1. Record Nr. UNINA9910143311403321

Titolo	Spectral analysis [[electronic resource]] : parametric and non-parametric digital methods / / edited by Francis Castanie
Pubbl/distr/stampa	London ; ; Newport Beach, CA, : ISTE Ltd., 2006
ISBN	1-280-60344-5 9786610603442 1-84704-455-7 0-470-61219-3 0-470-39444-7 1-84704-555-3
Descrizione fisica	1 online resource (264 p.)
Collana	Digital signal and image processing series
Altri autori (Persone)	CastanieFrancis
Disciplina	621.382/2
Soggetti	Signal processing - Digital techniques Spectrum analysis - Statistical methods
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Spectral Analysis; Table of Contents; Preface; Specific Notations; PART I. Tools and Spectral Analysis; Chapter 1. Fundamentals; 1.1. Classes of signals; 1.1.1. Deterministic signals; 1.1.2. Random signals; 1.2. Representations of signals; 1.2.1. Representations of deterministic signals; 1.2.1.1. Complete representations; 1.2.1.2. Partial representations; 1.2.2. Representations of random signals; 1.2.2.1. General approach; 1.2.2.2. 2nd order representations; 1.2.2.3. Higher order representations; 1.3. Spectral analysis: position of the problem; 1.4. Bibliography Chapter 2. Digital Signal Processing2.1. Introduction; 2.2. Transform properties; 2.2.1. Some useful functions and series; 2.2.2. Fourier transform; 2.2.3. Fundamental properties; 2.2.4. Convolution sum; 2.2.5. Energy conservation (Parseval's theorem); 2.2.6. Other properties; 2.2.7. Examples; 2.2.8. Sampling; 2.2.9. Practical calculation, FFT; 2.3. Windows; 2.4. Examples of application; 2.4.1. LTI systems identification; 2.4.2. Monitoring spectral lines; 2.4.3. Spectral analysis of the coefficient of tide fluctuation; 2.5. Bibliography; Chapter

3. Estimation in Spectral Analysis

3.1. Introduction to estimation3.1.1. Formalization of the problem; 3.1.2. Cramer-Rao bounds; 3.1.3. Sequence of estimators; 3.1.4. Maximum likelihood estimation; 3.2. Estimation of 1st and 2nd order moments; 3.3. Periodogram analysis; 3.4. Analysis of estimators based on cxx (m); 3.4.1. Estimation of parameters of an AR model; 3.4.2. Estimation of a noisy cisoid by MUSIC; 3.5. Conclusion; 3.6. Bibliography; Chapter 4. Time-Series Models; 4.1. Introduction; 4.2. Linear models; 4.2.1. Stationary linear models; 4.2.2. Properties; 4.2.2.1. Stationarity; 4.2.2.2. Moments and spectra
4.2.2.3. Relation with Wold's decomposition4.2.3. Non-stationary linear models; 4.3. Exponential models; 4.3.1. Deterministic model; 4.3.2. Noisy deterministic model; 4.3.3. Models of random stationary signals; 4.4. Non-linear models; 4.5. Bibliography; PART II. Non-Parametric Methods; Chapter 5. Non-Parametric Methods; 5.1. Introduction; 5.2. Estimation of the power spectral density; 5.2.1. Filter bank method; 5.2.2. Periodogram method; 5.2.3. Periodogram variants; 5.3. Generalization to higher order spectra; 5.4. Bibliography; PART III. Parametric Methods
Chapter 6. Spectral Analysis by Stationary Time Series Modeling6.1. Parametric models; 6.2. Estimation of model parameters; 6.2.1. Estimation of AR parameters; 6.2.2. Estimation of ARMA parameters; 6.2.3. Estimation of Prony parameters; 6.2.4. Order selection criteria; 6.3. Properties of spectral estimators produced; 6.4. Bibliography; Chapter 7. Minimum Variance; 7.1. Principle of the MV method; 7.2. Properties of the MV estimator; 7.2.1. Expressions of the MV filter; 7.2.2. Probability density of the MV estimator; 7.2.3. Frequency resolution of the MV estimator
7.3. Link with the Fourier estimators

Sommario/riassunto

This book deals with these parametric methods, first discussing those based on time series models, Capon's method and its variants, and then estimators based on the notions of sub-spaces. However, the book also deals with the traditional "analog" methods, now called non-parametric methods, which are still the most widely used in practical spectral analysis.