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The stability with a general decay of stochastic delay differential equations with Markovian switching. (English) Zbl 1428.60086

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Summary: This paper considers the problems on the existence and uniqueness, the pth ($p \geq 1$)-moment and the almost sure stability with a general decay for the global solution of stochastic delay differential equations with Markovian switching, when the drift term and the diffusion term satisfy the locally Lipschitz condition and the monotonicity condition. By using the Lyapunov function approach, the Barbalat lemma and the nonnegative semi-martingale convergence theorem, some sufficient conditions are proposed to guarantee the existence and uniqueness as well as the stability with a general decay for the global solution of such equations. It is mentioned that, in this paper, the time-varying delay is a bounded measurable function. The derived stability results are more general, which not only include the exponential stability but also the polynomial stability as well as the logarithmic one. At last, two examples are given to show the effectiveness of the theoretical results obtained.

MSC:

60H10 Stochastic ordinary differential equations (aspects of stochastic analysis)
34K20 Stability theory of functional-differential equations
34K50 Stochastic functional-differential equations
60H15 Stochastic partial differential equations (aspects of stochastic analysis)

Keywords:

stochastic delay differential equations; stability; general decay; existence and uniqueness; Markovian switching

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