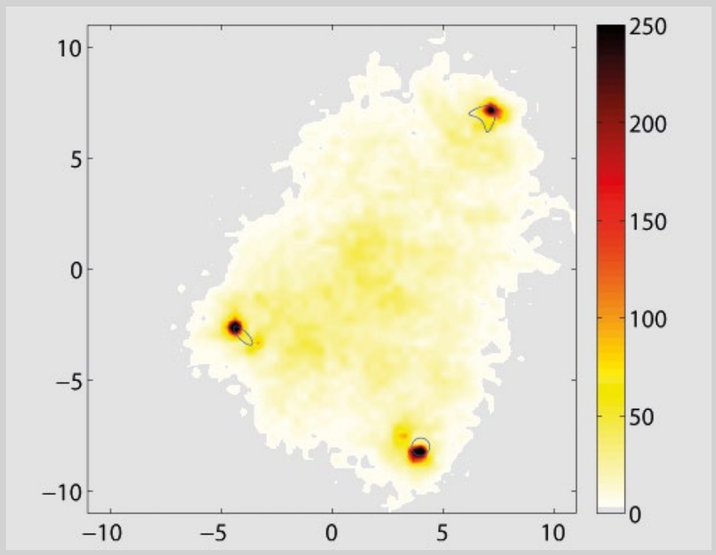

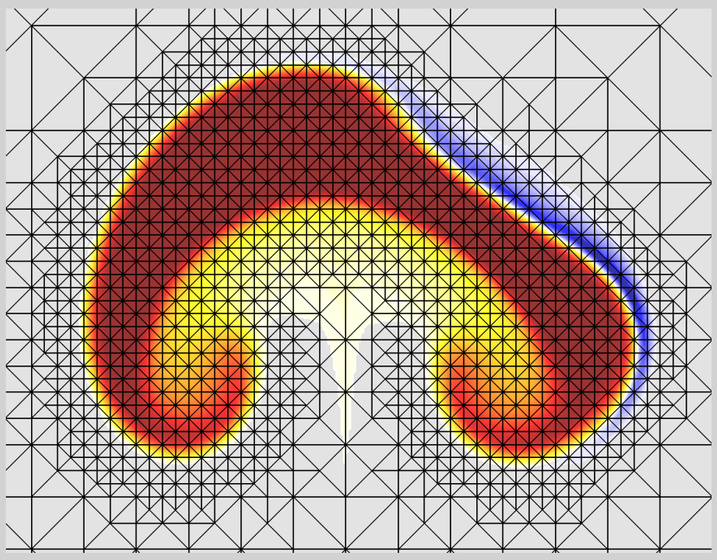

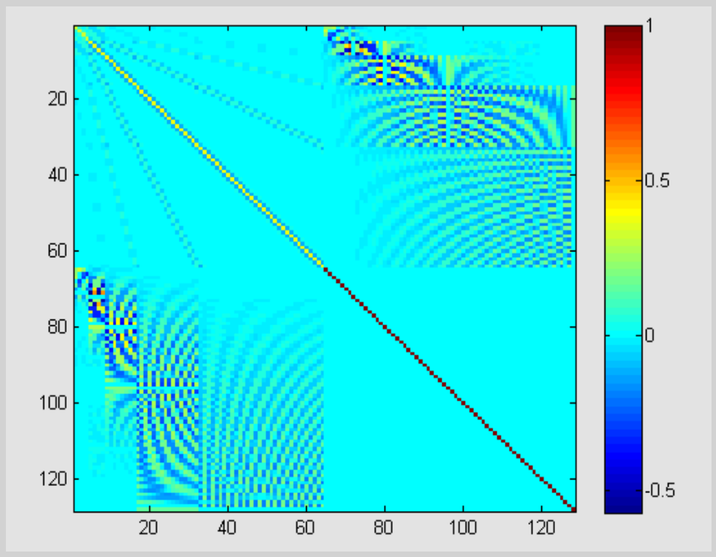

Oberseminar Numerik

Dr. Igor Voulis

01.07.2021
14:15 Uhr
MS Teams

Optimality of adaptive Galerkin methods for random elliptic PDEs

Abstract:

We consider elliptic PDEs depending on infinitely many parameters entering into a parametrized series expansion of the diffusion coefficient. Problems of this type arise in particular in the deterministic approximation of elliptic PDEs with random diffusion coefficients. The focus of this talk is on adaptive algorithms for computing sparse Legendre approximations with respect to the stochastic variables, where the Legendre coefficients are functions on the spatial domain. It has been shown that when the underlying series expansion of the random diffusion coefficient has multilevel structure, for instance when they correspond to a (suitably rescaled) wavelet-type basis, one obtains improved convergence results for such Legendre expansions. In particular, these estimates indicate the potential advantages of using independent adaptive spatial discretizations for each Legendre coefficient.

In this talk, we address the question whether an adaptive algorithm can be constructed that finds such approximations at optimal cost. It was previously shown that with adaptive wavelet schemes for the spatial discretization, one can get rates that are close to optimal under strong additional regularity requirements.
Here, combining adaptive operator application for the parametric expansion with spline wavelet tree approximation for the spatial coefficients, we obtain a method that can achieve optimal convergence rates under natural assumptions.

Hierzu sind alle herzlich eingeladen.

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