**Conclusion:**

In this paper, an FEC scheme was presented for the tradeoff among decoding delay, complexity, and performance according to user’s needs. The proposed scheme combining two decoders without interleaver has at least three merits:

1) Adaptive optimization;

2) Low average computation without performance loss;

3) Suitable for short packet transmissions.

The adaptive list decoder is superior to the single Malgorithm decoder with small survivor paths. Compared with SMAD in medium-to-high SNR region, the ALD has noticeable computational savings by hard decision decoding without performance loss. Moreover, the adaptive optimization mechanism makes TSHD suitable for WSNs applications.