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Detection Scheme for Channels with Unknown Varying Offset

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Pearson distance-based detection [1] has been proposed to counter the effects of gain and/or offset mismatch in noisy channels, where the gain and the offset may change from word to word, but are constant for all transmitted symbols within a codeword. Here, we consider the situation where the offset varies linearly within a codeword. A detection technique for such channels is investigated in [2], where Pearson distance-based detection is used in conjunction with mass-centered codewords.

In this paper, we show that the use of Pearson distance-based detection in cooperation with a difference operator also offers immunity to gain and varying offset mismatch. In addition, pair-constrained codes are proposed for unambiguous decoding, where in each codeword, certain adjacent symbol pairs appear at least once. We investigate the cardinality and redundancy of these codes. The redundancy of pair-constrained codes is much lower than that of prior art mass-centered codes, which makes the new decoding scheme an attractive alternative for practical applications.

References

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