



Wir laden sehr herzlich zu einem Vortrag im Rahmen des
Oberseminars Partielle Differentialgleichungen
ein:

Prof. Dr. Hari Shankar Mahato

(Indian Institute of Technology Kharagpur)

*“Two-scale Models in Porous Media: Modeling, Analysis and
Homogenization”*

Donnerstag, 27. Juni 2019

Beginn: **15.15 Uhr**

Raum: **F 426**

Interessenten sind herzlich willkommen!

R. Denk, M. Kunze

Abstract: A porous medium (concrete, soil, rocks, water reservoir, e.g.) is a multi-scale medium where the heterogeneities present in the medium are characterized by the micro scale and the global behaviors of the medium are observed by the macro scale. The upscaling from the micro scale to the macro scale can be done via averaging methods. In this talk, we consider the diffusion, advection and reaction of different types of mobile chemical species which are separated by an interface at the micro scale. The presence of different types mobile and the immobile species make the model complex and the modeling yields a system of non-linear partial differential equations coupled with ordinary differential equations and a moving interface. The existence of a unique positive global weak solution is shown with the help of some energy estimates, fixed point theorem and some regularization technique. Finally with the help of two-scale convergence and periodic unfolding, the model is upscaled from the micro scale to the macro scale. This upscaled model gives the averaged behavior of the chemical species and it will help us conduct numerical simulation efficiently, without any heterogeneities of the micro-scale.

(eingeladen von Prof. Dr. Robert Denk)