

Analysis of Joint Source Channel LDPC Coding for Correlated Sources Transmission over Noisy Channels

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Abstract : In this paper, a Joint Source Channel coding scheme based on LDPC codes is investigated. We consider two concatenated LDPC codes, one allows to compress a correlated source and the second to protect it against channel degradations. The original information can be reconstructed at the receiver by a joint decoder, where the source decoder and the channel decoder run in parallel by transferring extrinsic information. We investigate the performance of the JSC LDPC code in terms of Bit-Error Rate (BER) in the case of transmission over an Additive White Gaussian Noise (AWGN) channel, and for different source and channel rate parameters. We emphasize how JSC LDPC presents a performance tradeoff depending on the channel state and on the source correlation. We show that, the JSC LDPC is an efficient solution for a relatively low Signal-to-Noise Ratio (SNR) channel, especially with highly correlated sources. Finally, a source-channel rate optimization has to be applied to guarantee the best JSC LDPC system performance for a given channel.

Keywords : AWGN channel, belief propagation, joint source channel coding, LDPC codes

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