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## OPTIMUM DECODERS AND MULTITHRESHOLD ALGORITHMS FOR HIGH-SPEED SATELLITE NETWORKS

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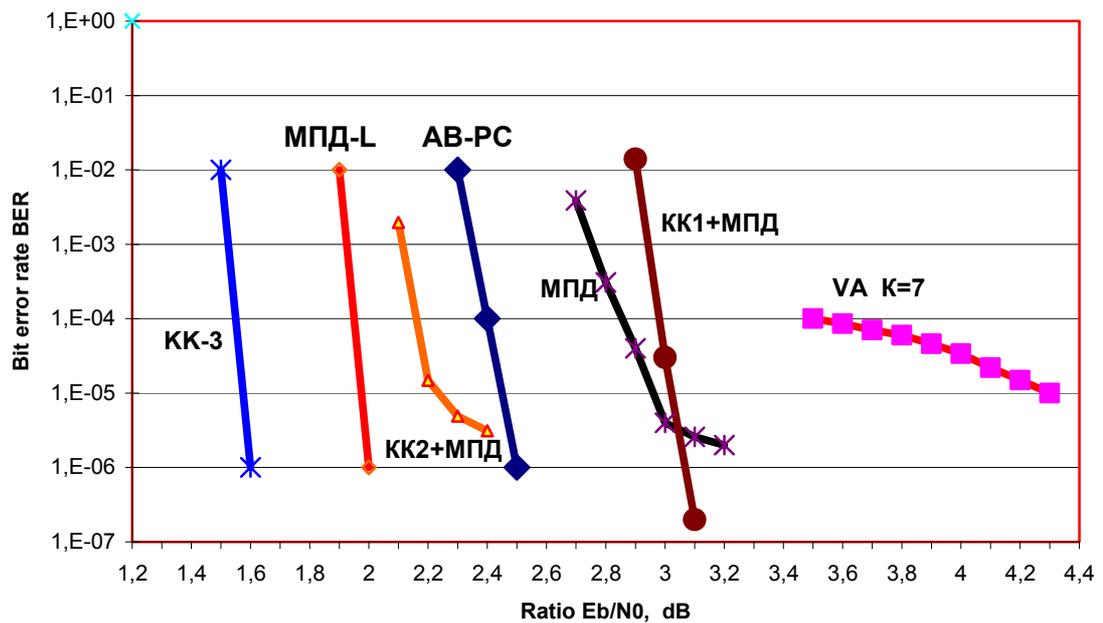
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All advanced countries have already generated programs of transition to digital processing and data transmission. The leading part at the decision of the most complicated problem of digital communication reliability is allocated to powerful modern methods of noiseproof coding.

The first big technological revolution became the decoders working with Viterbi algorithm (VA). The diagram of its error rate at code speed  $R=1/2$  for length  $K=7$  and Gaussian noise, is submitted on fig. 1, and for concatenated code VA and Reed – Solomon code diagram AB-PC is given.

But at comparable efficiency of coding and the subsequent decoding there are methods, in particular, multithreshold algorithms (MTD) [1,3] which for some typical parameters actually at 2 decimal orders is easier on number of operations than for a turbo decoders [4].

**MTD Decoder Performance with PLIS Xilinx  
Results 2005 Year**



At pict.1 last achievements are submitted in the field of high-speed decoders such as MTD on modern PLIS for code rate  $R \sim 1/2$ . Curve for MTD (MПД) concerns to development for convolutional MTD on the basis PLIS Xilinx [2] for the speed up to 480 Mbit/s. The concatenated circuit with usage of the same code with MTD and a code of the control over parity (CCP) provides the characteristics shown on diagram "KK1+MПД".

Curve "KK2+MПД" corresponds MTD decoder with a memory size increased in comparison with the first example in 1,4 times, which one is concatenated with the same CCP. The diagram MПД-L is

resulted for MTD decoder with 40 iterations of decoding. It is the usual basic decoder, i.e. it does not concern at all to concatenated schemes. The diagram KK-3 shows opportunities of the concatenated circuit with the MTD use in internal cascades. Operating levels  $E_b/N_0$  less than 1 dB are planned to achieve within the nearest year.

**Conclusions:** MTD decoders have record speed and the big code gain that is important in high-speed channels. In most cases high efficiency of program variants of MTD decoders is sufficient even for their application in various television systems.

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### The literature

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