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Nota di contenuto	Cover; Title Page; Contents; Preface; List of abbreviations; List of common symbols; 1 Introduction; 1.1 Prologue; 1.2 Elements of pseudo random signal processing; 1.3 Outline of the book; 2 Characterization of signals and sequences; 2.1 Classification of signals and sequences; 2.1.1 Morphological classification; 2.1.2 Phenomenological classification; 2.1.3 Energy classification; 2.1.4 Spectral classification; 2.2 Transformations of signals and sequences; 2.2.1 Basic transformations; 2.3 Correlation measures; 2.3.1 Autocorrelation and crosscorrelation functions 2.3.2 Discrete periodic correlation functions 2.3.3 Aperiodic correlation functions; 2.3.4 Other properties and relationships; 2.3.5 Correlation of binary sequences; 2.3.6 Orthogonality; 2.4 Power spectral density; 2.4.1 Power spectral density of analog signals; 2.4.2 Power spectral density of periodic signals; 2.4.3 Power spectral density of periodic pulse trains; 2.5 Pseudo random signals and sequences; 2.5.1 Pseudo randomness criteria; 2.5.2 Pseudo randomness and power spectral density; 2.5.3 Pseudo randomness and ployphase sequences; 3 Mathematical foundations; 3.1 Algebraic structures 3.1.1 Binary algebra, semigroup, and monoid 3.1.2 Groups, rings, and

fields; 3.2 Polynomials over finite fields; 3.2.1 Polynomials and polynomial rings; 3.2.2 Euclidean algorithm for polynomials; 3.2.3 Irreducible polynomials; 3.2.4 Cyclotomic cosets and minimal polynomials; 3.2.5 Primitive polynomials; 4 Binary pseudo random sequences; 4.1 Classification; 4.2 Maximal-length sequences; 4.2.1 Linear recurring sequences; 4.2.2 Maximal-length sequences; 4.2.3 Properties of maximal-length sequences; 4.2.4 Autocorrelation functions of maximal-length sequences
4.3 Binary sequences with good autocorrelation
4.3.1 Difference sets; 4.3.2 De Bruijn sequences; 4.3.3 Quadratic residue sequences; 4.3.4 Other difference set sequences; 4.3.5 Barker sequences and Williard sequences; 4.4 Binary sequences with special crosscorrelation; 4.4.1 Transorthogonal and orthogonal sequences; 4.4.2 Gold sequences; 4.4.3 Gold-like sequences; 4.4.4 Kasami sequences; 5 Nonbinary pseudo random sequences; 5.1 Classification; 5.2 Interference-free window sequences; 5.2.1 Large-area synchronous codes; 5.3 Complex-valued sequences; 5.3.1 Complex maximal-length sequences
5.3.2 Polyphase sequences
5.3.3 Quadriphase sequences; 5.4 Polyphase sequences with special correlations; 5.4.1 Equivalent odd and even correlation sequences; 5.4.2 Oppermann sequences; 6 Generating pseudo random signals; 6.1 Linear autonomous automata; 6.1.1 Mathematical description; 6.1.2 Canonical forms; 6.1.3 State cycles; 6.2 Generating maximal-length sequences; 6.2.1 Standard circuits for binary maximal-length sequences; 6.2.2 Special cases of modulo 2 arithmetic; 6.2.3 High-speed sequence generation; 6.2.4 Nonbinary sequence generation with binary encoding
6.3 Transformations of maximal-length sequences

Sommario/riassunto

In recent years, pseudo random signal processing has proven to be a critical enabler of modern communication, information, security and measurement systems. The signal's pseudo random, noise-like properties make it vitally important as a tool for protecting against interference, alleviating multipath propagation and allowing the potential of sharing bandwidth with other users. Taking a practical approach to the topic, this text provides a comprehensive and systematic guide to understanding and using pseudo random signals. Covering theoretical principles, design methodologies and applications
