The Methodology of Modeling Available for Data Traffic Bandwidth Telecommunications Network

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Abstract – **In this paper, the statement and solution of the important scientific problem of development the methodology of creation of adequate models simulating the timely changes of network throughput amount, available for the data traffic transmission are considered.**

Keywords – **simulation model, available bandwidth, traffic.**

I. INTRODUCTION

The timely changes of current value of network bandwidth, available for the data traffic transmission is a random process P(t). The implementations of this process are determined by the parameters of real time data streams transmitted through the network. While developing the methods of information density control in a telecommunication network and evaluating the control effectiveness it is necessary to apply mathematical models, which allow receiving the correct implementations of the random process P(t) [1].

II. MAIN PART

The aim of the scientific researches is to receive the correct current values of bandwidth available for data traffic in a telecommunication network by means of mathematical modeling.

In order to achieve the aim the authors of the report received the following results:

1) the methodology of modeling a telecommunication network bandwidth available for data traffic was developed;

2) a simulation model to implement this methodology was designed;

3) the sufficiency of the simulation model was grounded.

The methodology of modeling a telecommunication network bandwidth available for data traffic includes the following stages:

1) input of initial data;

2) making calls for the transmission of real time data streams in a telecommunication network;

3) receiving the density values of real time data streams in each of the network channels in a current moment of time;

4) calculating the values of total density of real time data streams, which is necessary to transmit in each of the network channels in a current moment of time;

5) defining the total density of real time data streams transmitted in each of the network channels in a current moment of time;

6) calculating the values of network bandwidth available for data stream in each of the network channels in a current moment of time;

7) defining the meanings of values of telecommunication network bandwidth available for data stream for a current moment of time.

The offered methodology was used while developing the model simulating the process of transmission of real time streams and data in a telecommunication network. The MATLAB + Simulink system [2] was used for the modeling.

The model validity of a model simulating the process of transmission of real time streams and data in a telecommunication network was proved by:

1) the control of the results of calculations used for the simulation of the investigated process;

2) the modeling correctness check in situations typical for the investigated process;

3) comparing the results received during the simulation and analytical modeling.

The designed simulation model confirms that the methodology suggested in the article can be successfully applied for a correct modeling the current values of a telecommunication network bandwidth available for data traffic.

III. CONCLUSION

The new methodology of modeling a telecommunication network bandwidth available for data traffic is offered. Unlike the well-known methodologies it suggests that the time slot between the moments of the beginning of real time streams transmission and the duration of their transmission are allocated on the exponential law.

The developed methodology is appropriate to use for the adequate modeling of the process of real time streams transmission in a telecommunication network and also for receiving the correct current values of network bandwidth available for data traffic.

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