Comments and Corrections

Corrections to "Low-Complexity Concatenated LDPC-Staircase Codes"

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We discovered an error in formulating the target information bit error probability for the coded component of the inner code in [1]. The correct formulation for inequalities (11) and (20) of [1] is

$$L_0 p_0 + (1 - L_0) R_c P_t \leq p_{\text{sc}} R_{\text{in}}. \tag{1}$$

Therefore, the correct formulation for equation (12) of [1] is

$$L_0^{\max} = \frac{p_{\text{sc}} R_{\text{in}}}{p_0}. \tag{2}$$

There is effectively no change in the reported results for code designs at 15% overhead (OH), and there is a loss of no more than 0.05 dB for code designs at 20% and 25% OHs.

The ensembles presented in examples 1 and 2 of [1] are updated as follows.

Example 1: A forward error correction (FEC) scheme operating at 1.27 dB from the constrained Shannon limit. The optimization procedure yields the following ensemble for the inner code:

$$L(x) = 0.1556 + 0.1389x + 0.2941x^3 + 0.4113x^4,$$
$$R(x) = x^{24}.$$

This code requires a maximum of 9 iterations to bring the bit error rate (BER) below the outer-code threshold, which gives an inner-code complexity score of 25.59.

Example 2: An FEC scheme operating at 1 dB from the constrained Shannon limit. The optimization procedure yields the following ensemble for the inner code:

$$L(x) = 0.1480 + 0.1111x + 0.4539x^3 + 0.0911x^4 + 0.0973x^6 + 0.0985x^7,$$
$$R(x) = x^{28}.$$

This code requires a maximum of 18 iterations to bring the BER below the outer-code threshold, which gives an inner-code complexity score of 60.24.

We have posted the manuscript with corrected results on arXiv [2].

References

[1] M. Barakatain and F. R. Kschischang, "Low-complexity concatenated LDPC-staircase codes," *J. Lightw. Technol.*, vol. 36, no. 12, pp. 2443–2449, Jun. 2018.

[2] M. Barakatain and F. R. Kschischang, "Low-complexity concatenated LDPC-staircase codes," Sep. 2018. [Online]. Available: http://arxiv.org/abs/1803.01076v2

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