

Shumafov M. M., Tlyachev V. B., Panesh T. A. (Adyghe State University, Republic of Adyghea, Russia) — **Stability of solutions of the second order nonlinear stochastic differential equations.**

In the present work, we prove theorems that generalize the results of the papers [1], [2]. We formulate one of these theorems, concerning the stochastic Lienard's equation.

Theorem. *Suppose that the functions $F(x)$, $g(x)$ and $\sigma(x)$ satisfy the Lipschitz condition on \mathbb{R} and the following hypotheses are fulfilled: there exist numbers $c_1 > 0$, $c_2 > 0$ and σ_0 such that*

- 1) $\frac{F(x)}{x} > c_1$ for all $x \neq 0$, $F(0) = 0$,
- 2) $\frac{g(x)}{x} > c_2$ for all $x \neq 0$, $g(0) = 0$,
- 3) $0 < \frac{\sigma(x)}{x} < \sigma_0^2$ for all $x \neq 0$, $\sigma(0) = 0$,
- 4) $\sigma_0^2 < 2c_1c_2$.

Then the trivial solution $(x(t) \equiv 0, y(t) \equiv 0)$ of the stochastic Lienard's system

$$dx(t) = (y - F(x))dt, \quad dy(t) = -g(x)dt + \sigma(x)d\xi(t)$$

is asymptotically stable in probability in the large.

REFERENCES

1. *Shumafov M.M.* Construction of Lyapunov functions for some second-order nonlinear stochastic differential equations and questions of stability. *Differ. Uravn.*, 1981, vol. 17, No. 6, pp. 1143–1145. (In Russian)
2. *Shumafov M.M.* On the stochastic stability of some two-dimensional dynamical systems. *Differential Equations*, 2010, vol. 46, No. 6, pp. 901–905. ■