

Short-term Forecasts Parameters the Stream of Calls on the Telecommunication Networks

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Abstract – In this paper the results of the short-term forecast the duration service time stream of calls are given.

Keywords - Forecast, stream of calls, telecommunication networks.

I. INTRODUCTION

Research issues parameters stream of calls are described in a large number of works. The peak of these researches for networks with space-division, frequency-division, time-division multiplexing took place in 80 years. Because of lack of financing and absence of available access to statistical data the analysis of probabilistic and temporal structure of streams of calls was not performed.

II. FORECASTING PARAMETERS THE STREAM OF CALLS

The active developing networks with the multiplexing by labels and packet switching network took the interest to the problem of traffic analysis back again. But these researches were focused to review the packet switching networks and the channel switching stayed outside the boundaries of the analysis. These researches were describing the aggregated traffic and very small attention was paid to its structure. Now established that for the packet switching networks the traffic has self-similar nature, and it is possible to predict statistical data with the help of several models: ARIMA, FARIMA, and GARCH.

For studying parameters the stream of calls on a modern Ukrainian telecommunication networks the large volume of statistical data (from 2003 to 2011 year) was obtained and analyzed by author. The data was taken from the international switching center the southern region of Ukraine. The special software packages designed for initial data processing and future analysis. This software gave opportunity to increase the processing speed and solve the problem of inability to analyze such a large array of statistical data by the modern statistical packages [1]. The analysis showed that the duration of calls for different types of loads is described by a logarithmically normal distribution [2], but such parameter as number of calls cannot be described by any known law of distribution For this parameter was calculated Hurst coefficient, whose value ranged from 0.8 to 0.9 depending of the type of load.

This gave opportunity to consider that it's possible to predict the number of calls with sufficient accuracy [3].

As a method of forecasting was selected ARIMA model with seasonality. The time-series visualization was performed. By the form of autocorrelation function was established that the series are not stationary. With the help of the Fourier spectral analysis of periodic components were established. As the constant component the first differences were taken. In this case, the series of first differences is stationary. The work shows that using the chosen method of predicting short-term prognosis can be obtained with an accuracy of 1%.

Also an important aspect is the degree of aggregation. In this study was used aggregation of half-hour intervals, which allows predicting values on a small interval of time. However, we can increase the degree of aggregation, which will allow forecasting over a longer interval.

III. CONCLUSION

The forecasting model and the obtained input values in the generalized formula for calculating the value of network equipment allowed to increase its number by 30%. Also the paper shows the correlation with the research related to packet-switched networks, and prove the invariance of the proposed method for calculating the number of network equipment to the method of switching and to the type of information transfer.

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