

Stabilization of Regime-Switching Processes by Feedback Control Based on Discrete Time Observations

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Abstract: This work aims to extend X.R. Mao's work (Automatica 2013) on stabilization of hybrid stochastic differential equations by discrete-time feedback control. In X.R. Mao's work, the feedback control depends on discrete-time observation of the state process but on continuous time observation of the switching process. While, in this work, we study the feedback control depending on discrete-time observations of the state process and the switching process. Our criteria depend explicitly on the regular conditions of the coefficients of stochastic differential equations and on the stationary distribution of the switching process. The sharpness of our criteria is shown through studying the stability of linear systems, which also shows explicitly that the stability of hybrid stochastic differential equations depends essentially on the long time behavior of the switching process.