Differentiated Assignment of Extrinsic Information in Iterated Decoding of Fixed Weight Codewords

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Abstract—**Constant amplitude multi-code (CAMC) CDMA has the same structure as a recursively generated single parity check product code. A top-level codeword of CAMC is recursively constructed from lower-level codewords. In the iterative decoding of CAMC, log likelihood ratio (LLR),** *a priori* **information and extrinsic information (EI) of a codeword is a weighted sum of LLR values of associated codewords from which it is despread or into which it is spread. In this paper, we show that differentiated assignment of EI in the computation of LLR can improve the performance of bit error correction. The weights of CAMC codewords are fixed at two fixed values. We let EI converge fast to saturation value when a codeword has the correct weight. The proposed method achieved performance improvement of 0.1 ~ 0.3 dB in E_b/N_0 over the regular iterated decoding of CAMC. When compared with despreading ON/OFF control, a gain of about 0.1 dB is achieved, which is meaningful near the Shannon capacity limit.**

Keyword— **Constant Amplitude Multi Code, Code Weight, Extrinsic Information, Iterated Decoding, Single Parity Check Product Code**

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