

DETECTION AND ESTIMATION THEORY



Thomas A. Schonhoff | Arthur A. Giordano

Detection And Estimation

H. Vincent Poor



Detection And Estimation:

An Introduction to Signal Detection and Estimation H. Vincent Poor, 2013-06-29 The purpose of this book is to introduce the reader to the basic theory of signal detection and estimation. It is assumed that the reader has a working knowledge of applied probability and random processes such as that taught in a typical first semester graduate engineering course on these subjects. This material is covered for example in the book by Wong 1983 in this series. More advanced concepts in these areas are introduced where needed primarily in Chapters VI and VII where continuous time problems are treated. This book is adapted from a one semester second tier graduate course taught at the University of Illinois. However, this material can also be used for a shorter or first tier course by restricting coverage to Chapters I through V which for the most part can be read with a background of only the basics of applied probability including random vectors and conditional expectations. Sufficient background for the latter option is given for example in the book by Thomas 1986 also in this series.

Quantum Detection and Estimation Theory Helstrom, 1976-07-06 *Quantum Detection and Estimation Theory* **Signal Detection and Estimation** Mourad Barkat, 2005 This newly revised edition of a classic Artech House book provides you with a comprehensive and current understanding of signal detection and estimation. Featuring a wealth of new and expanded material, the second edition introduces the concepts of adaptive CFAR detection and distributed CA CFAR detection. The book provides complete explanations of the mathematics you need to fully master the material including probability theory, distributions, and random processes. *Detection and Estimation* Dimitri Kazakos, P. Papantoni-Kazakos, 1990 **Statistical**

Signal Processing Louis L. Scharf, Cédric Demeure, 1991 This book embraces the many mathematical procedures that engineers and statisticians use to draw inference from imperfect or incomplete measurements. This book presents the fundamental ideas in statistical signal processing along four distinct lines: mathematical and statistical preliminaries, decision theory, estimation theory, and time series analysis. **Principles of Signal Detection and Parameter Estimation** Bernard C. Levy, 2008-12-16 As a discipline, signal detection has evolved significantly over the last 40 years. Some changes have been caused by technical advances like the development of robust detection methods or the use of the theory of large deviations to characterize the asymptotic performance of tests, but most changes have been caused by transformations in the engineering systems to which detection techniques are applied. While early applications of signal detection focused on radar and sonar, signal processing or the design of digital communication receivers, newer areas of application include image analysis and interpretation, document authentication, biometrics, and sensor or actuator failure detection. This expanded scope of application has required some adjustment in standard ways of formulating detection problems. For example, image processing applications typically combine parameter estimation and detection tasks, so the separation of parameter estimation and detection in distinct operations typical of early communication systems, where parameter estimation was accomplished through the use of training signals, needs to be abandoned. Other changes have occurred in the design of communication systems which make it

increasingly difficult to treat the detection of communications signals and of radar sonar signals in a unified manner. This common framework assumes implicitly that intersymbol interference is not present and that channel coding and modulation are implemented separately since in this case modulated signals can be detected one symbol at a time. But modern communication systems are typically designed to operate over bandlimited channels where intersymbol interference is present and starting with the introduction of trellis coded modulation modulation and coding have become intertwined. Detection and Estimation for Communication and Radar Systems Kung Yao, Flavio Lorenzelli, Chiao-En Chen, 2013-01-17. Covering the fundamentals of detection and estimation theory this systematic guide describes statistical tools that can be used to analyze design implement and optimize real world systems. Detailed derivations of the various statistical methods are provided ensuring a deeper understanding of the basics. Packed with practical insights it uses extensive examples from communication telecommunication and radar engineering to illustrate how theoretical results are derived and applied in practice. A unique blend of theory and applications and over 80 analytical and computational end of chapter problems make this an ideal resource for both graduate students and professional engineers. Detection, Estimation, and Modulation Theory, Part III

Harry L. Van Trees, 2004-03-24. Paperback reprint of one of the most respected classics in the history of engineering publication. Together with the reprint of Part I and the new Part IV this will be the most complete treatment of the subject available. Provides a highly readable discussion of Signal Processing and Noise. Features numerous problems and illustrations to help promote understanding of the topics. Contents are highly applicable to current systems. **Optimum Array Processing** Harry L. Van Trees, 2002-04-04. Array Processing ist eine wichtige Anwendung im Bereich der digitalen Signalverarbeitung. Eingesetzt wird sie u.a. in der Radar Sonar und Kommunikationstechnik in der Seismologie und der Biomedizintechnik. Van Trees zweibändiges Werk Detection Estimation and Modulation Theory das 1972 vom Wiley College Department herausgegeben wurde war damals ein echter Klassiker. Array Processing Detection and Estimation Theory ist das aktuellste und umfassendste Buch zu diesem Thema. Auf 1 400 Seiten wird die Array Signalverarbeitung umfassend und enzyklopädisch erläutert. Dabei werden auch alle modernen Anwendungen von der Biomedizin bis hin zur drahtlosen Kommunikation berücksichtigt. Jedes Kapitel enthält eine Zusammenfassung Beispiele und zahlreiche Problemstellungen. Der Stoff ist übersichtlich gegliedert und wird anschaulich und verständlich vermittelt. Array Processing Detection and Estimation Theory ist ein topaktuelles Nachschlagewerk im Doppelpack. Zum Buch gehört die nachgedruckte Broschurausgabe des zweibändigen Vorgängertitels der eine ideale Einführung in die komplexe Theorie bietet die im aktuellen Band behandelt wird.

Detection, Estimation, and Modulation Theory, Part I Harry L. Van Trees, 2001. Highly readable paperback reprint of one of the great time tested classics in the field of signal processing. Together with the reprint of Part III and the new Part IV this will be the most complete treatment of the subject available. As imperative today as it was when it originally published. Has important applications in radar sonar communications seismology biomedical engineering and astronomy. Includes

section summaries examples and a large number of problems

Detection and Estimation Theory and Its Applications Thomas A. Schonhoff, Arthur Anthony Giordano, 2006 For courses in Estimation and Detection Theory offered in departments of Electrical Engineering This is the first student friendly textbook to comprehensively address the topics of both detection and estimation with a thorough discussion of the underlying theory as well as the practical applications By addressing detection and estimation theory in the same volume the authors encourage a greater appreciation of the strong coupling and often blurring of these fields of study In order to modernize classical topics the text focuses on discrete signal processing with continuous signal presentations included to demonstrate uniformity and consistency of the results

Detection, Estimation, and Modulation Theory, Part I Harry L. Van Trees, 2004-03-24 Band 1 Nachdruck des vierbändigen Werkes insgesamt die umfassendste gegenwärtig erhältliche Abhandlung auf diesem Gebiet anerkannter und bewährter Klassiker verfasst von einer der führenden Persönlichkeiten in gut verständlichem Stil geschrieben und übersichtlich organisiert mit Zusammenfassungen an den Kapitelenden Beispielen und zahlreichen Übungsaufgaben vorgestellte Theorie hat wichtige praktische Anwendungen unter anderem in der Radar und Sonartechnik Nachrichtentechnik Seismologie Biomedizintechnik und Astronomie

Principles of Signal Detection and Parameter Estimation Bernard C. Levy, 2008-11-01 This textbook provides a comprehensive and current understanding of signal detection and estimation including problems and solutions for each chapter Signal detection plays an important role in fields such as radar sonar digital communications image processing and failure detection The book explores both Gaussian detection and detection of Markov chains presenting a unified treatment of coding and modulation topics Addresses asymptotic tests with the theory of large deviations and robust detection This text is appropriate for students of Electrical Engineering in graduate courses in Signal Detection and Estimation

RANDOM PROCESSES: FILTERING, ESTIMATION AND DETECTION Lonnie C. Ludeman, 2010-07-01 Market_Desc Graduate students of electrical and computer engineering Practicing engineers in communications and signal processing Special Features Covers modern detection and estimation theory as well as the basics of random processes Emphasizes the use of discrete time Wiener and Kalman filters and covers nonlinear systems in detail Includes over 380 class tested homework exercises About The Book An understanding of random processes is crucial in the study of many engineering systems for example analyzing noise in a wireless communications channel This book covers the basics of probability and random processes for an engineering audience Importantly though the book also presents the details of modern detection and estimation theory giving it a real edge over existing textbooks The author has a proven track record His book Fundamentals of Digital Signal Processing has sold 15 000 copies and won Choice magazine's Outstanding Engineering Book of the Year award

Quantum detection and estimation theory C Helstrom, 2012

Detection Estimation and Modulation Theory, Part I Harry L. Van Trees, Kristine L. Bell, 2013-04-15 Originally published in 1968 Harry Van Trees's Detection Estimation and Modulation Theory Part I is one of the great time tested classics in the field of signal processing

Highly readable and practically organized it is as imperative today for professionals researchers and students in optimum signal processing as it was over thirty years ago The second edition is a thorough revision and expansion almost doubling the size of the first edition and accounting for the new developments thus making it again the most comprehensive and up to date treatment of the subject With a wide range of applications such as radar sonar communications seismology biomedical engineering and radar astronomy among others the important field of detection and estimation has rarely been given such expert treatment as it is here Each chapter includes section summaries realistic examples and a large number of challenging problems that provide excellent study material This volume which is Part I of a set of four volumes is the most important and widely used textbook and professional reference in the field *Signal Processing: Discrete Spectral Analysis, Detection, and Estimation* Mischa Schwartz, Leonard Shaw, 1975 **Optimum Array Processing** Harry L. Van Trees, 2004-04-07 Well known authority Dr Van Trees updates array signal processing for today's technology This is the most up to date and thorough treatment of the subject available Written in the same accessible style as Van Tree's earlier classics this completely new work covers all modern applications of array signal processing from biomedicine to wireless communications

Nonlinear modulation theory Harry L. Van Trees, 1968 *Detection and Estimation Methods for Biomedical Signals* Metin Akay, 1996 *Detection and Estimation Methods for Biomedical Signals* discusses the most powerful signal detection and estimation methods in use and includes appendices of related computer programs to aid the reader in applying the methods to their particular problem This book includes numerous practical examples of detection and estimation of biological signals such as the detection of Multiple Sclerosis using the orthogonal expansion method and the early detection of coronary artery disease and occlusions before and after angioplasty by the Eigenvector methods There is also ample coverage of four different wavelet transforms useful in biomedical signal processing as well as coverage of biomedical applications of neural networks and chaos theory This book includes a disk of ANSI C source code for ten useful computer programs **Key Features** Time frequency methods design implementation simulation biomedical applications computer programs on disk Wavelets design implementation simulation biomedical applications computer programs on disk High resolution methods design implementation simulation biomedical applications computer programs on disk Singular value composition principle component analysis Karhunen Loeve transforms design implementation and biomedical applications Bayes Rules and Neyman Pearson Methods design implementation biomedical applications

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