APPROACH TO DETERMINING PARAMETERS OF ELECTRICITY RELIABILITY OF USING BY SIMULATION

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Approach reveals a determination of the reliability of power supply system with the use of simulation and formed mathematical model search possible range of the number of cycles to generate random values to continue to receive adequate values of reliability Simulation method.

Due to complexity of the structure of the electricity network and financial relationships between the consumer and electricity supplier vital question of determination of the reliability of the electricity supply system by simulation.

The purpose of research - formation approach to determine the parameters of reliability of power supply system with the use of simulation modeling and the study of changes in the number of cycles to generate random values for adequate results.

Materials and methods research. To investigate the application of the method of simulation modeling – Monte Carlo [5]. This is a great method to solve mathematical problems by simulation of random variables. The objective of this work is to determine the number of tests to obtain adequate values of reliability.

To find the number of cycles perform the following steps:

1. Generates a random number x1 uniform distribution law.

2. If the first generated random number x1 is not equal to the expectation, the second random number generating x2 with the same settings uniform distribution law and find the average value of random numbers. In this case, the expectation m - value is the probability of failure of one element. If the average value Random number is not equal to the expectation, then generate Random number third, and so on. d.

These operations are carried out until a random number will be equal to the expectation. For the operation of the average value of the random number, which is expected value not held indefinitely, wonder restrictions. For more reliable results of the initial limit should be 1000, ie from generated random numbers in 1000 found the average value of a random number that is equal to the expectation. Then the program remembers the cycle in which there was a coincidence (eg, 560 th cycle generating random numbers). If this coincidence did not happen, the memorable 1000 cycles.

All these operations are carried out in one cycle, which we call internal.

One outer loop - this is the number of cycles at which the mean value of random variables coincided with the expectation, that the number of internal cycles. Chart for five cycles of the external value of the limit in 1000 and the average value of 230.4 cycles shown in Fig. 2.

Outer loop can be set. However, each outer loop has a number of cycles, which is summed and divided by the number of external cycles, find the average value of the external cycles.

For the above program has been developed in the environment of C ++, which allows you to calculate by simulation Monte Carlo method for each element of the mains with a given probability or likelihood of failure, the number of cycles Random number distributed by a uniform distribution law in which this probability is reached.

However, because the network is made up of many elements (lines, cables, tires, transformers, circuit breakers, fuses, etc.), It is advisable to determine what is the number of cycles to generate Random number to be posted for this network to get reliable results. We assume that each network element has a certain probability (reference data), it is necessary for each element of its probability to find the number of cycles and one to choose the largest number of cycles [2].

Results.

The mathematical results of the experiment show that the reference and experimental probability of failure of elements differ in size, that are less than 5%, which indicates the adequacy of this method of modeling.