About asymptotical properties of solutions of difference equations with random parameters. (Russian. English summary) Zbl 1366.39014


Summary: We investigate the asymptotic behavior of solutions of difference equations. Their right-hand sides at given time depend not only on the value of state at the previous moment, but also on a random value from a given set $\Omega$. We obtain conditions of Lyapunov stability and asymptotic stability of the equilibrium for all values of random parameters and with probability one. We show that the problem of coexistence of stochastic cycles of different periods has a solution, which strongly differs from a known Sharkovsky result for a determined difference equation. Under some conditions, the existence of a stochastic cycle of length $k$ implies the existence of a cycle of any length $\ell > k$.

MSC:

39A50 Stochastic difference equations
39A22 Growth, boundedness, comparison of solutions to difference equations
39A30 Stability theory for difference equations

Keywords:
difference equations with random parameters; Lyapunov stability; asymptotical stability; cyclic solution

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