Error control methods for digital devices

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Abstract: Most modern communication systems work by means of the transmission digital information. It is known that due to the presence of the noise in the communication channels in the process of working of the digital device occur the errors, which distort the information. If the reason is the fail of the element of the device, the permanent distortion of information occurs and in the case of the noises one definite code combination replaces the other, that leads to the failure of the devise. Because of the occurrence of errors, it is necessary to provide the device with the system of control of the correctness of the circularizing information. The effective way of ant blackout is the noiseless coding, which is based on introducing artificial redundancy in sending message. In such control systems the following method of ant blackout is used: coding with errors detection, coding with errors correction. Methods of errors detection and correction use minimal code distance i.e. minimum number of symbols, in which all of the code combinations differ from each other. In common case, for detection r errors – minimal code distance $d0 = r + l$; for synchronous error detection and correction: $d0 = r + s + l$; where s - the number of detected errors. For codes only detecting errors $d0 = 2s + 1$. For computer system error detections linear periodic code is widely used. It is accepted to describe periodic number with the help of the generator polynomial $G(X)$ involution $m = n – k$, where m - the number checking symbols in code word. In the article the process of periodic codes for system errors detection, the choice of the constitutive polynomial according to the adjusted code dimension and detection adjustment capacity are observed.

Keywords: coding, noiseless code, periodic code, generator polynomial, errors detection.

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