



$$\inf_{W \in W(\mathcal{G})} \sup_{V \in V(\mathcal{G})} \frac{B[W, V]}{\|W\|_W \|V\|_V} > 0$$

having a coffee in a Banach space makes you feel complete

## Vortragsankündigung Oberseminar Sommersemester 2018

14:00 Uhr im Seminarraum 7.122

23.04.2018 **Fabian Meyer** (Universität Stuttgart)

Uncertainty Quantification for Compressible Flows and Aeroacoustics

**Abstract:** Including and accounting for uncertain (model) parameters in numerical simulations becomes more and more popular. In this talk we present three different Uncertainty Quantification (UQ) methods to include uncertain parameters in numerical simulations of compressible flows. On the one hand we consider non-intrusive methods, especially the Non-Intrusive Spectral Projection and the Stochastic Collocation method. On the other hand we consider intrusive methods, where we focus on the Stochastic Galerkin method. A significant aspect when considering uncertainty as an additional parameter is to quantify the errors that arise from numerical discretization. We therefore present a novel a posteriori framework which allows us to derive computable error estimators quantifying space, time and stochastic errors arising from numerical discretization. Our theoretical findings are confirmed by corresponding numerical experiments. Additionally, as an application of the UQ methods we consider the simulation of open cavity flows, where we quantify the influence of uncertain model parameters on the development of tonal noise.

**Alle Interessenten sind herzlich eingeladen!**

Die Professoren des Instituts für Angewandte Analysis und Numerische Simulation

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```

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

$$\|U - u\|_W \lesssim \left( \sum_{E \in \mathcal{E}_G} \varepsilon_G^2(U; E) \right)^{1/2}$$

$$\operatorname{div}_x f(u) = 0$$