Shumafov M. M. (Maykop, Republic of Adygea, Russia), Tlyachev V.B. (Maykop, Republic of Adygea, Russia) — **Stochastic Stability of the Second-Order Differential Equations and Systems.**

Our research here deal with a problem of stability of the second-order nonlinear stochastic differential equations and two-dimensional linear stationary stochastic systems. For the study of the problem we use the Lyapunov's direct method, i.e. Lyapunov functions one, developed for the problems of the stability of stochastic systems in the works of H.Kushner [1] and R.Z. Khas'minskii [2]. Sufficient conditions of stability on probability and exponential stability in mean square are given for the second-order nonlinear differential equations perturbed by Gaussian white noise. For linear stationary second-order systems of stochastic differential equations necessary and sufficient conditions of the exponential stability in mean square are rendered. The investigation is based on the construction of special Lyapunov functions for the stochastic equations and systems considered. As an example it is considered a linear oscillator in which one of its parameters is perturbed by white noise.

REFERENCES

1. *Kushner H.* Stochastic stability and Control. New York: Academic Press, 1967. 160 p.

2. *Khas'minskii R.Z.* Stability of the systems of differential equations under random perturbations of their parameters. M.: Nauka, 1969. 367 p.