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Sampling recovery in Bochner spaces and applications to parametric PDEs with random inputs

We proved convergence rates of linear sampling recovery of functions in an abstract Bochner space satisfying some weighted l_2-summability of their generalized polynomial chaos expansion coefficients, by extended least squares methods. As applications to a problem in Computational Uncertainty Quantification, we derived convergence rates of linear collocation approximation of solutions to parametric elliptic PDEs with log-normal random inputs, and of relevant infinite dimensional holomorphic functions on R^∞. These convergence rates significantly improve the known results. From the general results we also received the same convergence rates of linear collocation approximation of solutions to parametric elliptic PDEs with affine random inputs.