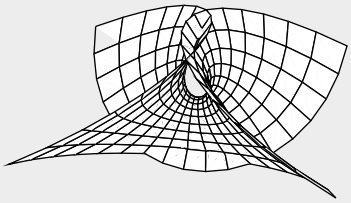

Oberseminar Mathematische Strömungsmechanik

Institut für Mathematik der Julius-Maximilians-Universität Würzburg

Hyperbolic equations - structure preserving methods & other topics

Qin Li

University of Wisc Madison, USA)

Low rank structure in the forward and inverse kinetic theory

Abstract:

Kinetic theory is a body of theory from statistical mechanics. It is useful in describing the dynamics of a large number of particles, but its high dimensional structure makes the computation infeasible. In multi-scale regimes, however, kinetic equations can be compressed: The Boltzmann equation is asymptotically equivalent to the Euler equations, and the radiative transfer equation is asymptotically equivalent to the diffusion equation. In linear algebra, this phenomenon is equivalent to a system being of low rank.

I will discuss how the low rank structure forms, and how it affects the computation. In the forward regime, inserting the low-rank structure greatly advances the computation, but in the inverse regime, the system being of low rank typically makes the problems significantly harder.nd large space scale simulations to approach the macroscopic scales. A highly accurate deduced equation of state for the Euler equations establishes a one-to-one correspondence of the molecular dynamics and the continuum solutions.

via Zoom video conference (request the Zoom link from klingen@mathematik.uni-wuerzburg.de)

Friday, Apr. 16, 2021 at 3 pm CET

Zu diesem Vortrag sind Sie herzlich eingeladen.

gez. Christian Klingenberg