

The problem of quantitative response analysis and control of the nonlinear systems attractors for stochastic disturbances is considered. A new technique [1,2] for investigation of the local stochastic dynamics near invariant manifolds is suggested. This technique is based on asymptotics of quasipotential. An approximation of quasipotential is expressed by some matrix function (sensitivity function) satisfying the singular boundary problem for Lyapunov differential equation. Probabilistic interpretation of this problem connected with linear stochastic extension system is discussed. The constructive approaches to boundary problem solution are suggested. The conditions and degree of convergence are discussed. A control method for synthesis of stochastic attractors with desirable probabilistic properties is proposed. The effectiveness of this of sensitivity analysis technique and control for the stochastic Lorenz and Roessler models cycles is demonstrated. The peculiarities of stochastic cycles behavior for period-doubling bifurcation and chaotic zone are shown.

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References

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2. Bashkirtseva I., Ryashko L., Stikhin P. Stochastic sensitivity of the Roessler cycles under transition to chaos. *J. Appl. Nonlinear Dynamics*, (accepted 2003).