On Joint Convergence Rates for Approximation of Random Evolution Equations

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Keywords: joint convergence rate; C_0-semigroups; approximation; error bounds; Trotter-Kato; random coefficients; polynomial chaos; random heat equation.

MSC2010 codes: 47D06, 47A58, 47N40, 65J08, 47D60

Abstract: Solving random evolution equations numerically requires discretising in space, in time, and of random parameters. Methods to treat these three problems seperately are well-known, including rates of convergence. In this talk, conditions are presented under which these rates of convergence are conserved for the fully discretised solution. Focusing on spatial discretisation, a quantified version of the Trotter-Kato theorem corresponding to the weak formulation is presented. On a semigroup level, this corresponds to approximating form-induced semigroups on separable Hilbert spaces by restricting the form to simpler, often finite-dimensional, approximating spaces. Rates of strong convergence are obtained on dense subspaces under a joint condition on properties of both the form and the approximating spaces. As a standard application, results are discussed for the heat equation with random coefficients.
This is joint work with Christian Seifert.

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