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The genetic regulatory network models with the reaction-diffusion driven by Markovian and fractional Brownian motion. (Chinese. English summary) [Zbl 07339326]

Summary: Based on the diffusion-reaction process of fractional Brownian motion, Markov jump and time-varying delay, a stochastic gene regulatory network model is established. By constructing Lyapunov function, using Wirtinger inequality and stochastic stability theory, and delay-dependent asymptotic stability theorem, the global stability of the random gene regulatory network model in the mean square sense is achieved by deducing linear matrix inequalities.

MSC:
92C42 Systems biology, networks
92D10 Genetics and epigenetics
60G22 Fractional processes, including fractional Brownian motion
93E15 Stochastic stability in control theory

Keywords:
stochastic genetic regulatory networks; fractional Brownian motion; stability