Chemical Reaction Networks with Stochastic Switching Behavior and Machine Learning Applications

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Special session: Recent Advances in Monte Carlo Methods for Forward and Inverse Problems for Stochastic Reaction Networks, Parts I and II

Switching behavior is an interesting feature observed in some chemical reaction networks, where the molecular copy numbers fluctuate between two or more states. In this talk, we introduce two models with switching behavior: the Togashi-Kaneko model and the Schloegl model. Both models show switching behavior between two states, but the underlying mechanisms are different. We generate sample trajectories and stationary distributions of two models. We set the parameters so that the sample trajectories of the two models look similar. Then, we apply classification techniques using either some features of the sample trajectories or the entire sample trajectories to see if the two models are distinguishable. This is joint work with Dongli Deng at UMBC.