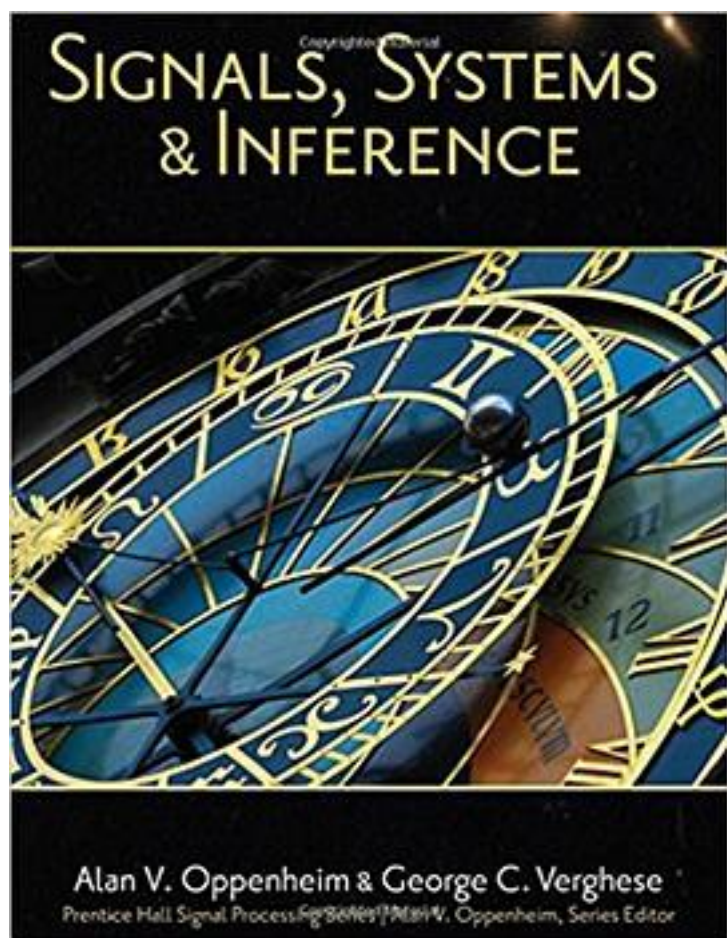


Signals Systems and Inference



[Signals Systems and Inference 下载链接1](#)

著者:Alan V Oppenheim

出版者:Pearson

出版时间:2015-4-11

装帧:Hardcover

isbn:9780133943283

Signals, Systems and Inference is a comprehensive text that builds on introductory courses in time- and frequency-domain analysis of signals and systems, and in probability. Directed primarily to upper-level undergraduates and beginning graduate

students in engineering and applied science branches, this new textbook pioneers a novel course of study. Instead of the usual leap from broad introductory subjects to highly specialized advanced subjects, this engaging and inclusive text creates a study track for a transitional course. Properties and representations of deterministic signals and systems are reviewed and elaborated on, including group delay and the structure and behavior of state-space models.

The text also introduces and interprets correlation functions and power spectral densities for describing and processing random signals. Application contexts include pulse amplitude modulation, observer-based feedback control, optimum linear filters for minimum mean-square-error estimation, and matched filtering for signal detection. Model-based approaches to inference are emphasized, in particular for state estimation, signal estimation, and signal detection. The text explores ideas, methods and tools common to numerous fields involving signals, systems and inference: signal processing, control, communication, time-series analysis, financial engineering, biomedicine, and many others. Signals, Systems, and Inference is a long-awaited and flexible text that can be used for a rigorous course in a broad range of engineering and applied science curricula.

作者介绍:

目录: Preface
Acknowledgments
Prologue
1 Signals and Systems
1.1 Signals, Systems, Models, and Properties
1.1.1 System Properties
1.2 Linear, Time-Invariant Systems
1.2.1 Impulse-Response Representation of LTI Systems
1.2.2 Eigenfunction and Transform Representation of LTI Systems
1.2.3 Fourier Transforms
1.3 Deterministic Signals and Their Fourier Transforms
1.3.1 Signal Classes and Their Fourier Transforms
1.3.2 Parseval's Identity, Energy Spectral Density, and Deterministic Autocorrelation
1.4 Bilateral Laplace and Z-Transforms
1.4.1 The Bilateral z-Transform
1.4.2 The Bilateral Laplace Transform
1.5 Discrete-Time Processing of Continuous-Time Signals
1.5.1 Basic Structure for DT Processing of CT Signals
1.5.2 DT Filtering and Overall CT Response
1.5.3 Nonideal D/C Converters
1.6 Further Reading
2 Amplitude, Phase, and Group Delay
2.1 Fourier Transform Magnitude and Phase
2.2 Group Delay and the Effect of Nonlinear Phase
2.2.1 Narrowband Input Signals
2.2.2 Broadband Input Signals
2.3 All-Pass and Minimum-Phase Systems
2.3.1 All-Pass Systems
2.3.2 Minimum-Phase Systems
2.4 Spectral Factorization
2.5 Further Reading

- 3 Pulse-Amplitude Modulation
 - 3.1 Baseband Pulse-Amplitude Modulation
 - 3.1.1 TheTransmittedSignal
 - 3.1.2 TheReceivedSignal
 - 3.1.3 Frequency-Domain Characterizations
 - 3.1.4 Intersymbol Interference at the Receiver
 - 3.2 NyquistPulses
 - 3.3 Passband Pulse-Amplitude Modulation
 - 3.3.1 Frequency-Shift Keying (FSK)
 - 3.3.2 Phase-ShiftKeying (PSK)
 - 3.3.3 Quadrature-Amplitude Modulation (QAM)
 - 3.4 FurtherReading
- 4 State-Space Models
 - 4.1 SystemMemory
 - 4.2 IllustrativeExamples
 - 4.3 State-SpaceModels
 - 4.3.1 DTState-SpaceModels
 - 4.3.2 CTState-SpaceModels
 - 4.3.3 Defining Properties of State-Space Models
 - 4.4 State-Space Models from LTI Input-Output Models
 - 4.5 Equilibria and Linearization of Nonlinear State-Space Models
 - 4.5.1 Equilibrium
 - 4.5.2 Linearization
 - 4.6 FurtherReading
- 5 LTI State-Space Models
 - 5.1 Continuous-Time and Discrete-Time LTI Models
 - 5.2 Zero-Input Response and Modal Representation
 - 5.2.1 UndrivenCTSystems
 - 5.2.2 UndrivenDTSystems
 - 5.2.3 Asymptotic Stability of LTI Systems
 - 5.3 General Response in Modal Coordinates
 - 5.3.1 DrivenCTSystems
 - 5.3.2 DrivenDTSystems
 - 5.3.3 Similarity Transformations and Diagonalization
 - 5.4 Transfer Functions, Hidden Modes, Reachability, and Observability
 - 5.4.1 Input-State-Output Structure of CT Systems
 - 5.4.2 Input-State-Output Structure of DT Systems
 - 5.5 FurtherReading
- 6 State Observers and State Feedback
 - 6.1 Plant andModel
 - 6.2 StateEstimationandObservers
 - 6.2.1 Real-TimeSimulation
 - 6.2.2 TheStateObserver
 - 6.2.3 ObserverDesign
 - 6.3 StateFeedbackControl
 - 6.3.1 Open-LoopControl
 - 6.3.2 Closed-Loop Control via LTI State Feedback
 - 6.3.3 LTISTateFeedbackDesign
 - 6.4 Observer-Based Feedback Control
 - 6.5 FurtherReading
- 7 Probabilistic Models
 - 7.1 The Basic Probability Model
 - 7.2 Conditional Probability, Bayes' Rule, and Independence
 - 7.3 Random Variables

- 7.4 Probability Distributions
- 7.5 Jointly Distributed Random Variables
- 7.6 Expectations, Moments, and Variance
- 7.7 Correlation and Covariance for Bivariate Random Variables
- 7.8 A Vector-Space Interpretation of Correlation Properties
- 7.9 Further Reading
- 8 Estimation
 - 8.1 Estimation of a Continuous Random Variable
 - 8.2 From Estimates to the Estimator
 - 8.2.1 Orthogonality
 - 8.3 Linear Minimum Mean Square Error Estimation
 - 8.3.1 Linear Estimation of One Random Variable from a Single Measurement of Another
 - 8.3.2 Multiple Measurements
 - 8.4 Further Reading
- 9 Hypothesis Testing
 - 9.1 Binary Pulse-Amplitude Modulation in Noise
 - 9.2 Hypothesis Testing with Minimum Error Probability
 - 9.2.1 Deciding with Minimum Conditional Probability of Error
 - 9.2.2 MAP Decision Rule for Minimum Overall Probability of Error
 - 9.2.3 Hypothesis Testing in Coded Digital Communication
 - 9.3 Binary Hypothesis Testing
 - 9.3.1 False Alarm, Miss, and Detection
 - 9.3.2 The Likelihood Ratio Test
 - 9.3.3 Neyman-Pearson Decision Rule and Receiver Operating Characteristic
 - 9.4 Minimum Risk Decisions
 - 9.5 Further Reading
- 10 Random Processes
 - 10.1 Definition and Examples of a Random Process
 - 10.2 First- and Second-Moment Characterization of Random Processes
 - 10.3 Stationarity
 - 10.3.1 Strict-Sense Stationarity
 - 10.3.2 Wide-Sense Stationarity
 - 10.3.3 Some Properties of WSS Correlation and Covariance Functions
 - 10.4 Ergodicity
 - 10.5 Linear Estimation of Random Processes
 - 10.5.1 Linear Prediction
 - 10.5.2 Linear FIR Filtering
 - 10.6 LTI Filtering of WSS Processes
 - 10.7 Further Reading
- 11 Power Spectral Density
 - 11.1 Spectral Distribution of Expected Instantaneous Power
 - 11.1.1 Power Spectral Density
 - 11.1.2 Fluctuation Spectral Density
 - 11.1.3 Cross-Spectral Density
 - 11.2 Expected Time-Averaged Power Spectrum and the Einstein-Wiener-Khinchin Theorem
 - 11.3 Applications
 - 11.3.1 Revealing Cyclic Components
 - 11.3.2 Modeling Filters
 - 11.3.3 Whitening Filters
 - 11.3.4 Sampling Bandlimited Random Processes
 - 11.4 Further Reading
- 12 Signal Estimation
 - 12.1 LMMSE Estimation for Random Variables

- 12.2 FIR Wiener Filters
- 12.3 The Unconstrained DT Wiener Filter
- 12.4 Causal DT Wiener Filtering
- 12.5 Optimal Observers and Kalman Filtering
 - 12.5.1 Causal Wiener Filtering of a Signal Corrupted by Additive Noise
 - 12.5.2 Observer Implementation of the Wiener Filter
 - 12.5.3 Optimal State Estimates and Kalman Filtering
- 12.6 Estimation of CT Signals
- 12.7 Further Reading
- 13 Signal Detection
 - 13.1 Hypothesis Testing with Multiple Measurements
 - 13.2 Detecting a Known Signal in I.I.D. Gaussian Noise
 - 13.2.1 The Optimal Solution
 - 13.2.2 Characterizing Performance
 - 13.2.3 Matched Filtering
 - 13.3 Extensions of Matched-Filter Detection
 - 13.3.1 Infinite-Duration, Finite-Energy Signals
 - 13.3.2 Maximizing SNR for Signal Detection in White Noise
 - 13.3.3 Detection in Colored Noise
 - 13.3.4 Continuous-Time Matched Filters
 - 13.3.5 Matched Filtering and Nyquist Pulse Design
 - 13.3.6 Unknown Arrival Time and Pulse Compression
 - 13.4 Signal Discrimination in I.I.D. Gaussian Noise
 - 13.5 Further Reading
- Bibliography
- Index
- • • • • • [\(收起\)](#)

[Signals Systems and Inference 下载链接1](#)

标签

信号与系统

统计信号处理

奥本海姆

评论

[Signals Systems and Inference 下载链接1](#)

书评

[Signals Systems and Inference 下载链接1](#)