

# Numerical Solution of Elliptic Diffusion Problems on Random Domains

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In this talk, we provide regularity results for the solution to elliptic diffusion problems on random domains. Especially, based on the decay of the Karhunen-Loève expansion of the domain perturbation field, we establish rates of decay which imply the tractability of the Quasi-Monte Carlo method. By taking into account only univariate derivatives, the regularity results can considerably be sharpened in order to show also the applicability of the stochastic collocation method and related rates of convergence. We moreover employ parametric finite elements to compute the solution of the diffusion problem on each particular realization of the domain generated by the perturbation field. This simplifies the implementation and yields a non-intrusive approach. The theoretical findings are complemented by numerical examples.

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