ОБОЗРЕНИЕ
ПРИКЛАДНОЙ И ПРОМЫШЛЕННОЙ
Том 23 МАТЕМАТИКИ Выпуск 2
2016

A. A. Kudryavtsev, S. I. Palionnaia [1] (Moscow, Lomonosov Moscow State University). **Parabolic distribution of parameters in Bayesian recurrent model of reliability growth.**

Frequently, any first established complex information system does not possess the required reliability. In order to correct the deficiencies of the system a series of modifications is needed. Those modifications can be made during the development and testing phases as well as during the regular functioning.

To formalize the notion of system's reliability let us describe a reliability with a parameter $p(t)$ where t is continuous and is interpreted as time. Parameter $p(t)$ changes as we modify the system and it takes value $p(t) = p_j$ after modification j. It is important to notice that reliability parameter either increase or decrease. The decrease of the parameter can happen in case of poor modifications.

It is known that in the framework of discrete exponential model one has

$$p_{j+1} = \eta_{j+1} p_j + \theta_{j+1}(1-p_j),$$

where $\{(\theta_j, \eta_j)\}_{j=1,2,\dots}$ is a sequence of independent identically distributed two-dimensional random vectors such as $0 < \eta_1 < 1$, $0 < \theta_1 < 1$ almost everywhere and the marginal reliability looks like

$$p = \lim_{j\to\infty} \mathbf{E}\, p_j = \frac{\mu}{\lambda+\mu},$$

where $\lambda = 1 - \mathbf{E}\,\theta_j$, $\mu = \mathbf{E}\,\eta_j$.

In the framework of Bayesian approach in the reliability theory it is supposed that we only have information about *a priori* distributions of system's key parameters λ and μ. Wherein the most natural and convenient characteristic for a study is an average marginal reliability

$$p_{\text{av}} = \mathbf{E}\, p = \mathbf{E}\,\frac{\mu}{\lambda+\mu},$$

where averaging is based on the joint distribution of random variables λ and μ and these variables have *a priori* distributions concentrated on the segment $[0, 1]$.

In the report formulas for average marginal system's reliability with *a priori* parabolic distributions of independent parameters λ and μ are given. Also numerical results for model examples are provided.

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