

Stochastic Analysis and Applications

Organizer:S. Sathananthan ,Tennessee State University

Large-scale stochastic hybrid parabolic systems under jump Markovian perturbations-I: convergence and stability via Lyapunov functions

M. Anabtawi

Tennessee State University, USA
email:anabtawi@coe.tsuniv.edu

S. Sathananthan

In this paper, the qualitative properties of the jump Markovian perturbations caused by the interactions among the states of a stochastic hybrid parabolic partial differential system are investigated. The concept of vector Lyapunov-like functions coupled with the decomposition-aggregation techniques are utilized to develop a comparison principle and sufficient conditions are established for various types of convergence and stability in the p -th moment and probability of the equilibrium state of the system under jump Markovian perturbations. This frame work of decomposition-aggregation is ideally suited for reducing the dimensionality problem arising in testing large-scale systems for the concept of convergence and stability. In addition, an example is given to illustrate the significance of the presented results.

→ ∞ ◇ ∞ ←

Stochastic perturbation of solutions in optical fibers

Anjan Biswas

Tennessee State University, USA
email:ABiswas@tnstate.edu

The soliton perturbation theory is used to study and analyze the stochastic perturbation of optical solitons in addition to the deterministic perturbations that are governed by the nonlinear Schrodinger's

equation. The corresponding Langevin equations are derived and analyzed. The deterministic perturbations that are considered here are both Hamiltonian as well as of non-Hamiltonian type. Finally, the soliton mean drift velocity is calculated in presence of these perturbation terms.

→ ∞ ◇ ∞ ←

Stability boundedness and tightness of stochastic flows

D. Kannan

University of Georgia,USA
email: kannan@arches.uga.edu
TBA

→ ∞ ◇ ∞ ←

Practical stability criteria for nonlinear stochastic systems by decomposition and aggregation

S. Sathananthan

Tennessee State University, USA
email:satha@coe.tsuniv.edu

In this talk, the concept of practical stability is investigated for the large-scale stochastic systems of Ito-Doob type. The concept of vector-Lyapunov like functions coupled with the decomposition-aggregation techniques are utilized to develop a comparison principle and, sufficient conditions are established for various types of practical stability criteria in the p -th mean and in probability. This framework of decomposition-aggregation is ideally suited for reducing the dimensionality problem arising in testing large-scale systems for the concepts of convergence and stability.

→ ∞ ◇ ∞ ←