Graph theory-based approach for stability analysis of stochastic coupled systems with Lévy noise on networks. (English summary)


Summary: “In this paper, a novel class of stochastic coupled systems with Lévy noise on networks (SCSLNNs) is presented. Both white noise and Lévy noise are considered in the networks. By exploiting graph theory and Lyapunov stability theory, criteria ensuring $p$th moment exponential stability and stability in probability of these SCSLNNs are established, respectively. These principles are closely related to the topology of the network and the perturbation intensity of white noise and Lévy noise. Moreover, to verify the theoretical results, stochastic coupled oscillators with Lévy noise on a network and stochastic Volterra predator-prey system with Lévy noise are performed. Finally, a numerical example about oscillators’ network is provided to illustrate the feasibility of our analytical results.”

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