wir Sie herzlich ein.
You are cordially invited to this lecture.

gez. Prof. Dr. Alfio Borzi
gez. Prof. Dr. Frank Werner