PIMS / AMI Seminar

Friday, March 18, 2016
3:00 p.m.
CAB 657

"Stochastic Multi-symplectic Methods for Stochastic Maxwell Equations with Additive Noise"

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Abstract

In this talk, we first review main results on stochastic symplectic methods for stochastic Hamiltonian systems. Then we introduce the stochastic multi-symplectic structure for stochastic Hamiltonian partial differential equations (PDEs), and show that stochastic Maxwell equations are of the stochastic Hamiltonian PDEs. We also show that the averaged energy increases linearly as the growth of time with a precisely given increasing rate. It is proved that the phase flow of stochastic Maxwell equations preserves the divergence in the sense of expectation. In order to preserve the above properties numerically, we present three stochastic multi-symplectic methods for stochastic Maxwell equations. We obtain the corresponding dissipative property of the discrete averaged energy satisfied by each method. Furthermore, utilizing the adaptedness of solutions to stochastic Maxwell equations and properties of Wiener process, we estimate the dissipative rates with respect to time for three methods in our consideration, and we show that the discrete averaged energies evolve at most linearly with respect to time under certain assumptions. As for divergence, we show that all of the three methods preserve the discrete conservation law of averaged divergence well. The work in this talk is in collaboration with Chuchu Chen and Liying Zhang.

Refreshments will be served in CAB 649 at 2:30 p.m.