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Dynamical Structures in Stochastic Chemical Reaction Systems

Motivated by the need for dynamical analysis and model reduction in stiff stochastic chemical systems, we focus on the development of methodologies for analysis of the dynamical structure of singularly-perturbed stochastic dynamical systems. We outline a formulation based on random dynamical systems theory. We demonstrate the analysis for a model two-dimensional stochastic dynamical system built on an underlying deterministic system with a tailored fast-slow structure, and an analytically known slow manifold, employing multiplicative brownian motion noise forcing.