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Guangliang Zhao* (ea4628@wayne.edu). *Regularization and Stabilization of Hybrid Diffusion System.*

This presentation focuses on switching diffusions that are modulated by a continuous-time Markov chain. The dynamics are represented by Markovian switching diffusions. The goal is to stabilize the systems. The difficulty is that the systems grow much faster than the allowable rates in the classical stochastic differential equation setup, and as a result, the underlying systems may be exploded in finite time. To overcome the difficulties, the main efforts are to develop feedback controls so that we can first extended the local solutions to global solutions and then stabilize the resulting systems. The feedback controls are, in fact, Brownian type of perturbations. After establishing the regularity, proving the stability of the resulting systems, obtaining tightness of the solutions, and providing sufficient conditions for almost sure stability, we present numerical experiments to illustrate the main results. [This is a joint work with George Yin and Fuke Wu.] (Received September 06, 2012)