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Lyapunov function technique for stochastic stability analysis of toroidal manifolds

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ABSTRACT

An exponential mean square stability for quasiperiodic motion of nonlinear stochastic system is considered. Using a toroidal quadratic Lyapunov function technique the first approximation linear systems for invariant toroidal manifolds are introduced and a notion of P-stability (projective) is proposed. A criterion for P-stability is obtained. As a result the stochastic stability analysis is reduced to the estimation of the spectral radius of some positive operator. For 2-torus in 3-dimensional case a parametric criterion is given.

This work was supported by grant of RFBR N 00-01-00076.

Keywords: *Stability, torus, stochastic system, Lyapunov function*

Mathematics Subject Classification: *34D35*

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