Karachanskaya E.V., Rybkina O.V. (Far Eastern State Transport University, Khabarovsk, Russia). **STOCHASTIC MODELS OF INFORMATION SYSTEM PROTECTION**

Considering the protection of an information system against information security threats as a dynamic system, we can assume that there are invariants that allow this system to remain in a protected state. Proceeding from the set of such invariants, a set of systems of stochastic differential equations is constructed by means of selection of additional functions, from which the set of systems is chosen, the form of which allows an adequate interpretation of the system coefficients and initial conditions. The model of information system protection against information security threats based on the Lanchester's model can be described by a system of Itô stochastic differential equations

$$\begin{cases} du(t) = (-a\alpha(t) + bu(t))dt + r_1(t)dw(t), \\ dz(t) = (-u(t) + \beta(z_0 - z(t)))dt + r_2(t)dw(t), \\ d\alpha(t) = \gamma(u(t) - \alpha(t))dt + r_3(t)dw(t), \end{cases} \quad (1)$$

with initial conditions $u(0) = u_0$, $z(0) = z_0$, $\alpha(0) = \alpha_0$, where $u(t)$ is current number of realized threat scenarios, $z(t)$ is current number of information impact objects, $\alpha(t)$ is a number of active information protection means,t is time, a $(0 \leq a \leq 1)$ is a coefficient of effectiveness of information protection means, b is a coefficient of intensity of appearance of new threat scenarios, β is a coefficient of intensity of restoration of information impact objects, γ is a coefficient of intensity of introduction of new active information protection means, z_0 is an initial number of information impact objects $w(t)$ is a one-dimensional Wiener process [1, 2].

The invariants of the Ito SDE system will be the first integrals of the Itô SDE [3]. Assuming that the functions $s(t, u(t), z(t), \alpha(t))$ and $v(t, u(t), z(t), \alpha(t))$ describe properties of an information system that must remain unchanged for any t in order for it to be protected from threats to information security, it is possible, according to [4], to introduce into the system (1) such compensating functions that, with probability 1, the conditions are met:

$$s(t, u(t), z(t), \alpha(t)) = s(t, u_0, z_0, \alpha_0), \qquad v(t, u(t), z(t), \alpha(t)) = v(t, u_0, z_0, \alpha_0).$$

Theorem. *There exists a stochastic model of information system protection against information securitythreats protected with probability 1.*

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