

Switching diffusion with past dependent switching and countable state space

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This talk is concerned with switching diffusions consisting of continuous and discrete components, in which the discrete component takes values in a countably infinite set and the rates of switching at current time depend on the value of the continuous component over an interval including certain past history. In addition to existence and uniqueness of the associated stochastic differential equations, we present recurrence and ergodicity of the function-valued Markov process associated with the equations. We also reveal the relationship between systems of partial differential equations and recurrence when the switching is past-independent. We use the recently developed functional Itô formula of Dupire in our problem, which enables us to make much progress in our quest of properties of switching diffusions with past-dependent switching.

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