

An Analytical, Imitation and Experimental Design of Device of Surveillance is After Bearing Frequency

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Abstract – Speech goes in this lecture, about research of device of surveillance after bearing frequency, at the dynamic change of frequency on an entrance.

Keywords – imitation, spectrum, surveillance, autocorrelation, error, detector.

I. INTRODUCTION

As known devices of surveillance after bearing frequency behave to the class stochastic nonlinear systems which have casual character sometimes. In most cases for their decision used the methods of linearizing, which influence on exactness, and firmness of their work, that substantially enough at the choice of optimum parameters of device of surveillance. Therefore one of methods of decision such substantial questions there is the use of simulation models of device, which enable verification of optimum parameters, got an analytical decision.

II. INSTRUCTION FOR AUTHORS

Research of device of surveillance was conducted, at the dynamic change of frequency on an entrance – that is one of cases where it is necessary to provide high exactness and speed of surveillance after bearing frequency.

By the first task for the decision of this question is a construction of mathematical model of device. For the construction of mathematical model the classic flow diagram of device of surveillance was used, represented on pic.1, which is widespread enough and known. Mathematical models were built for 2 cases of device of surveillance of the second order, with the use of integrating and proportionally integrating to the filter in a circle.

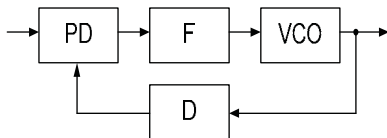


Figure.1 The Flow diagram of PLL (PD is a phase detector, F - is a filter of lower frequencies, VCO - a voltage controller oscillator, D - is divisor of frequency).

Used got dependence from the decisions of mathematical model, the dynamic and statistical error of device was certain at the dynamic change of frequency on an entrance. For determination of it minimum value the method of surplus of values of basic parameters of device used, such as a stripe maintenances, permanent to time of filter, and transmission descriptions of generator guided by tension (GKN) and phase detector (FD), and also parameters of entrance signal basic from which are speed of growth of entrance signal and character of

change of frequency. To save firmness of work of device at variations of parameters, logarithmic gain-frequency characteristics are used.

Used MATLAB Simulink software, and got results of analytical decision, the simulation model of device of surveillance was built after bearing frequency.

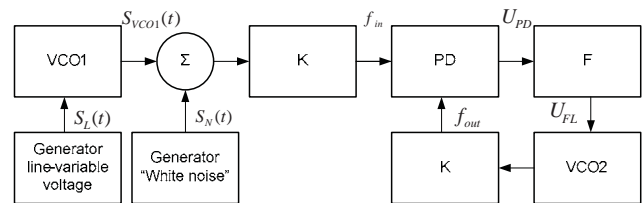


Figure.2 Imitation model device PLL

In quality comparative descriptions, work of device, spectral and cross-correlation descriptions used.

Like, as well as in an analytical design, imitation research was conducted for two types of device of surveillance of the second order. The got results showed, spectral descriptions of entrance and initial signal coincide. On high-frequencies evidently display of odd accordions of impulsive signal that is naturally.

That to the cross-correlation function, then it gathers with the autocorrelative function of input-output signal, substantial also there is that the Y-level of lateral petals makes thousandth from a central peak which talks about high repetition of output signal in regard to an input-output.

A limit of change of optimum parameters is little enough, one of examples there can be comparative description of device at the narrowed band of fascination on 10%, that resulted in occurring on LFS of accordions, what talk about derangement, transgressing of work of device from the regime of fascination in the mode of beating, that increase of duration of transient, which is more than speed of change of entrance signal which already is wrong.

III. CONCLUSION

Consequently, a question of choice of optimum parameters for the device of surveillance after bearing frequency is substantial enough even for today. The use of today's programmatic to provide allows to decide this question, from provide of high exactness, and to firmness of work of device.

REFERENCES

- [1] Systems of phase synchronization with the elements of discretisation / with red. V.V. Shahgildyan. – Radio & connection. – 1989.
- [2] Theory of the systems of automatic management / Besekerskiy V.A. Popov E.P. is a publ. «Profession». – 2003.