

*Weak convergence for a stochastic exponential integrator and finite element discretization of stochastic partial differential equation with additive noise*

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We consider a finite element approximation of a general semi-linear stochastic partial differential equation driven by space-time additive noise. We examine the full weak convergence rate for non-self-adjoint linear operator with additive noise. Key part of the proof does not rely on Malliavin calculus. For non-self-adjoint operators, we analyse the optimal strong error for spatially semi discrete approximations for additive noise with truncated and non-truncated noise. Depending on the regularity of the noise and the initial solution, we found that in some cases the rate of weak convergence is twice the rate of the strong convergence. We present some numerical results in two dimensions to support our convergence rate result.