

A finite element method for PDEs with stochastic input data

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We compute the expectation and the two-point correlation of the solution to elliptic boundary value problems with stochastic input data. Besides stochastic loadings, via perturbation theory, our approach covers also elliptic problems on stochastic domains or with stochastic coefficients. The solution's two-point correlation satisfies a deterministic boundary value problem with the two-fold tensor product operator on the two-fold tensor product domain. For its numerical solution we apply a sparse tensor product approximation by multilevel frames. This way standard finite element techniques can be used. Numerical examples illustrate feasibility and scope of the method.

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