Forced Sequence Sequential Decoding - DTU Orbit (04/10/2019)

Forced Sequence Sequential Decoding: A concatenated coding system with iterated sequential inner decoding

We describe a new concatenated decoding scheme based on iterations between an inner sequentially decoded convolutional code of rate $R=1/4$ and memory $M=23$, and block interleaved outer Reed-Solomon (RS) codes with nonuniform profile. With this scheme decoding with good performance is possible as low as $Eb/N0=0.6$ dB, which is about 1.25 dB below the signal-to-noise ratio (SNR) that marks the cutoff rate for the full system. Accounting for about 0.45 dB due to the outer codes, sequential decoding takes place at about 1.7 dB below the SNR cutoff rate for the convolutional code. This is possible since the iteration process provides the sequential decoders with side information that allows a smaller average load and minimizes the probability of computational overflow. Analytical results for the probability that the first RS word is decoded after $C$ computations are presented. These results are supported by simulation results that are also extended to other parameters.

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