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Introductions. Reliability indicators of objects are established based on the results of determinative tests based on their statistical processing. One of the main and widespread tasks of statistical processing of test results (observations) is the construction (selection) of such a theoretical (probability) distribution that best reproduces the characteristic features (features) of the experimental series. Such a step from a statistical model to a probability distribution allows the use of statistical information about analogues in reliability calculations.

Aim. Analytical expressions of the distribution laws of random variables are distribution functions - integral and differential.

Materials and methods. Integral distribution function of a random variable shows the probability that the random variable does not exceed some given or current value.

From the point of view of reliability, the integral function corresponds to the failure function, which is related to the reliability function by an arithmetic relation.

If the integral distribution function can be differentiated for all values of the random variable, then the law of probability distribution can be expressed in analytical form also using the differential function of probability distribution.

With the help of the differential distribution function, the probability of a random variable being in any area from its set of possible values is calculated.

Both integral and differential distribution functions are exhaustive probabilistic characteristics of a random variable.

However, some basic properties of random variables can be described more simply with the help of certain numerical parameters.

Indicators describing the sample can be divided into several groups.

1. Position indicators describe the position of the data on the numerical axis. Examples of such indicators are the minimum and maximum elements of the sample (the first and last term of the variation series), the upper and lower quartiles (they limit the zone in which 50% of the central elements of the sample fall), summaries about the middle of the population can give the sample mean, the sample median and other similar characteristics.

2. Scatter indicators describe the degree of dispersion of data relative to their center. They primarily include: sample variance, standard deviation, sample range, standard deviation, sample range (difference between the maximum and minimum elements), in the maximum and minimum elements), interquartile range (difference between the upper and lower quartile), kurtosis coefficient etc. These indicators tell how densely the main mass of data is grouped near the center.

3. Indicators of asymmetry -answer the question about the symmetry of the distribution of data about its distribution of data about its center. It can include: the asymmetry coefficient, the position of the sample median in relation to the sample mean and in relation to the sample quartiles, a histogram, etc.

4. Indicators describing the law of distribution. The fourth group of indicators of descriptive statistics gives an idea about the law of distribution of data. This includes histogram and empirical distribution function graphs, frequency tables.

Two groups of parameters play the greatest role among numerical parameters in practice - parameters characterizing the center of dispersion (center of distribution) of a random variable and parameters characterizing the degree of dispersion of a random variable around the center of distribution.

Characteristics of the distribution center there is a mathematical expectation, median and mode.

Characteristics of the degree of dispersion of a random variable around the distribution center are variance, mean square deviation, and coefficient of variation.

In cases where numerical characteristics are determined on the basis of selective observation, then instead of numerical parameters, their selective estimates are calculated.

When choosing a function, not any arbitrary distributions are considered, but those that are uniquely described by a small number of parameters. One- and two-parameter distributions are usually preferred. If many parameters for one distribution function are determined from the experiment, then, it is noted, any observational data can be fitted to a multiparameter distribution law, but it may not correspond at all to the physical essence of the phenomena being studied.

Various continuous and discrete distributions are used in reliability analysis. This is due to the fact that different conditions of connection of elements in the object, different physical nature of failures and different features of recovery lead to different distributions.

Normal distribution specially often used in statistics. This distribution provides a good model for real phenomena in which there is a strong tendency for the data to cluster around the center; positive and negative deviations from the center are equally likely, and the frequency of deviations decreases rapidly when the deviations from the center become large.

Even distribution is used to describe variables for which each value has the same probability, that is, the values of the variable are uniformly distributed in some region. In practice, it is accepted that a uniform distribution corresponds to failure in a narrow interval, for example, when reading the position of the arrow between two consecutive divisions of the scale within half the price of the division.

Exponential distribution is the distribution of time between independent events that occur with constant intensity. In reliability theory, the exponential distribution describes the occurrence of sudden failures. The exponential distribution is used to describe the performance of complex systems during normal operation, as well as to determine the time of failure-free operation of a system with a large number of serially connected elements, if individually each of them does not significantly affect the failure of the system.

Waybull distribution used to estimate the service life of elements of electronic equipment, to assess the reliability of rolling bearings, to describe the fatigue strength characteristics of metals. In the theory of reliability, the Weibull distribution is the

most general distribution of the time of failure-free operation of elements, the time of operation to the limit state, for describing the distributions of service life of other various objects.

Binomial distribution is one of the most widespread discrete distributions. It arises in those cases when we are interested in how many times a certain event occurs in a series of a certain number of independent observations that occur under the same conditions. This law is valid, for example, for the number of failures if the number of trials is known in advance, for the number of failures for a given time interval, for the number of defective objects in samples, etc.

Results and discussion. Reliability indicators of objects are established based on the results of determinative tests based on their statistical processing.

Conclusions. One of the main and widespread tasks of statistical processing of test results (observations) is the construction (selection) of such a theoretical (probability) distribution that best reproduces the characteristic features (features) of the experimental series. Such a step from a statistical model to a probability distribution allows the use of statistical information about analogues in reliability calculations.

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