ON ELLIPTIC PARTIAL DIFFERENTIAL EQUATIONS WITH RANDOM COEFFICIENTS

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2000 Mathematics Subject Classification. 35R60, 65N12, 65N30

Keywords and phrases. Random partial differential equation, stochastic Galerkin methods, generalized polynomial chaos.

Based on the article [1] we consider elliptic partial differential equations

$$-\nabla \cdot (\kappa \nabla u) = f$$

with homogeneous boundary conditions, where the coefficient κ and the forcing f are random fields. Under the assumption that there are random variables κ_{min} and κ_{max} such that

$$0 < \kappa_{min} \leq \kappa(x) \leq \kappa_{max} < \infty \qquad \text{a.e. and a.s.}$$

we study the existence of a unique solution of a corresponding weak formulation to this boundary value problem involving different ansatz and test function spaces. Furthermore a priori error estimates for the Stochastic Galerkin approximation to the solution based on (generalized) polynomial chaos can be given under some conditions.

REFERENCES

[1] J. Galvis, M. Sarkis, *Approximating infinity-dimensional stochastic Darcy's equations without uniform ellipticity*, SIAM Journal on Numerical Analysis, **47** (2009), pp. 3624-3651.