INSTITUT FÜR ANGEWANDTE ANALYSIS UND NUMERISCHE SIMULATION

mathematik ians

Universität Stuttgart

having a coffee in a Banach space makes you feel complete

Vortragsankündigung Oberseminar

Sommersemester 2018

14:00 Uhr im Seminarraum 7.122

14.05.2018 **Dr. Hadi Minbashian** (Universität Stuttgart)

Adaptive Wavelet Methods with Hierarchical Viscosity Stabilization for Hyperbolic Conservation Laws

Abstract: In this talk we present different approaches of incorporating wavelet bases into existing Galerkin discretizations for hyperbolic conservation laws. We will see that such incorporations provide a flexible structure for a cheap adaptivity realization as well as viscous stabilization of the discrete solution. In fact, due to few interesting features of wavelet bases including locality and cancellation property, it is possible to predict the irregular regions of the numerical solution whereby we can concentrate degrees of freedom only to those regions. Further- more, since wavelets give a multiscale (i.e. hierarchical) representation of the solution, we can add any kind of artificial diffusion only to some top levels of hierarchy instead of all levels. This dampens high-frequency components of the numerical solution in the sense of spectral methods, so providing enough stabil- ity without sacrificing accuracy. Also, this structure provides the possibility to exploit efficient post-processing methods to reduce Gibbs' wiggles around dis- continuities through adaptive total variation minimization. The performance of the proposed adaptive wavelet method in reduction of degrees of freedom is confirmed by numerical experiments.

Alle Interessenten sind herzlich eingeladen!

```
39 typedef Dune::ACFem::MassModel<EllipticModelType> MassModelType;
40 MassModelType bareMassModel(implicitEllipticModel);
41
42 auto massModel(mu * (mat.Z_a) * J + mat.Z_w) * bareMassModel);
```

Die Professoren des Instituts für Angewandte Analysis und Numerische Simulation

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