

Einladung

Datum: 8. November 2017

Im Rahmen des Schwerpunktskolloquiums „Analysis und Numerik“ hält

Herr Professor Dr. Christian Rhode
(Institut für Angewandte Analysis und numerische Simulation,
Universität Stuttgart)

am **Donnerstag, dem 16. November 2017**, einen Vortrag zum Thema:

Heterogeneous Multiscale Methods for Two-Phase Flow in Free and Porous Media Domains

Der Vortrag findet um **17:00 Uhr** in Raum **F 426** statt.

Alle Interessenten sind herzlich eingeladen.

Andrea Barjasic

Beauftragte für das Kolloquium

Abstract:

Multiphase scenarios are ubiquitous in fluid mechanical problems. Despite its long history basic mathematical questions on modelling, analysis and numerics for multiphase flow are remaining open. In the talk we will consider regimes such that the bulk dynamics are governed by systems of hyperbolic conservation laws as e.g. the compressible Euler equations for free liquid-vapour flow with phase transition or the hyperbolic Muskat equations for overshooting fronts in porous media. Across the sharp interface physical coupling conditions account for mass, momentum and energy transfer. Although there is a wide debate on the specific form of the coupling conditions and its closure on a continuum-mechanical level the dynamics of the interface itself can be understood in the framework of hyperbolic shock wave theory. In the talk we will discuss basic well-posedness results for several examples of multiphase flow. These results motivate and provide an analytical basis for a moving-mesh finite volume numerical method. Within this macro-scale approach the local tracking of the interface is determined from a micro-scale problem. Depending on the choice of the coupling conditions this can be either a Riemann problem, a regularizing diffuse interface model or even a molecular dynamics approach. We conclude the talk with convergence results for the overall multiscale method and illustrating numerical simulations.

(Freistühler)