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Numerical methods for stochastic parabolic PDEs. (English) Zbl 0919.65100
Numer. Funct. Anal. Optimization 20, No. 1-2, 121-145 (1999).

This paper presents a proof of the convergence of finite difference approximations of the solution of the nonlinear stochastic partial differential equation initial value problem of the form

$$du(t) = \left[\frac{\partial^2 u(t)}{\partial x^2} + f(u(t)) \right] dt + dB(t), \quad u(0) = U,$$

where $B(t)$ is a Wiener process. It concludes with a brief summary of results obtained in numerical experiments with $f = 0$ and with $f = .5(u - u^3)$.

Reviewer: [M.D.Lax \(Long Beach\)](#)

MSC:

- [65C99](#) Probabilistic methods, stochastic differential equations
- [35K55](#) Nonlinear parabolic equations
- [65M06](#) Finite difference methods for initial value and initial-boundary value problems involving PDEs
- [60H15](#) Stochastic partial differential equations (aspects of stochastic analysis)
- [35R60](#) PDEs with randomness, stochastic partial differential equations
- [65M12](#) Stability and convergence of numerical methods for initial value and initial-boundary value problems involving PDEs

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Keywords:

[convergence](#); [finite difference](#); [nonlinear stochastic partial differential equation](#); [initial value problem](#); [Wiener process](#); [numerical experiments](#)

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