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Oberseminar im Institut für Angewandte Analysis

Wintersemester 2024/25

Im Rahmen des Oberseminars spricht am Mittwoch, den **12. März 2025**:

Marlies Pirner

Universität Münster

Hypocoercivity for non-linear kinetic equations in the context of chemical reactions and quantum particles

Kinetic equations describe gas flows at an intermediate scale between microscopic and macroscopic models. A key challenge is proving convergence to equilibrium and determining the rate at which solutions converge to equilibrium. While relative entropy methods work well for spatially homogeneous equations, they fail in the space inhomogeneous setting due to the structure of the collision operator. This has led to the development of hypocoercivity techniques, which combine dissipation in velocity space with transport effects to establish global convergence results. In this talk, we extend hypocoercivity methods to various nonlinear models in the torus, including for instance a kinetic model with chemical reactions and the nonlinear semiconductor Boltzmann equation. The achievement here is proving convergence without requiring a close-to-equilibrium assumption on the initial data by establishing uniform solution bounds. Additionally, we will provide some outlook to boundary conditions which are different from the torus in space. Here, we present a result on the BGK equation with diffusive boundary conditions.

Der Vortrag findet in **Raum E60, Helmholtzstr. 18** statt.
Beginn: 14 Uhr (s.t.). Alle Interessierten sind herzlich eingeladen.

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