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Design of Long Period Pseudo-Random Sequences from the Addition of m -Sequences over F_p

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Abstract

Pseudo-random sequence with good correlation property and large linear span is widely used in code division multiple access (CDMA) communication systems and cryptology for reliable and secure information transmission. In this paper, sequences with long period, large complexity, balance statistics, and low cross-correlation property are constructed from the addition of m -sequences with pairwise-prime linear spans (AMPLS). Using m -sequences as building blocks, the proposed method proved to be an efficient and flexible approach to construct long period pseudo-random sequences with desirable properties from short period sequences. Applying the proposed method to \mathbb{F}_2 , a signal set $\left((2^n - 1)(2^m - 1), (2^n + 1)(2^m + 1), (2^{ln+1/2} + 1)(2^{lm+1/2} + 1) \right)$ is constructed.

Keywords

pseudo-random sequences, linear span/complexity, cross/autocorrelation, balance