

Read Free Radar Principles By Nadav Levanon

Radar Principles By Nadav Levanon | ad42945cb6732c1b285d218228b566f5

Practical Image and Video Processing Using MATLAB
Advances in Bistatic Radar
Information-Theoretic Methods in Data Science
FMCW Radar Design
Window Functions and Their Applications in Signal Processing
Signal Processing for Multistatic Radar Systems
Advanced Array Systems, Applications and RF Technologies
Detecting and Classifying Low Probability of Intercept Radar
Time-Frequency Signal Analysis and Processing
Spread Spectrum and CDMA
Propagation Engineering in Wireless Communications
Target Position Estimation with a Continuous Wave Radar Network
Radar Signals
Design of Multi-Frequency CW Radars
An Introduction to Atmospheric Gravity Waves
Probability and Random Processes
Micro-Doppler Characteristics of Radar Targets
Radar and ARPA Manual
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High Speed Digital Design
Malware Diffusion Models for Modern Complex Networks
Measuring Ocean Currents
Principles of Modern Radar
Detecting and Classifying Low Probability of Intercept Radar
Radar Principles
Radar Design Principles
Applications of Nonlinear Fiber Optics
Global Navigation Satellite Systems, Inertial Navigation, and Integration
Foxbats Over Dimona

Practical Image and Video Processing Using MATLAB

A text and general reference on the design and analysis of radar signals. As radar technology evolves to encompass a growing spectrum of applications in military, aerospace, automotive, and other sectors, innovations in digital signal processing have risen to meet the demand. Presenting a long overdue, up-to-date, dedicated resource on radar signals, the authors fill a critical gap in radar technology literature. Radar Signals features in-depth coverage of the most prevalent classical and modern radar signals used today, as well as new signal concepts developed in recent years. Inclusion of key MATLAB software codes throughout the book demonstrates how they dramatically simplify the process of describing and analyzing complex signals. Topics covered include: * Matched filter and ambiguity function concepts * Basic radar signals, with both analytical and numerical analysis * Frequency modulated and phase-coded pulses * Complete discussion of band-limiting schemes * Coherent LFM pulse trains-the most popular radar signal * Diversity in pulse trains, including stepped frequency pulses * Continuous-wave signals * Multicarrier phase-coded signals. Combining lucid explanation, preferred signal tables, MATLAB codes, and problem sets in each chapter, Radar Signals is an essential reference for professionals-and a systematic tutorial for any seeking to broaden their knowledge base in this dynamic field.

Advances in Bistatic Radar

Human Interaction with Electromagnetic Fields: Computational Models in Dosimetry presents some highly rigorous and sophisticated integral equation techniques from computational electromagnetics (CEM), along with practical techniques for the calculation and measurement of internal dosimetry. Theory is accompanied by numerical modeling algorithms and illustrative computational examples that range from academic to full real-world scenarios. Covers both deterministic and stochastic modeling. Presents implementations of integral equation approaches, overcoming the limitations of the FDTD approach. Presents various biomedical applications.

Information-Theoretic Methods in Data Science

Dr. John Milan, radar consultant; formerly 36 years with ITT Gilfillan, IEEE AESS Radar Systems Panel --

FMCW Radar Design

Spread spectrum and CDMA are cutting-edge technologies widely used in operational radar, navigation and telecommunication systems and play a pivotal role in the development of the forthcoming generations of systems and networks. This comprehensive resource presents the spread spectrum concept as a product of the advancements in wireless IT, shows how and when the classical problems of signal transmission/processing stimulate the application of spread spectrum, and clarifies the advantages of spread spectrum philosophy. Detailed coverage is provided of the tools and instruments for designing spread spectrum and CDMA signals answering why a designer will prefer one solution over another. The approach adopted is wide-ranging, covering issues that apply to both data transmission and data collection systems such as telecommunications, radar, and navigation. Presents a theory-based analysis complemented by practical examples and real world case studies resulting in a self-sufficient treatment of the subject. Contains detailed discussions of new trends in spread spectrum technology such as multi-user reception, multicarrier modulation, OFDM, MIMO and space-time coding. Provides advice on designing discrete spread spectrum signals and signal sets for time-frequency measuring, synchronization and multi-user communications. Features numerous Matlab-based problems and other exercises to encourage the reader to initiate independent investigations and simulations. This valuable text provides timely guidance on the current status and future potential of spread spectrum and CDMA and is an invaluable resource for senior undergraduates and postgraduate students, lecturers and practising engineers and researchers involved in the deployment and development of spread spectrum and CDMA technology. Supported by a Companion website on which instructors and lecturers can find a solutions manual for the

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problems and Matlab programming, electronic versions of some of the figures and other useful resources such as a list of abbreviations.

Window Functions and Their Applications in Signal Processing

This book deals with the basic theory for design and analysis of Low Probability of Intercept (LPI) radar systems. The design of one such multi-frequency high resolution LPI radar, PANDORA, is covered. This work represents the first time that the topic of multi-frequency radars is discussed in such detail and it is based on research conducted by the author in The Netherlands. The book provides the design tools needed for development, design, and analysis of high resolution radar systems for commercial as well as military applications. Software written in MATLAB and C++ is provided to guide the reader in calculating radar parameters and in ambiguity function analysis. Some radar simulation software is also included.

Signal Processing for Multistatic Radar Systems

High Speed Digital Design discusses the major factors to consider in designing a high speed digital system and how design concepts affect the functionality of the system as a whole. It will help you understand why signals act so differently on a high speed digital system, identify the various problems that may occur in the design, and research solutions to minimize their impact and address their root causes. The authors offer a strong foundation that will help you get high speed digital system designs right the first time. Taking a systems design approach, High Speed Digital Design offers a progression from fundamental to advanced concepts, starting with transmission line theory, covering core concepts as well as recent developments. It then covers the challenges of signal and power integrity, offers guidelines for channel modeling, and optimizing link circuits. Tying together concepts presented throughout the book, the authors present Intel processors and chipsets as real-world design examples. Provides knowledge and guidance in the design of high speed digital circuits Explores the latest developments in system design Covers everything that encompasses a successful printed circuit board (PCB) product Offers insight from Intel insiders about real-world high speed digital design

Advanced Array Systems, Applications and RF Technologies

Micro-Doppler Characteristics of Radar Targets is a monograph on radar target's micro-Doppler effect theory and micro-Doppler feature extraction techniques. The micro-Doppler effect is presented from two aspects, including micro-Doppler effect analysis and micro-Doppler feature extraction, with micro-Doppler effects induced by different micro-motional targets in different radar systems analyzed and several methods of micro-Doppler feature extraction and three-dimensional micro-motion feature reconstruction presented. The main contents of this book include micro-Doppler effect in narrowband radar, micro-Doppler effect in wideband radar, micro-Doppler effect in bistatic radar, micro-Doppler feature analysis and extraction, and three-dimensional micro-motion feature reconstruction, etc. This book can be used as a reference for scientific and technical personnel engaged in radar signal processing and automatic target recognition, etc. It is especially suitable for beginners who are interested in research on micro-Doppler effect in radar. Presents new views on micro-Doppler effects, analyzing and discussing micro-Doppler effect in wideband radar rather than focusing on narrowband Provides several new methods for micro-Doppler feature extraction which are very helpful and practical for readers Includes practical cases that align with main MATLAB codes in each chapter, with detailed program annotations

Detecting and Classifying Low Probability of Intercept Radar

Measuring Ocean Currents: Tools, Technologies, and Data covers all major aspects of ocean current measurements in view of the implications of ocean currents on changing climate, increasing pollution levels, and offshore engineering activities. Although more than 70% of the Earth is covered by ocean, there is limited information on the countless fine- to large-scale water motions taking place within them. This book fills that information gap as the first work that summarizes the state-of-the-art methods and instruments used for surface, subsurface, and abyssal ocean current measurements. Readers of this book will find a wealth of information on Lagrangian measurements, horizontal mapping, imaging, Eulerian measurements, and vertical profiling techniques. In addition, the book describes modern technologies for remote measurement of ocean currents and their signatures, including HF Doppler radar systems, satellite-borne sensors, ocean acoustic tomography, and more. Crucial aspects of ocean currents are described in detail as well, including dispersion of effluents discharged into the sea and transport of beneficial materials—as well as environmentally hazardous materials—from one region to another. The book highlights several important practical applications, showing how measurements relate to climate change and pollution levels, how they affect coastal and offshore engineering activities, and how they can aid in tsunami detection. Coverage of measurement, mapping and profiling techniques Descriptions of technologies for remote measurement of ocean currents and their signatures Reviews crucial aspects of ocean currents, including special emphasis on the planet-spanning thermohaline circulation, known as the ocean's "conveyor belt," and its crucial role in climate change

Time-Frequency Signal Analysis and Processing

An advanced treatment of the main concepts of radar. Systematic and organized, it nicely balances readability with mathematical rigor. Many techniques and examples have been chosen from the radar industry (Rayleigh fluctuating targets are used as they yield simple expressions for the probability of detection), and others for their pedagogical value (Costas signals lead the coded radar signals because their ambiguity function can be intuitively deduced). Ordered statistics is covered in more depth than other CFAR techniques because its performance can be obtained analytically without resorting to simulation

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methods. Contains many exercises. An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department.

Spread Spectrum and CDMA

A text and general reference on the design and analysis of radar signals. As radar technology evolves to encompass a growing spectrum of applications in military, aerospace, automotive, and other sectors, innovations in digital signal processing have risen to meet the demand. Presenting a long overdue, up-to-date, dedicated resource on radar signals, the authors fill a critical gap in radar technology literature. Radar Signals features in-depth coverage of the most prevalent classical and modern radar signals used today, as well as new signal concepts developed in recent years. Inclusion of key MATLAB software codes throughout the book demonstrates how they dramatically simplify the process of describing and analyzing complex signals. Topics covered include: * Matched filter and ambiguity function concepts * Basic radar signals, with both analytical and numerical analysis * Frequency modulated and phase-coded pulses * Complete discussion of band-limiting schemes * Coherent LFM pulse trains—the most popular radar signal * Diversity in pulse trains, including stepped frequency pulses * Continuous-wave signals * Multicarrier phase-coded signals Combining lucid explanation, preferred signal tables, MATLAB codes, and problem sets in each chapter, Radar Signals is an essential reference for professionals and a systematic tutorial for anyone seeking to broaden their knowledge base in this dynamic field.

Propagation Engineering in Wireless Communications

An updated guide to GNSS, and INS, and solutions to real-world GNSS/INS problems with Kalman filtering. Written by recognized authorities in the field, this third edition of a landmark work provides engineers, computer scientists, and others with a working familiarity of the theory and contemporary applications of Global Navigation Satellite Systems (GNSS), Inertial Navigational Systems, and Kalman filters. Throughout, the focus is on solving real-world problems, with an emphasis on the effective use of state-of-the-art integration techniques for those systems, especially the application of Kalman filtering. To that end, the authors explore the various subtleties, common failures, and inherent limitations of the theory as it applies to real-world situations, and provide numerous detailed application examples and practice problems, including GNSS-aided INS (tightly and loosely coupled), modeling of gyros and accelerometers, and SBAS and GBAS. Drawing upon their many years of experience with GNSS, INS, and the Kalman filter, the authors present numerous design and implementation techniques not found in other professional references. The Third Edition includes: Updates on the upgrades in existing GNSS and other systems currently under development Expanded coverage of basic principles of antenna design and practical antenna design solutions Expanded coverage of basic principles of receiver design and an update of the foundations for code and carrier acquisition and tracking within a GNSS receiver Expanded coverage of inertial navigation, its history, its technology, and the mathematical models and methods used in its implementation Derivations of dynamic models for the propagation of inertial navigation errors, including the effects of drifting sensor compensation parameters Greatly expanded coverage of GNSS/INS integration, including derivation of a unified GNSS/INS integration model, its MATLAB implementations, and performance evaluation under simulated dynamic conditions The companion website includes updated background material; additional MATLAB scripts for simulating GNSS-only and integrated GNSS/INS navigation; satellite position determination; calculation of ionosphere delays; and dilution of precision.

Target Position Estimation with a Continuous Wave Radar Network

Window functions—otherwise known as weighting functions, tapering functions, or apodization functions—are mathematical functions that are zero-valued outside the chosen interval. They are well established as a vital part of digital signal processing. Window Functions and their Applications in Signal Processing presents an exhaustive and detailed account of window functions and their applications in signal processing, focusing on the areas of digital spectral analysis, design of FIR filters, pulse compression radar, and speech signal processing. Comprehensively reviewing previous research and recent developments, this book: Provides suggestions on how to choose a window function for particular applications Discusses Fourier analysis techniques and pitfalls in the computation of the DFT Introduces window functions in the continuous-time and discrete-time domains Considers two implementation strategies of window functions in the time- and frequency domain Explores well-known applications of window functions in the fields of radar, sonar, biomedical signal analysis, audio processing, and synthetic aperture radar

Radar Signals

"The Second Lebanon War broke out on July 12, 2006, without either Israel or Hezbollah intending this escalation. However, the abduction of IDF soldiers that day by a Hezbollah cell created a new reality in the north that prompted Israel to embark on a military operation, which ultimately became a war. The course of the war and its outcomes strongly affected subsequent internal and external Israeli, Lebanese, and regional processes. Hindsight provides an opportunity to examine the war and its ramifications from a broader and more balanced perspective than is possible in the heat of the moment. Studying the past and learning its lessons allow a better understanding of the subsequent decade, shed light on the current state of Israel's northern sector, and contribute to an assessment of possible future scenarios"—Preface.

Design of Multi-Frequency CW Radars

This book reviews the principles of Doppler radar and emphasizes the quantitative measurement of meteorological parameters.

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It illustrates the relation of Doppler radar data and images to atmospheric phenomena such as tornados, microbursts, waves, turbulence, density currents, hurricanes, and lightning. Radar images and photographs of these weather phenomena are included. Polarimetric measurements and data processing An updated section on RASS Wind profilers Observations with the WSR-88D An updated treatment of lightning Turbulence in the planetary boundary layer A short history of radar Chapter problem sets

An Introduction to Atmospheric Gravity Waves

This book is a practitioner's guide to all aspects of pulse Doppler radar. It concentrates on airborne military radar systems since they are the most used, most complex, and most interesting of the pulse Doppler radars; however, ground-based and non-military systems are also included.

Probability and Random Processes

Micro-Doppler Characteristics of Radar Targets

Gravity waves exist in all types of geophysical fluids, such as lakes, oceans, and atmospheres. They play an important role in redistributing energy at disturbances, such as mountains or seamounts and they are routinely studied in meteorology and oceanography, particularly simulation models, atmospheric weather models, turbulence, air pollution, and climate research. An Introduction to Atmospheric Gravity Waves provides readers with a working background of the fundamental physics and mathematics of gravity waves, and introduces a wide variety of applications and numerous recent advances. Nappo provides a concise volume on gravity waves with a lucid discussion of current observational techniques and instrumentation. Foreword is written by Prof. George Chimonas, a renowned expert on the interactions of gravity waves with turbulence. CD containing real data, computer codes for data analysis and linear gravity wave models included with the text

Radar and ARPA Manual

UP-TO-DATE, TECHNICALLY ACCURATE COVERAGE OF ESSENTIAL TOPICS IN IMAGE AND VIDEO PROCESSING This is the first book to combine image and video processing with a practical MATLAB®-oriented approach in order to demonstrate the most important image and video techniques and algorithms. Utilizing minimal math, the contents are presented in a clear, objective manner, emphasizing and encouraging experimentation. The book has been organized into two parts. Part I: Image Processing begins with an overview of the field, then introduces the fundamental concepts, notation, and terminology associated with image representation and basic image processing operations. Next, it discusses MATLAB® and its Image Processing Toolbox with the start of a series of chapters with hands-on activities and step-by-step tutorials. These chapters cover image acquisition and digitization; arithmetic, logic, and geometric operations; point-based, histogram-based, and neighborhood-based image enhancement techniques; the Fourier Transform and relevant frequency-domain image filtering techniques; image restoration; mathematical morphology; edge detection techniques; image segmentation; image compression and coding; and feature extraction and representation. Part II: Video Processing presents the main concepts and terminology associated with analog video signals and systems, as well as digital video formats and standards. It then describes the technically involved problem of standards conversion, discusses motion estimation and compensation techniques, shows how video sequences can be filtered, and concludes with an example of a solution to object detection and tracking in video sequences using MATLAB®. Extra features of this book include: More than 30 MATLAB® tutorials, which consist of step-by-step guides to exploring image and video processing techniques using MATLAB® Chapters supported by figures, examples, illustrative problems, and exercises Useful websites and an extensive list of bibliographical references This accessible text is ideal for upper-level undergraduate and graduate students in digital image and video processing courses, as well as for engineers, researchers, software developers, practitioners, and anyone who wishes to learn about these increasingly popular topics on their own.

The Quiet Decade

An introduction to the subject for non-specialists: engineers, technicians, pilots, and aerospace industry marketing, public relations, and customer support personnel. Also a reference for specialists in the field. The completely rewritten and revised Second Edition updates the original published by the Hughes Aircraft Company.

Astronomical Optics

Malware Diffusion Models for Wireless Complex Networks: Theory and Applications provides a timely update on malicious software (malware), a serious concern for all types of network users, from laymen to experienced administrators. As the proliferation of portable devices, namely smartphones and tablets, and their increased capabilities, has propelled the intensity of malware spreading and increased its consequences in social life and the global economy, this book provides the theoretical aspect of malware dissemination, also presenting modeling approaches that describe the behavior and dynamics of malware diffusion in various types of wireless complex networks. Sections include a systematic introduction to malware diffusion processes in computer and communications networks, an analysis of the latest state-of-the-art malware diffusion modeling frameworks, such as queuing-based techniques, calculus of variations based techniques, and game theory based techniques, also demonstrating how the methodologies can be used for modeling in more general applications and practical scenarios.

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Presents a timely update on malicious software (malware), a serious concern for all types of network users, from laymen to experienced administrators Systematically introduces malware diffusion processes, providing the relevant mathematical background Discusses malware modeling frameworks and how to apply them to complex wireless networks Provides guidelines and directions for extending the corresponding theories in other application domains, demonstrating such possibility by using application models in information dissemination scenarios

Signal Processing in Noise Waveform Radar

Pace (Naval Postgraduate School) presents the principles of radar design that enable a low probability of intercept (LPI) by a noncooperative intercept receiver. The RF system uses complex pulse compression CW waveforms, low side lobe antennas, and power management techniques to render itself virtually undetectable. The second part of the textbook investigates three algorithms for providing the intercept receiver with a processing gain that is close to the radar's matched filter processing gain, and quantifies their performance with LPI waveforms. The CD-ROM contains MATLAB code for evaluating the complex LPI radar-receiver interactions. Annotation : 2004 Book News, Inc., Portland, OR (booknews.com).

Air and Spaceborne Radar Systems

This book covers the basic principles for understanding radio wave propagation for common frequency bands used in radio-communications. This includes achievements and developments in propagation models for wireless communication. This book is intended to bridge the gap between the theoretical calculations and approaches to the applied procedures needed for radio links design in a proper manner. The authors emphasize propagation engineering by giving fundamental information and explain the use of basic principles together with technical achievements. This new edition includes additional information on radio wave propagation in guided media and technical issues for fiber optics cable networks with several examples and problems. This book also includes a solution manual - with 90 solved examples distributed throughout the chapters - and 158 problems including practical values and assumptions.

Radar Principles with Applications to Tracking Systems

Advanced Array Systems, Applications and RF Technologies adopts a holistic view of arrays used in radar, electronic warfare, communications, remote sensing and radioastronomy. Radio frequency (RF) and intermediate frequency (IF) signal processing is assuming a fundamental importance, owing to its increasing ability to multiply a system's capabilities in a cost-effective manner. This book comprehensively covers the important front-end RF subsystems of active phased arrays, so offering array designers new and exciting opportunities in signal processing. Provides an up to date record of existing systems from different applications Explores array systems under development Bridges the gap between textbook coverage of idealized phased arrays and practical knowledge of working phased arrays Recognises the significance of cost to the realization of phased arrays Discusses future advances in the field that promise to deliver even more affordable arrays ['intelligent' or self-focussing/cohering arrays]

Human Interaction with Electromagnetic Fields

This book is devoted to the emerging technology of noise waveform radar and its signal processing aspects. It is a new kind of radar, which use noise-like waveform to illuminate the target. The book includes an introduction to basic radar theory, starting from classical pulse radar, signal compression, and wave radar. The book then discusses the properties, difficulties and potential of noise radar systems, primarily for low-power and short-range civil applications. The contribution of modern signal processing techniques to making noise radar practical are emphasized, and application examples are given.

MATLAB Simulations for Radar Systems Design

Simulation is integral to the successful design of modern radar systems, and there is arguably no better software for this purpose than MATLAB. But software and the ability to use it does not guarantee success. One must also: Understand radar operations and design philosophy Know how to select the radar parameters to meet the design req

Radar Signals

The first unified treatment of the interface between information theory and emerging topics in data science, written in a clear, tutorial style. Covering topics such as data acquisition, representation, analysis, and communication, it is ideal for graduate students and researchers in information theory, signal processing, and machine learning.

Fundamentals of Radar Signal Processing

This fully revised new edition covers the complete radar/ARPA installation and serves as the most comprehensive and up-to-date reference on equipment and techniques for radar observers using older and newer systems alike. Suitable for use as a professional reference or as a training text, the book covers all aspects of radar, ARPA and integrated bridge systems technology (including AIS, ECDIS and GNSS) and their role in shipboard operations. It is a valuable resource for larger vessels and also covers the needs of leisure and amateur sailors for whom this technology is now accessible. Radar and ARPA Manual

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provides essential information for professional mariners, including those on training courses for electronic navigation systems and professional certificates internationally. Reference is made throughout to IMO (International Maritime Organization) Performance Standards, the role of radar in navigation and in collision avoidance, and to international professional and amateur marine operations qualifications. The most up-to-date book available, with comprehensive treatment of modern radar and ARPA systems and ECDIS (Electronic Chart Display & Information Systems) Full coverage of IMO performance standards relating to radar and navigational technology on new and established vessels Covers best practice use of equipment as well as underlying principles, with essential mathematics and complicated concepts illustrated through the use of clear illustrations

Doppler Radar & Weather Observations

This revised and expanded second edition brings you to the cutting edge with new chapters on LPI radar design, including over-the-horizon radar, random noise radar, and netted LPI radar. You also discover critical LPI detection techniques, parameter extraction signal processing techniques, and anti-radiation missile design strategies to counter LPI radar.

Introduction to Airborne Radar

Written by a recognized expert in the field, this clearly presented, well-illustrated book provides both advanced level students and professionals with an authoritative, thorough presentation of the characteristics, including advantages and limitations, of telescopes and spectrographic instruments used by astronomers of today. Written by a recognized expert in the field Provides both advanced level students and professionals with an authoritative, thorough presentation of the characteristics, including advantages and limitations, of telescopes and spectrographic instruments used by astronomers of today

Pulse Doppler Radar

Of related interest ... Microwave Passive Direction Finding Stephen E. Lipsky This breakthrough work answers the need of every engineer in search of a comprehensive, single source on DF technology. Microwave Passive Direction Finding succinctly unifies DF theory, provides representative block diagrams of working equipment, and details the methods of calculating and predicting system performance. Sections cover evolution and use of monopulse passive DF receiver theory, design of antenna elements for conformal DF coverage, receiver configurations, DF antenna arrays, computation methods for signal detection, and much more. Never before published material includes new systems concepts such as digital preprocessing, supercommutation, and wide RF bandwidth noise detection methods. With tips on preparing proposals for new business, this reference covers every aspect of the principles and practice of DF technology. 1987 (0 471-83454-8) 298 pp. Radar Principles Nadav Levanon With this first published textbook on the subject, practicing engineers and graduate students will quickly master the basic concepts of radar science. A clear, straightforward introduction to the discipline through an analytical and problem-solving mode, this unique book features mathematical analysis and proofs, fully analyzed examples, and problem sections—all selected from the author's course assignments. Key topics include propagation, radar cross section, clutter, radar signals, the ambiguity function, measurement accuracy, coherent processing, Synthetic Aperture Radar and monopulse. The text's tutorial format, consistent terminology, and 141 illustrations (including 3-D plots of ambiguity functions) make it an optimal self-study tool, classroom text, and professional reference. 1988 (0 471-85881-1) 308 pp. Optimal Radar Tracking Systems George Biernson Here is a systematic unveiling of the methods and means underlying the design of radar tracking technology. Topics covered include issues essential to an understanding of Altair radar as well as target-tracking systems. Kalman filter theory, feedback control, modulation and demodulation of signals, digital sampled-data systems, digital computer simulation, statistical analysis of random signals, detection and tracking processes in a radar system are developed first from their rudiments toward a more advanced discussion. Offering a breadth of technical detail unusual in the unclassified literature, this study is of paramount importance to those involved in tracking applications that use optical signal, sonar signal, or RF telemetry signals. 1989 (0 471-50673-7) 560 pp.

High Speed Digital Design

Isabella Ginor and Gideon Remez's groundbreaking history of the Six-Day War in 1967 radically changes our understanding of that conflict, casting it as a crucial arena of Cold War intrigue that has shaped the Middle East to this day. The authors, award-winning Israeli journalists and historians, have investigated newly available documents and testimonies from the former Soviet Union, cross-checked them against Israeli and Western sources, and arrived at fresh and startling conclusions. Contrary to previous interpretations, Ginor and Remez's book shows that the Six-Day War was the result of a joint Soviet-Arab gambit to provoke Israel into a preemptive attack. The authors reveal how the Soviets received a secret Israeli message indicating that Israel, despite its official ambiguity, was about to acquire nuclear weapons. Determined to destroy Israel's nuclear program before it could produce an atomic bomb, the Soviets then began preparing for war—well before Moscow accused Israel of offensive intent, the overt trigger of the crisis. Ginor and Remez's startling account details how the Soviet-Arab onslaught was to be unleashed once Israel had been drawn into action and was branded as the aggressor. The Soviets had submarine-based nuclear missiles poised for use against Israel in case it already possessed and tried to use an atomic device, and the USSR prepared and actually began a marine landing on Israel's shores backed by strategic bombers and fighter squadrons. They sent their most advanced, still-secret aircraft, the MiG-25 Foxbat, on provocative sorties over Israel's Dimona nuclear complex to prepare the planned attack on it, and to scare Israel into making the first strike. It was only the unpredicted devastation of Israel's response that narrowly thwarted the Soviet design.

Malware Diffusion Models for Modern Complex Networks

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Advances in Bistatic Radar updates and extends bistatic and multistatic radar developments since the publication of Willis' Bistatic Radar in 1991. New and recently declassified military applications are documented, civil applications are detailed including commercial and scientific systems and leading radar engineers provide expertise to each of these applications. Advances in Bistatic Radar consists of two major sections: Bistatic/Multistatic Radar Systems and Bistatic Clutter and Signal Processing. Starting with a history update, the first section documents the early and now declassified military AN/FPS-23 Flutlar DEW-Line Gap-filler, and high frequency (HF) bistatic radars developed for missile attack warning. It then documents the recently developed passive bistatic and multistatic radars exploiting commercial broadcast transmitters for military and civilian air surveillance. Next, the section documents scientific bistatic radar systems for planetary exploration, which have exploited data link transmitters over the last forty years; ionospheric measurements, again exploiting commercial broadcast transmitters; and 3-D wind field measurements using a bistatic receiver hitchhiking off doppler weather radars. This last application has been commercialized. The second section starts by documenting the full, unclassified bistatic clutter scattering coefficient data base, along with the theory and analysis supporting its development. The section then details two major clutter-related developments, spotlight bistatic synthetic aperture radar (SAR), which can now generate high resolution images using bistatic autofocus and related techniques; and adaptive moving target indication (MTI), which allows cancellation of nonstationary clutter generated by moving (i.e. airborne) platforms through the use of bistatic space-time adaptive processing (STAP).

Measuring Ocean Currents

Time-Frequency Signal Analysis and Processing (TFSAP) is a collection of theory, techniques and algorithms used for the analysis and processing of non-stationary signals, as found in a wide range of applications including telecommunications, radar, and biomedical engineering. This book gives the university researcher and R&D engineer insights into how to use TFSAP methods to develop and implement the engineering application systems they require. New to this edition: New sections on Efficient and Fast Algorithms; a "Getting Started" chapter enabling readers to start using the algorithms on simulated and real examples with the TFSAP toolbox, compare the results with the ones presented in the book and then insert the algorithms in their own applications and adapt them as needed. Two new chapters and twenty three new sections, including updated references. New topics including: efficient algorithms for optimal TFDs (with source code), the enhanced spectrogram, time-frequency modelling, more mathematical foundations, the relationships between QTFDs and Wavelet Transforms, new advanced applications such as cognitive radio, watermarking, noise reduction in the time-frequency domain, algorithms for Time-Frequency Image Processing, and Time-Frequency applications in neuroscience (new chapter). A comprehensive tutorial introduction to Time-Frequency Signal Analysis and Processing (TFSAP), accessible to anyone who has taken a first course in signals Key advances in theory, methodology and algorithms, are concisely presented by some of the leading authorities on the respective topics Applications written by leading researchers showing how to use TFSAP methods

Principles of Modern Radar

Signal Processing for Multistatic Radar Systems: Adaptive Waveform Selection, Optimal Geometries and Pseudolinear Tracking Algorithms addresses three important aspects of signal processing for multistatic radar systems, including adaptive waveform selection, optimal geometries and pseudolinear tracking algorithms. A key theme of the book is performance optimization for multistatic target tracking and localization via waveform adaptation, geometry optimization and tracking algorithm design. Chapters contain detailed mathematical derivations and algorithmic development that are accompanied by simulation examples and associated MATLAB codes. This book is an ideal resource for university researchers and industry engineers in radar, radar signal processing and communications engineering. Develops waveform selection algorithms in a multistatic radar setting to optimize target tracking performance Assesses the optimality of a given target-sensor geometry and designs optimal geometries for target localization using mobile sensors Gives an understanding of low-complexity and high-performance pseudolinear estimation algorithms for target localization and tracking in multistatic radar systems Contains the MATLAB codes for the examples used in the book

Detecting and Classifying Low Probability of Intercept Radar

Frequency Modulated Continuous Wave (FMCW) radars are a fast expanding area in radar technology due to their stealth features, extremely high resolutions, and relatively clutter free displays. This groundbreaking resource offers engineers expert guidance in designing narrowband FMCW radars for surveillance, navigation, and missile seeking. It also provides professionals with a thorough understanding of underpinnings of this burgeoning technology. Moreover, readers find detailed coverage of the RF components that form the basis of radar construction. Featuring clear examples, the book presents critical discussions on key applications. Practitioners learn how to use time-saving MATLAB® and SystemVue design software to help them with their challenging projects in the field. Additionally, this authoritative reference shows engineers how to analyze FMCW radars of various types, including missile seekers and missile altimeters. Packed with over 600 equations, the book presents discussions on key radar algorithms and their implementation, as well as designing modern radar to meet given operational requirements.

Radar Principles

Miller and Childers have focused on creating a clear presentation of foundational concepts with specific applications to signal processing and communications, clearly the two areas of most interest to students and instructors in this course. It is aimed at graduate students as well as practicing engineers, and includes unique chapters on narrowband random processes and

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simulation techniques. The appendices provide a refresher in such areas as linear algebra, set theory, random variables, and more. Probability and Random Processes also includes applications in digital communications, information theory, coding theory, image processing, speech analysis, synthesis and recognition, and other fields. * Exceptional exposition and numerous worked out problems make the book extremely readable and accessible * The authors connect the applications discussed in class to the textbook * The new edition contains more real world signal processing and communications applications * Includes an entire chapter devoted to simulation techniques

Radar Design Principles

The development of new highly nonlinear fibers - referred to as microstructured fibers, holey fibers and photonic crystal fibers - is the next generation technology for all-optical signal processing and biomedical applications. This new edition has been thoroughly updated to incorporate these key technology developments. The book presents sound coverage of the fundamentals of lightwave technology, along with material on pulse compression techniques and rare-earth-doped fiber amplifiers and lasers. The extensively revised chapters include information on fiber-optic communication systems and the ultrafast signal processing techniques that make use of nonlinear phenomena in optical fibers. New material focuses on the applications of highly nonlinear fibers in areas ranging from wavelength laser tuning and nonlinear spectroscopy to biomedical imaging and frequency metrology. Technologies such as quantum cryptography, quantum computing, and quantum communications are also covered in a new chapter. This book will be an ideal reference for: R&D engineers working on developing next generation optical components; scientists involved with research on fiber amplifiers and lasers; graduate students and researchers working in the fields of optical communications and quantum information. The only book on how to develop nonlinear fiber optic applications Two new chapters on the latest developments; Highly Nonlinear Fibers and Quantum Applications Coverage of biomedical applications

Applications of Nonlinear Fiber Optics

Advances in DSP (digital signal processing) have radically altered the design and usage of radar systems -- making it essential for both working engineers as well as students to master DSP techniques. This text, which evolved from the author's own teaching, offers a rigorous, in-depth introduction to today's complex radar DSP technologies. Contents: Introduction to Radar Systems * Signal Models * Sampling and Quantization of Pulsed Radar Signals * Radar Waveforms * Pulse Compression Waveforms * Doppler Processing * Detection Fundamentals * Constant False Alarm Rate (CFAR) Detection * Introduction to Synthetic Aperture Imaging

Global Navigation Satellite Systems, Inertial Navigation, and Integration

Offers coverage of digital technology, weather radar, microburst detection, and digital correlators. Provides an evaluation of theory as well as a review of development in practical equipment design and construction. Includes four chapters on equations and detection theory, plus seven on waveforms and signal processing.

FoXBats Over Dimona

The book focuses on the history, main principles, functions, modes, properties and specific nature of modern airborne radar. It provides a practical tool that will be of major help to engineers and technicians working in industry and in radar research and development.

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