Cellular Automata Based Byte Error Correcting Codes over Finite Fields

Mehmet E. Koroglu[1], Irfan Siap[1] and Hasan Akin[2]

[1]Department of Mathematics, Yildiz Technical University, Istanbul-Turkey

[2]Department of Mathematics, Education Faculty, Zirve University, Gaziantep, Turkey

Abstract

Reed-Solomon codes are very convenient for burst error correcting codes, but as the number of errors increase, the circuit structure for Reed-Solomon codes become very complex. The modular and regular structure of cellular automata can be constructed with VLSI economically. Therefore, in recent years, cellular automata have became an important tool for error correcting codes. For the first time cellular automata based byte error correcting codes analogous to extended Reed-Solomon codes over binary fields was studied by Chowdhury *et al.* in [1] and Bhaumik *et al.* improved that coding-decoding scheme in [2]. In this study cellular automata based double-byte error correcting codes are generalized from binary fields to primitive finite fields $\mathbb{Z}_p$.

References

[1] D. R. Chowdhury, I. Sen Gupta and P.P. Chaudhuri, CA-Based Byte Error- Correcting Code, *IEEE* Transaction on Computers 44 (3), 371-382, 1995.

[2] J. Bhaumik, D. R. Chowdhury, and I. Chakrabarti, An Improved Double Byte Error Correcting Code Using Cellular Automata, In Proc. 8th Int. Conf. Cellular Automat for Res. Ind. (ACRI), LNCS 5191, 463–470, 2008.