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MULTITHRESHOLD DECODERS: HARDWARE PERSPECTIVES

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The development of methods of digital transmission and data processing requires a high veracity of the transmitted information. The most effective means of the digital information veracity increase is the application of noiseproof coding. The review of the most perspective coding methods by yardstick "efficiency - productivity" was made in [1], where it was indicated, that the greatest preference the multithreshold decoders (MTD) merit in high-velocity satellite channels [2]. Capabilities of these new methods of error correction below are described, which one were designed as a hardware for satellite communications systems built in NIIRadio [3-5].

The new MTD decoder at PLIS Xilinx of the 200K has a code speed R=1/2, and speed from 160 up to 480 Mbits/s with a code gain (CG) G=7-8,5 dB. Thus the speed of decoding can else essentially heightened.

The increase of a code length for such MTD twice and application of concatenation with the parity check code allows to achieve CG levels, which one correspond to the classic scheme of Viterbi algorithm (VA) with a code of Read - Solomon. But the MTD concatenated implementation is much easier also it saves high speed of initial MTD algorithm.

It is possible to create MTD decoders, which one will work at energetic efficiency, at ~1,5 dB higher, than throughput capacity of a binary Gaussian channel. During 1,5 - 3 years achievements of energetic efficiency is planned, which one will exceed throughput capacity of a channel only at ~0,7 dB. The high speeds of decoding in hundreds megabits per second will be saved also..

The simple and simultaneously high-performance MTD algorithms create good capabilities for more full usage of real throughput of expensive channels satellite and the Space communication. If the VA application has allowed to use channel throughput with ~30 % efficiancy, the MTD application can increase productivity of a channel approximately twice. The MTD concatenation will increase efficiency of satellite channels till 75-80%. So MTD decoders have thus all capabilities to be algorithm with much more simple implementation, than known now other methods of error correction.

The large volume of the new scientific, educational and methodical information about algorithms of the MTD class can be found on the web-site [6].

The literature

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