On Concatenated Coding Scheme for High-Speed Ethernet

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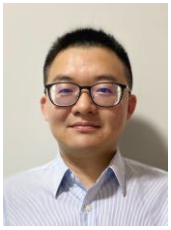
***Abstract*— A concatenated forward error correction (FEC) scheme, which takes a binary code and a Reed-Solomon code as its inner and outer code, respectively, has been adopted as one of the candidate schemes in the next-generation high-speed Ethernet standard (IEEE 802.3df). Unlike the other concatenated scheme used before, to possess a low latency feature, the interleaving depth in the new scheme is very small, such as 2 or 4. In this case, the bit error ratio (BER) performance evaluation at low BER needs mass computer simulation, and the BER analysis proposed for large interleaving depth is no longer suitable. We propose a new BER analysis for a concatenated coding scheme with a small interleaving depth in this work. From the simulation results, the analysis is very accurate at a large range of BER. We also show that, contrary to intuition, a short inner code outperforms a long inner code in concatenated decoding performance, even though the long code performs better without being concatenated with the outer code.**

***Keyword*— forward error correction, concatenated coding scheme, Reed-Solomon codes, soft-decision decoding, performance analysis**



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