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METHODS FOR IMPROVEMENT OF NOISE STABILITY IN INFORMATION TRANSMISSION SYSTEMS WITH OPTIMAL PREDISTORTION AND CORRECTION

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The paper considers some methods for improvement of efficiency and noise stability of information transmission systems with the use of optimal pre-emphasis and de-emphasis of signals. The main attention is paid at complicated noise situations, when a radio channel is attacked by high-power pilse interference, and when short-term interruptions in communication occur.

The methods of optimal linear and nonlinear pre-emphasis and de-emphasis of signals, aimed at improvement of efficiency and noise stability, have found wide application in the information transmission systems (ITS) [1–3]. In some cases it seems expedient to combine these methods with adaptive correction of signals, used not only in the reception channel of ITS but also in its transmitting part [4, 5].

There are reports about ITS with adaptive predistortion and correction of signals, which use combined adaptation of the predistorting and correcting filters both to a nonstationary signal and to a continuously changing additive interference [6]. However, such systems show relatively low noise stability when the channel is jammed with pulse interference of a considerable power or with additive mixture of pulse-type and fluctuative interference. To devoid this disadvantage, the block diagram of ITS, depicted in Fig. 1, is suggested.

This information transmission system operates as follows. The information signal, coming from the output of signal source *1*, passes through pre-emphasis filter *2* with variable AFR and is applied to the information input of a controllable (adaptive) compensating filter *3* designed for compensation of the information signal distortion in a whitening filter *5*. The latter serves for whitening the additive interference (fluctuative or pulse type). From the output of compensation filter *3* the information signal comes to communication channel *4*, and then — to the information input of whitening filter *5* with variable AFR, and to the input of interference selection unit *11* for suppressing the interference acting in the information channel. The output of whitening filter *5* is connected to the information input of a de-emphasis filter *6* with controllable AFR. From the de-emphasis filter output the corrected information signal, having the same shape as the signal at the output of source *1*, is applied to the input of information receiver *7*.

From the output of pre-emphasis filer *2* the signal is applied to the input of analyzer *9* of predistorted signal spectrum and, from its output — to the input of control channel *14* and to the controlling input the adaptive pre-emphasis filter *2*. From the controlling channel output the control signal is applied to the controlling input of adaptive de-emphasis filter *6* for adaptive variation of its AFR.

From the output of communication channel *4* the information signal and additive interference come to the input of interference selection unit *11*, whose block diagram is shown in Fig. 2.

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