



## Vortrag im Gästeprogramm des GRK 2075

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## Multilevel Monte Carlo Analysis for Optimal Control of Elliptic PDEs with Random Coefficients

Montag, 10.04.2017, 10.00 Uhr  
Institut für Wissenschaftliches Rechnen, Raum 812  
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This work is motivated by the need to study the impact of data uncertainties and material imperfections on the solution to optimal control problems constrained by partial differential equations. We consider a pathwise optimal control problem constrained by a diffusion equation with random coefficient together with box constraints for the control. For each realization of the diffusion coefficient we solve an optimal control problem using the variational discretization. Our framework allows for lognormal coefficients whose realizations are not uniformly bounded away from zero and infinity.

We establish finite element error bounds for the pathwise optimal controls. This analysis is nontrivial due to the limited spatial regularity and the lack of uniform ellipticity and boundedness of the diffusion operator. We apply the error bounds to prove convergence of a multilevel Monte Carlo estimator for the expected value of the pathwise optimal controls. In addition we analyze the computational complexity of the multilevel estimator. We perform numerical experiments in 2D space to confirm the convergence result and the complexity bound.

#### Reference:

M. Hinze, *Comput. Optim. Appl.*, 30 (2005), pp. 45-61

#### Kontakt

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