



Einladung

Im Rahmen des Schwerpunktskolloquiums „Analysis und Numerik“ hält

Herr Professor Dr. Bernd R. Noack
(Directeur de Recherche CNRS Institut PPRIME, Poitiers, Frankreich)

am **Montag, dem 23. Februar 2015**, einen Vortrag zum Thema:

Closed-loop turbulence control using machine learning

Der Vortrag findet um **10:15 Uhr** in Raum **F 428** statt.

Alle Interessenten sind herzlich eingeladen.

Andrea Barjasic

Beauftragte für das Kolloquium

Abstract:

Active turbulence control is a rapidly evolving, interdisciplinary field of research. In particular, closed-loop control with sensor information can offer distinct benefits over blind open-loop forcing. The range of current and future engineering applications of closed-loop turbulence control has truly epic proportions, including cars, trains, airplanes, jet noise, air conditioning, medical applications, wind turbines, combustors, and energy systems. Many problems of the University of Konstanz belong to that portfolio. A key feature, opportunity and technical challenge of closed-loop turbulence control is the inherent nonlinearity of the actuation response. For instance, excitation at a given frequency will affect also other frequencies. Such frequency cross-talk is not accessible in any linear control framework. We propose a novel nonlinear feedback control design strategy with a model-free exploration of control laws preceding a model-based exploitation. During the exploration, machine learning techniques discover the best a priori unknown actuation mechanisms in an unsupervised manner. During the exploitation, a class of winning actuation mechanisms can be framed in reduced-order models. The approach is demonstrated for drag reduction of a D-shaped body, for the TUCOROM mixing layer control experiment, and for separation mitigation of shear flow experiments at PMMH, LML and PRISME.

(Volkwein)