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MECHANISMS FOR INCREASING THE NOISE RESISTANCE OF ANALOG BLOCKS OF INFORMATION MEASURING SYSTEMS

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ANNOTATION

Modern methods and means of data transmission are mainly aimed at transmitting large amounts of information at high speeds and relatively low noise and signal distortion in the communication line.

Keywords: information measurement systems, analog block, noise resistance, low noise, vibration, communication line

INTRODUCTION

In modern telemetry information systems (TEIS), regardless of their purpose, the measurement data received from the sensors are transmitted over significant distances so that it can be restored on the side of the addressee with a certain accuracy. To do this, the primary measurement data is first processed and then transmitted over a communication line. Modern methods and means of data transmission are mainly aimed at transmitting large volumes of information at high speeds and under relatively low noise and signal line signal conditions, so their use in CIIS is not always recommended. There are many systems in which the volumes of transmitted measurement data are not significant, but the transmission of a modulated signal is accompanied by distortion in the communication line due to its Doppler propagation, dispersion properties of the medium, and dispersion properties. the effect of various noises on it; in this case the signal-to-noise ratio on the communication line drops to values less than one. One of the most important parameters of CIMS operating under these conditions is noise immunity, which is mainly determined by the noise resistance of communication equipment. In some cases, the use of complex communication devices in such a CIIS is impractical. This may be due to low cost, high reliability, one-time use of individual parts, simplification of design, etc. the development of data methods and tools that will allow to increase. and relevant research task.Increase the noise immunity of CIIS operating in conditions where the signal distortion and signal-to-noise ratio in the communication line is less than one unit without increasing the complexity of the equipment.Algorithm concept has existed since ancient times. To achieve this goal, the following tasks must be solved:

- Study of signals whose parameters do not change to the disturbances in the communication line (narrowing of the range, violation of the phase relationships in the signal spectrum);
- Development of a method for transmitting discrete measurement data to CIMS, which does not require complex hardware, providing high noise immunity of CIIS in the case of signal distortion. communication and signal-to-noise ratio is less than one, including: carrier signal modulation method and noise-resistant demodulation algorithm that does not change under the influence of destabilizing factors (frequency instability, Doppler propagation, change of phase relationships between elements). signal spectrum, signal-to-noise ratio less than one);
- assessment of the noise resistance of the developed method;

- ❖ Experimental testing of the method;
- ❖ The solution of the identified tasks was carried out using the theory of information and measurement systems, telemechanics, digital communication, statistical radio engineering. Theoretical results were confirmed by computer simulation as well as practical implementation of a discrete measurement data transmission device. Scientific novelty of the work. A new method of noise-tolerant data transmission has been developed in the CIIS, which operates in conditions where the signal distortion and signal-to-noise ratio on the communication line is less than one, including;
- ❖ A new method of noise-like signal modulation; New autocorrelation demodulation algorithm.

The developed method differs in the application of a signal repetition period similar to that of the carrier noise as the modulated parameter that is least sensitive to distortions in transmission over the communication line for the transmission of discrete measurement data. To do this, the information signals on the transmitting side of the CIMS are compared with periodic composite signals with different repetition cycles of the noise-like signal and are based on the analysis of the reverse transformation on the receiving side of the CIMS. the values of the autocorrelation function (ACF) of the received signals or its envelopes at several points corresponding to the maximum of the ACF lateral lobes of the transmitted signals. data acquisition, data transmission via radio relays, troposphere and other communication lines. the transmitted signal is distorted. The developed method of discrete measurement data transmission uses autocorrelation demodulation algorithms; devices based on them do not require storing a copy of the transmitted signal on the receiving side and ensuring its synchronization with the received signal, which significantly simplifies the CIIS communication equipment and provides fast transmission of small amounts of data. and software modules can be recommended for use in the development of CIMS operating in signal distortion and noise conditions on the communication line.

Arithmetic algorithms, for example, were division algorithms. Used by ancient Babylonian mathematicians c. 2500 BC and Egyptian mathematicians c. 1550 BC. Later, in 240 BC, mathematicians used algorithms to find prime numbers in the Eratosthenes sieve, and the Euclidean algorithm to find the greatest common divisor of two numbers. Arab mathematicians such as al-Kindi used cryptographic algorithms in the 9th century to decode code based on frequency analysis. The word algorithm itself is derived from the name of the 9th century mathematician Muhammad ibn Musa al-Khwarizmi, whose ratio (defining it as Khorezmian) is Latinized as Algorithm. It is determined from a combination of metrological characteristics of information-measuring systems (AMS) and the properties of the elements of the measuring channel. IMS tools with different functions and hardware.

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Cleaning equipment includes the removal of dust, moisture, and corrosion from it.The most time-consuming part of preventive maintenance is closely related to inspection and adjustment work and fault prediction. Control work involves checking the REA parameters relative to the specified tolerances. Adjustments are made to restore the missing features or performance of the equipment. For home electronics, work is underway at this stage to reduce the fire risk of televisions and restore the performance of kinescopes that have lost cathode emissions after long-term operation. a method of predicting faults based on the assumption that they are related to a gradual change. Forecasting is carried out for step-by-step failures in order to replace (repair, adjust) the relevant elements and blocks in a timely manner. The basis of metrology is the general problems of opening, information about the units of physical quantities and their systems, methods and means of opening, methods of determining the accuracy of the results of opening, and so on. The physical dimensions of the opening can be mechanical, electrical, thermal, optical, acoustic. While one type of these quantities is a direct indicator of the development of a technological process, others are functionally related to that process. The more accurate and objective the information, the deeper the understanding of the true meaning of physical phenomena. A certain value of physical size is an important part of information about the development of a technological process. Information about the state of the technological process, expressed by various methods and tools, is called information. The information is obtained mainly by means of opening instruments and devices.

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