

Department of Mathematics

University of Houston

Scientific Computing Seminar

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Chinese Academy of Sciences

Stochastic Symplectic Methods and Multi-symplectic Methods for Two Stochastic Hamiltonian Partial Differential Equations

Thursday, February 22, 2018

1:30 PM- 2:30 PM

Room 646 PGH

Abstract: In this talk we review some results on stochastic symplectic methods for stochastic Hamiltonian systems, including stochastic generating functions and stochastic Hamilton-Jacobi theory. We investigate the canonical form and the stochastic symplectic structure of stochastic nonlinear Schroedinger equations (SSEs), and show that the symplectic Runge-Kutta semidiscretization for SSEs in time preserves charge conservation law. We present stochastic multi-symplectic methods for stochastic Maxwell equations, and show that these methods preserve physical properties of equations.

References

1. J. Hong, L. Sun, X. Wang, High order conformal symplectic and ergodic schemes for the stochastic Langevin equation via generating functions, *SIAM J. Numer. Anal.*, 55 (2017), 3006-3029.
2. J. Hong, L. Ji, L. Zhang, J. Cai, An energy-conserving method for stochastic Maxwell equations with multiplicative noise, *J. Comput. Phys.*, 351 (2017), 216-229.
3. C. Chen, J. Hong, L. Zhang, Preservation of physical properties of stochastic Maxwell equations with additive noise via stochastic multi-symplectic methods, *J. Comput. Phys.*, 306 (2016), 500-519.
4. C. Chen, J. Hong, L. Ji, Mean-square convergence of a symplectic local discontinuous Galerkin method applied to stochastic linear Schroedinger equation, *IMA J. Numer. Anal.*, 37 (2017), 1041-1065.
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6. C. Chen, J. Hong, Symplectic Runge-Kutta semidiscretization for stochastic Schroedinger equation, *SIAM J. Numer. Anal.*, 54 (2016), 2569-2593.
7. J. Cui, J. Hong, Z. Liu, W. Zhou, Stochastic symplectic and multi-symplectic methods for nonlinear Schroedinger equation with white noise dispersion, *J. Comput. Phys.* 342 (2017), 267-285.

This seminar is easily accessible to persons with disabilities. For more information or for assistance, please contact the Mathematics Department at 743-3500.