Einladung zum Oberseminar Wissenschaftliches Rechnen

Julius-Maximilians-Universität Würzburg
Lehrstuhl für Wissenschaftliches Rechnen IX

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Optimal control of PDEs under uncertainty with joint chance state constraints

We study optimal control of PDEs under uncertainty, where the state variable is subject to joint chance constraints.

While we seek deterministic controls, the corresponding states are probabilistic due to uncertainty in the governing equation. Joint chance constraints require that realizations of the state satisfy pointwise bounds with a given probability.

We consider linear and bilinear PDEs with infinite-dimensional uncertain parameters. We show that properties of the governing equations reduce the effective random space dimension and show how this can be used to approximate the chance probabilities. We use a spherical-radial decomposition of Gaussian random variables, which allows not only computation of the joint chance probabilities, but also their derivatives.

In numerical examples we compare Monte Carlo and quasi Monte Carlo sampling methods and study the convergence as we increase the number of samples, and the sensitivity of these probabilities to the discretization of the physical space and to the truncation of expansions in random space.

This is joint work with Florian Wechsung (NYU) and Rene Henrion (WIAS Berlin).

Ort: Zoom Videokonferenz	Zeit: Mittwoch, 14.07.2021, 14:00 Uhr

Zu diesem Vortrag laden wir Sie herzlich ein.
You are cordially invited to this lecture.

gez. Prof. Dr. Alfio Borzì
gez. Prof. Dr. Frank Werner