Many phenomena of statistical physics (lasers, radio-frequency generators), biological systems and chemical reactions are due to the interaction of coupled oscillators. The invariant manifolds (cycles, tori etc.) are an essence of this interaction. The stability analysis of manifolds is important link of an investigation of the bifurcation chain from order to chaos. The problem of an invariant manifolds stability for nonlinear system with respect to stochastic disturbances is considered. The stability analysis on the base of Lyapunov function is used. The local approximation (near deterministic manifold) of the quadratic Lyapunov function is investigated. For the 2D manifolds, the simple approximation is constructed. A parametric stochastic stability criterion is given. The control problem for stochastic manifolds is discussed.

References

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