Veranstaltungen im Sommersemester 2019

Das dreiunddreißigste Treffen des Rhein-Main Arbeitskreises findet am

Freitag, den 14. Juni 2019

an der

Johannes-Gutenberg-Universität Mainz, Institut für Mathematik,
Staudinger Weg 9,
55128 Mainz

im **Raum 05-514** statt.

Programm

15:00 Uhr: Dr. Stephan Knapp (Universität Mannheim)
Modeling of a diffusion with aggregation: rigorous derivation and numerical simulation
We introduce a diffusion-aggregation equation with delta interaction potential and its numerical approximation in this talk. In the last decades, diffusion-aggregation equations have been widely studied in the literature. Here, we focus on the case that the aggregation potential V is a delta distribution. To do so, we start from a stochastic particle system with smooth interaction potential V_ε and use a corresponding intermediate nonlocal problem to obtain the limiting system, where the behavior, i.e. global existence of solutions or finite time blow-up, severely depends on parameters. The parameters are the variance 2a the mass 2b of the kernel V and the initial value u_0. The challenge to obtain a rigorous limit is an appropriate balance between the number of particles N and the range ε of the interaction kernel, which converges to a delta interaction as ε tends to zero. This balance plays also an important role in the behavior of the particle system in simulation results. The theoretical results are compared to numerical simulations relying on suitable discretization schemes for the microscopic and macroscopic level. In particular, the regime switch in which the analytic theory fails, i.e. the case $a = 2b\|u_0\|_{L^\infty}$, is numerically analyzed very carefully and allows for a better understanding of the limiting equation.

15:45 Uhr: Tee/Kaffee

16:15 Uhr: Sebastian Neumayer (TU Kaiserslautern)
Extensions and Applications of Image Metamorphosis
Image Metamorphosis is a framework for computing an interpolation path between two images which is split into a deformation part and an additional intensity modulation. We generalize a time discrete variant of the model to manifold-valued images, which can consist of phase data or tensor-valued information. Without the intensity modulation part, the model can be used to obtain very good results in computerized tomography if a template, i.e. some prior information about the object of interest, is known.

17:00 Uhr: Prof. Dr. Eduard Feireisl (Czech Academy of Sciences)
K-convergence and weak solution method in the analysis of numerical schemes

We propose a new approach to studying problems of convergence of numerical schemes approximating the motion of inviscid fluid flows. We can show strong pointwise convergence of Cesaro averages of numerical solutions to a generalized solution to the limit problem. We illustrate the method by its application to a scheme approximating the isentropic Euler system in fluid dynamics.

anschließend: Nachsitzung

Informationen zur Anreise finden Sie auf dieser Seite.