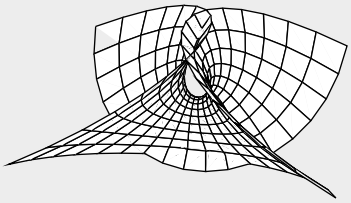

Oberseminar Mathematische Strömungsmechanik

Institut für Mathematik der Julius-Maximilians-Universität Würzburg

Junming Duan

Humboldt fellow
Universität Würzburg

High-Order Accurate Entropy Stable Adaptive Moving Mesh Methods

Abstract:

The adaptive moving mesh method is a powerful tool to improve the efficiency and quality of numerical simulations with localized structures, e.g. sharp transitions or discontinuities in relatively localized regions, which often appear in the solutions in the quasi-linear system of hyperbolic conservation laws. For the governing equations of the fluid flows, the entropy condition should be respected according to the second law of thermodynamics, and it is desirable to seek the entropy stable (ES) schemes satisfying some discrete or semi-discrete entropy conditions. This talk will present the high-order accurate ES adaptive moving mesh methods for the hyperbolic systems and their applications to the 2D and 3D special relativistic (magneto)hydrodynamics, the (multi-component) compressible Euler equations with the stiffened equation of state (EOS), and shallow water equations with non-flat bottom topography. The key is the high-order discretization of the metrics introduced by the coordinate transformation and the construction of the high-order ES fluxes with the discrete metrics. We will also show the mesh iteration redistribution or adaptive moving mesh strategy built on the minimization of the mesh adaption functional. Extensive numerical tests have been conducted to validate the shock-capturing ability and high efficiency of our methods.

room 40.03.003 (Emil Fischer Str. 40)

Thursday, Oct. 12 at 1 pm

Zu diesem Vortrag sind Sie herzlich eingeladen.

gez. Christian Klingenberg