

Radar Systems Analysis And Design Using Matlab

Radar Systems Analysis and Design Using MATLAB
Second Edition
Radar Systems Principles
Phase Noise Analysis in Radar Systems Using Personal Computers
Waveform Design and Diversity for Advanced Radar Systems
MATLAB Simulations for Radar Systems Design
Multifunction Array Radar
Small and Short-Range Radar Systems
Design and Analysis of Modern Tracking Systems
Introduction to Radar Analysis
Fundamentals of Radar Signal Processing
Radar System Design and Analysis
Radar System Performance Modeling
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Radar System Analysis, Design, and Simulation
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Radar Signal Analysis and Processing Using MATLAB
Modern Radar System Analysis
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MATLAB Simulations for Radar Systems Design
Detection and Estimation for Communication and Radar Systems
Millimeter-Wave Circuits for 5G and Radar
Radar Signal Analysis and Processing Using MATLAB
Signal Processing Algorithms for Communication and Radar Systems
Solutions Manual for Radar Systems Analysis And Design Using Matlab
Radar Range-performance Analysis
MIMO Radar: Theory and Application
Signal Processing in Radar Systems
Basic Radar Analysis, Second Edition
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TrackingSystem Engineering Analysis, Design, and DevelopmentSurface-based Air Defense System AnalysisRadar EssentialsIntroduction to Radar Analysis, Second EditionRadar Systems Analysis and Design Using MATLAB

Radar Systems Analysis and Design Using MATLAB Second Edition

This book presents the basic principles, analyses, design formulas, and characteristics of various fin-line configurations. You'll find summaries of hundreds of rigorous formulas as well as approximate closed-form expressions, which can be readily programmed to generate design data for any structure. Discover millimeter-wave integrated circuits and components realized using the various fin-line techniques presented in the text, including directional couplers, power dividers, attenuators, detectors, modulators, and oscillators. An Artech House bestseller!

Radar Systems Principles

The 2nd Edition of this popular textbook is a major revision. It is written within the context of communication theory as well as the theory of signals and noise. Part I bridges the gap between communication theory, signals and noise and radar system analysis. Part II is on radar subsystems and associated topics and includes most common radar signal processing techniques, the theory of radar detection, coherent and non-coherent integration, and

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radar clutter analysis. Part III of this Edition will analyze special topics in radar systems. Many new exercises are included and the author provides comprehensive easy to follow mathematical derivations of all key equations and formulas.

Phase Noise Analysis in Radar Systems Using Personal Computers

Waveform Design and Diversity for Advanced Radar Systems

MATLAB Simulations for Radar Systems Design

A thorough update to the Artech House classic Modern Radar Systems Analysis, this reference is a comprehensive and cohesive introduction to radar systems design and performance estimation. It offers you the knowledge you need to specify, evaluate, or apply radar technology in civilian or military systems. The book presents accurate detection range equations that let you realistically estimate radar performance in a variety of practical situations. With its clear, easy-to-understand language, you quickly learn the tradeoffs between choice of wavelength and radar performance and see the inherent advantages and limitations associated with each radar band. You find modeling procedures to help you analyze enemy systems or evaluate radar integrated into new weapon systems. The book covers ECM and ECCM for

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both surveillance and tracking to help you estimate the effects of active and passive ECM, select hardware/software for reconnaissance or jamming, and plan the operation of EW systems. As radar systems evolve, this book provides the equations needed to calculate and evaluate the performance of the latest advances in radar technology.

Multifunction Array Radar

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

Small and Short-Range Radar Systems

Radar Signals: An Introduction to Theory and Application introduces the reader to the basic theory and application of radar signals that are designated as large time-bandwidth or pulse-compression waveforms. Topics covered include matched filtering and pulse compression; optimum predetection processing; the radar ambiguity function; and the

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linear frequency modulation waveform and matched filter. Parameter estimation and discrete coded waveforms are also discussed, along with the effects of distortion on matched-filter signals. This book is comprised of 14 chapters and begins with an overview of the concepts and techniques of pulse compression matched filtering, with emphasis on coding source and decoding device. The discussion then turns to the derivation of the matched-filter properties in order to maximize the signal-to-noise ratio; analysis of radar ambiguity function using the principle of stationary phase; parameter estimation and the method of maximum likelihood; and measurement accuracies of matched-filter radar signals. Waveform design criteria for multiple and dense target environments are also considered. The final chapter describes a number of techniques for designing microwave dispersive delays. This monograph will be a useful resource for graduate students and practicing engineers in the field of radar system engineering.

Design and Analysis of Modern Tracking Systems

This highly-anticipated second edition of an Artech House classic covers several key radar analysis areas: the radar range equation, detection theory, ambiguity functions, waveforms, antennas, active arrays, receivers and signal processors, CFAR and chaff analysis. Readers will be able to predict the detection performance of a radar system using the radar range equation, its various parameters, matched filter

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theory, and Swerling target models. The performance of various signal processors, single pulse, pulsed Doppler, LFM, NLFM, and BPSK, are discussed, taking into account factors including MTI processing, integration gain, weighting loss and straddling loss. The details of radar analysis are covered from a mathematical perspective, with in-depth breakdowns of radar performance in the presence of clutter. Readers will be able to determine the noise temperature of a multi-channel receiver as it is used in active arrays. With the addition of three new chapters on moving target detectors, inverse synthetic aperture radar (ISAR) and constant false alarm rate (CFAR) and new MATLAB codes, this expanded second edition will appeal to the novice as well as the experienced practitioner.

Introduction to Radar Analysis

Providing a practical review of the latest technology in the field, *Ultrawideband Radar Applications and Design* presents cutting-edge advances in theory, design, and practical applications of ultrawideband (UWB) radar. This book features contributions from an international team of experts to help readers learn about a wide range of UWB topics, including: History of the technology American and European governmental regulations and key definitions Nonsinusoidal wave propagation theory Random signal radar Object detection by ground permittivity measurements Large-target backscattering effects Medical applications Large current radiator antenna design Materials-penetrating theory Radar signal

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processing Weak-signal detection methods
Holographic and real time radar imaging This book's contributors use practical information to illustrate the latest theoretical developments and demonstrate UWB radar principles through case studies. Radar system engineers will find ideas for precision electronic sensing systems for use in medical, security, industrial, construction, and geophysical applications, as well as those used in archeological, forensic and transportation operations.

Fundamentals of Radar Signal Processing

En lærebog i radarteknik. Beskriver systematisk alle væsentlige sider af radarteknikken.

Radar System Design and Analysis

An essential task in radar systems is to find an appropriate solution to the problems related to robust signal processing and the definition of signal parameters. Signal Processing in Radar Systems addresses robust signal processing problems in complex radar systems and digital signal processing subsystems. It also tackles the important issue of defining signal parameters. The book presents problems related to traditional methods of synthesis and analysis of the main digital signal processing operations. It also examines problems related to modern methods of robust signal processing in noise, with a focus on the generalized approach to signal processing in noise under coherent filtering. In

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In addition, the book puts forth a new problem statement and new methods to solve problems of adaptation and control by functioning processes. Taking a systems approach to designing complex radar systems, it offers readers guidance in solving optimization problems. Organized into three parts, the book first discusses the main design principles of the modern robust digital signal processing algorithms used in complex radar systems. The second part covers the main principles of computer system design for these algorithms and provides real-world examples of systems. The third part deals with experimental measurements of the main statistical parameters of stochastic processes. It also defines their estimations for robust signal processing in complex radar systems. Written by an internationally recognized professor and expert in signal processing, this book summarizes investigations carried out over the past 30 years. It supplies practitioners, researchers, and students with general principles for designing the robust digital signal processing algorithms employed by complex radar systems.

Radar System Performance Modeling

This major reference volume contains thirteen substantial topics, contributed by nine leading researchers (from 6 countries worldwide (including contributions from Europe, Japan and the USA). Areas of coverage include: system architecture, design, clutter and suppression, surveillance and synthetic aperture radars, detection, rejection of jamming, target identification, phased and coupled arrays, and

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radar signal processing. Contributions are complete mathematically and many include detailed appendices. About the author: Gaspare Galati received his Dr Ing Degree (Laurea) in 1970 and from then until 1986 was with the company Selenia, where he worked in radar system analysis and design, heading their Systems Analysis Group between 1984 and 1986. He taught Probability and Statistics at the University of Calabria from 1979 to 1983 and Telecommunications at the University of L'Aquila from 1984 to 1986. Since then he has been associate Professor of Radar Theory and Techniques at the Tor Vergata University in Rome. He is a member of the IEE and a senior member of the IEEE. His main interests are in the theory and techniques of radar, weather and space-based radar, signal processing, and air traffic control.

Digital Signal Processing

A reference source for phase noise effects on systems and components. Analyzes the effects of phase noise on a radar system's performance and on its major subsystems. Sequence of chapters follows the path of phase noise in a radar system from its generation through its transmission, reception, and processing to its final displayed level. Discusses major radar design areas pertaining to the analysis of phase noise effects on system performance. Includes solved practical problems and computer programs.

Radar System Analysis, Design, and Simulation

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This comprehensive new resource provides in-depth and timely coverage of the underpinnings and latest advances of MIMO radar. This book provides a comprehensive introduction to MIMO radar and demonstrates its utility in real-world applications, then culminates with the latest advances in optimal and adaptive MIMO radar for enhanced detection and target ID in challenging environments. Signal processing prerequisites are explained, including radar signals, orthogonal waveforms, matched filtering, multi-channel beam forming, and Doppler processing. This book discusses MIMO radar signal model, antenna properties, system modeling and waveform alternatives. MIMO implementation challenges are covered, including computational complexity, adaptive clutter mitigation, calibration and equalization, and hardware constraints. Applications for GMTI radar, OTH radar, maritime radar, and automotive radar are explained. The book offers an introduction to optimum MIMO radar and includes details about detection, clutter, and target ID. Insight into adaptive MIMO radar and MIMO channel estimation is presented and techniques and illustrative examples are given. Readers find exclusive flight testing data from DARPA. The breadth of coverage in this all-inclusive resource makes it suitable for both practicing engineers and advanced researchers. The book concludes with discussions on areas for future research.

Handbook of Radar Scattering Statistics for Terrain

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An authoritative text covering the key topics, concepts and analytical tools needed to understand modern communication and radar systems. With numerous examples, exercises and computational results, it is an invaluable resource for graduate students in electrical and computer engineering, and practitioners in communications and radar engineering.

Ultrawideband Radar

Discover the concepts, architectures, components, tools, and techniques needed to design millimeter-wave circuits for current and emerging wireless system applications. Focusing on applications in 5G, connectivity, radar, and more, leading experts in radio frequency integrated circuit (RFIC) design provide a comprehensive treatment of cutting-edge physical-layer technologies for radio frequency (RF) transceivers - specifically RF, analog, mixed-signal, and digital circuits and architectures. The full design chain is covered, from system design requirements through to building blocks, transceivers, and process technology. Gain insight into the key novelties of 5G through authoritative chapters on massive MIMO and phased arrays, and learn about the very latest technology developments, such as FinFET logic process technology for RF and millimeter-wave applications. This is an essential reading and an excellent reference for high-frequency circuit designers in both academia and industry.

Communication and Radar Systems

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As well as being fully up-to-date, this book provides wider subject coverage than many other radar books. The inclusion of a chapter on Skywave Radar, and full consideration of HF / OTH issues makes this book especially relevant for communications engineers and the defence sector. * Explains key theory and mathematics from square one, using case studies where relevant * Designed so that mathematical sections can be skipped with no loss of continuity by those needing only a qualitative understanding * Theoretical content, presented alongside applications, and working examples, make the book suitable to students or others new to the subject as well as a professional reference

Radar Signal Analysis and Processing Using MATLAB

Praise for the first edition: "This excellent text will be useful to every system engineer (SE) regardless of the domain. It covers ALL relevant SE material and does so in a very clear, methodical fashion. The breadth and depth of the author's presentation of SE principles and practices is outstanding." -Philip Allen This textbook presents a comprehensive, step-by-step guide to System Engineering analysis, design, and development via an integrated set of concepts, principles, practices, and methodologies. The methods presented in this text apply to any type of human system -- small, medium, and large organizational systems and system development projects delivering engineered systems or services across multiple business sectors such as medical, transportation,

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financial, educational, governmental, aerospace and defense, utilities, political, and charity, among others. Provides a common focal point for “bridging the gap” between and unifying System Users, System Acquirers, multi-discipline System Engineering, and Project, Functional, and Executive Management education, knowledge, and decision-making for developing systems, products, or services. Each chapter provides definitions of key terms, guiding principles, examples, author’s notes, real-world examples, and exercises, which highlight and reinforce key SE&D concepts and practices. Addresses concepts employed in Model-Based Systems Engineering (MBSE), Model-Driven Design (MDD), Unified Modeling Language (UMLTM) / Systems Modeling Language (SysMLTM), and Agile/Spiral/V-Model Development such as user needs, stories, and use cases analysis; specification development; system architecture development; User-Centric System Design (UCSD); interface definition & control; system integration & test; and Verification & Validation (V&V). Highlights/introduces a new 21st Century Systems Engineering & Development (SE&D) paradigm that is easy to understand and implement. Provides practices that are critical staging points for technical decision making such as Technical Strategy Development; Life Cycle requirements; Phases, Modes, & States; SE Process; Requirements Derivation; System Architecture Development, User-Centric System Design (UCSD); Engineering Standards, Coordinate Systems, and Conventions; et al. Thoroughly illustrated, with end-of-chapter exercises and numerous case studies and examples, Systems

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Engineering Analysis, Design, and Development, Second Edition is a primary textbook for multi-discipline, engineering, system analysis, and project management undergraduate/graduate level students and a valuable reference for professionals.

Modern Radar System Analysis

In recent years, various algorithms for radar signal design, that rely heavily upon complicated processing and/or antenna architectures, have been suggested. These techniques owe their genesis to several factors, including revolutionary technological advances (new flexible waveform generators, high speed signal processing hardware, digital array radar technology, etc.) and the stressing performance requirements, often imposed by defence applications in areas such as airborne early warning and homeland security. Increasingly complex operating scenarios calls for sophisticated algorithms with the ability to adapt and diversify dynamically the waveform to the operating environment in order to achieve a performance gain over classic radar waveforms. Thus, for example, a modern multifunction phased array radar can adapt the waveform, dwell time and update interval according to the nature of the particular target, e.g. the likely type of target, the clutter environment, the signal-to-noise ratio, the threat that it may represent and the degree to which it is manoeuvring. This is essentially the subject of waveform diversity. This new flexibility demands new ways of characterising waveform properties and optimising waveform design. This ability is very critical in increasing our

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objective performance as the ability will match the transmission waveform to the transmission environment and the sensing objective. This is the first book, in which several quintessential concepts inherent to the application of waveform design and diversity for advanced radar detection, tracking, and classification are brought together.

Radar System Analysis and Modeling

This book details the advantages of MFAR main parameter design and guides you through parameter and performance evaluation procedures. It presents practical design information on combinations of various radar functions, clutter conditions, multipath, and transmitted waveform design when Doppler filters adapted for clutter cancellation.

MATLAB Simulations for Radar Systems Design

An introduction to radar systems should ideally be self-contained and hands-on, a combination lacking in most radar texts. The first edition of Radar Systems Analysis and Design Using MATLAB® provided such an approach, and the second edition continues in the same vein. This edition has been updated, expanded, and reorganized to include advances in the field and to be more logical in sequence. Ideal for anyone encountering the topic for the first time or for professionals in need of on-the-job reference, this book features an abundance of MATLAB programs and code. Radar Systems Analysis and Design Using

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MATLAB®, Second Edition presents the fundamentals and principles of radar along with enough rigorous mathematical derivations to ensure that you gain a deep understanding. The author has extensively revised chapters on radar cross-section and polarization, matched filter and radar ambiguity function, and radar wave propagation. He also added information on topics such as PRN codes, multipath and refraction, clutter and MTI processing, and high range resolution. With all MATLAB functions updated to reflect version 7.0 and an expanded set of self-test problems, you will find this up-to-date text to be the most complete treatment of radar available, providing the hands-on tools that will enrich your learning.

Detection and Estimation for Communication and Radar Systems

Radar Expert, Esteemed Author Gregory L. Charvat on CNN and CBS Author Gregory L. Charvat appeared on CNN on March 17, 2014 to discuss whether Malaysia Airlines Flight 370 might have literally flown below the radar. He appeared again on CNN on March 20, 2014 to explain the basics of radar, and he explored the hope and limitations of the technology involved in the search for Flight 370 on CBS on March 22, 2014. Get His Book Now Coupling theory with reality, from derivation to implementation of actual radar systems, Small and Short-Range Radar Systems analyzes and then provides design procedures and working design examples of small and short-range radar systems. Discussing applications from automotive to through-wall imaging, autonomous vehicle, and beyond, the

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practical text supplies high-level descriptions, theoretical derivations, back-of-envelope calculations, explanations of processing algorithms, and case studies for each type of small radar system covered, including continuous wave (CW), ultrawideband (UWB) impulse, linear frequency modulation (FM), linear rail synthetic aperture radar (SAR), and phased array. This essential reference: Explains how to design your own radar devices Demonstrates how to process data from small radar sensors Provides real-world, measured radar data to test algorithms before investing development time Complete with downloadable MATLAB® scripts and actual radar measurements, Small and Short-Range Radar Systems empowers you to rapidly develop small radar technology for your application.

Millimeter-Wave Circuits for 5G and Radar

This book constitutes a multidisciplinary introduction to the analysis of air defence systems. It supplies the tools to carry out independent analysis. Individual sections deal with threat missions, observability, manoeuvrability and vulnerability. With the support of several examples, the text illustrates 12 air defence process models. These models form the foundation for any air defence system analysis, covering initial detection to kill assessment.

Radar Signal Analysis and Processing Using MATLAB

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An authoritative work on Synthetic Aperture Radar system engineering, with key focus on high resolution imaging, moving target indication, and system engineering technology Synthetic Aperture Radar (SAR) is a powerful microwave remote sensing technique that is used to create high resolution two or three-dimensional representations of objects, such as landscapes, independent of weather conditions and sunlight illumination. SAR technology is a multidisciplinary field that involves microwave technology, antenna technology, signal processing, and image information processing. The use of SAR technology continues grow at a rapid pace in a variety of applications such as high-resolution wide-swath observation, multi-azimuth information acquisition, high-temporal information acquisition, 3-D terrain mapping, and image quality improvement. Design Technology of Synthetic Aperture Radar provides detailed coverage of the fundamental concepts, theories, technology, and design of SAR systems and sub-systems. Supported by the author's over two decades of research and practice experience in the field, this in-depth volume systematically describes SAR design and presents the latest research developments. Providing examination of all topics relevant to SAR—from radar and antenna system design to receiver technology and signal and image information processing—this comprehensive resource: Provides wide-ranging, up-to-date examination of all major topics related to SAR science, systems, and software Includes guidelines to conduct grounding system designs and analysis Offers coverage of all SAR algorithm classes and detailed SAR algorithms suitable for enabling software implementations

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Surveys SAR and computed imaging literature of the last sixty years Emphasizes high resolution imaging, moving target indication, and system engineering Design Technology of Synthetic Aperture Radar is indispensable for graduate students majoring in SAR system design, microwave antenna, signal and information processing as well as engineers and technicians involved in SAR system techniques.

Signal Processing Algorithms for Communication and Radar Systems

The classic reference for radar and remote sensing engineers, Handbook of Radar for Scattering Statistics for Terrain, has been reissued with updated, practical software for modern data analysis applications. First published in 1989, this update features a new preface, along with three new appendices that explain how to use the new software and graphical user interface. Python- and MATLAB-based software has been utilized so remote sensing and radar engineers can utilize the wealth of statistical data that came with the original book and software. This update combines the book and software, previously sold separately, into a single new product. The text first presents detailed examinations of the statistical behavior of speckle when superimposed on nonuniform terrain. The Handbook of Radar Scattering Statistics for Terrain then supports system design and signal processing applications with a complete database of calibrated backscattering coefficients. Compiled over 30 years, the statistical summaries of radar backscatter from terrain offers you over

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400,000 data points compiled in tabular format. With this text, you'll own the most comprehensive database of radar terrain scattering statistics ever compiled. Derived from measurements made by both airborne and ground-based scatterometer systems, the database includes information from 114 references. The text provides over 60 tables of backscatter data for 9 different surface categories, all derived under strict quality criteria. Rigorous standards for calibration accuracy, measurement precision, and category identification make the database the most reliable source for scattering statistics ever available.

Solutions Manual for Radar Systems Analysis And Design Using Matlab

Offering radar-related software for the analysis and design of radar waveform and signal processing, Radar Signal Analysis and Processing Using MATLAB® provides a comprehensive source of theoretical and practical information on radar signals, signal analysis, and radar signal processing with companion MATLAB® code. After an overview of radar systems operation and design, the book reviews elements of signal theory relevant to radar detection and radar signal processing, along with random variables and processes. The author then presents the unique characteristic of the matched filter and develops a general formula for the output of the matched filter that is valid for any waveform. He analyzes several analog waveforms, including the linear frequency modulation pulse and stepped frequency waveforms,

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as well as unmodulated pulse-train, binary, polyphase, and frequency codes. The book explores radar target detection and pulse integration, emphasizing the constant false alarm rate. It also covers the stretch processor, the moving target indicator, radar Doppler processing, beamforming, and adaptive array processing. Using configurable MATLAB code, this book demonstrates how to apply signal processing to radar applications. It includes many examples and problems to illustrate the practical application of the theory.

Radar Range-performance Analysis

In planning a radar system, having the proper mathematical modeling of propagation effects, clutter, and target statistics is essential. Radar Systems Principles provides a strong theoretical basis for the myriad of formulas and rules of thumb required for analysis, conceptual design, and performance evaluation of radar systems. Mathematical derivations of formulas commonly used by radar engineers are presented, with detailed discussions of the assumptions behind these expressions and their ranges of validity. These principles are used in a wide range of radar applications. Radar Systems Principles makes it easy to understand the steps in calculating various formulas and when and how these formulas are used. A set of problems is provided for each chapter, enabling you to check your progress in applying the principles discussed in each section of the text. There are more than 170 figures illustrating key concepts.

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Numerous references to well-known books on radar for coverage of practical design issues and other specialized topics are given. Radar Systems Principles is an ideal textbook for advanced undergraduates and first-year graduate students and also makes an excellent vehicle for self-study by engineers wishing to enhance their understanding of radar principles and their implication in actual systems.

MIMO Radar: Theory and Application

Turn to this expanded second edition of an Artech House bestseller for the most current and comprehensive coverage of radar system performance analysis and system-level modeling. This revised edition features new material on airborne and space-based radar, radar tracking techniques, radar system design, and operational and performance issues. It also provides new detailed examples, problem sets and solutions, and a comprehensive self-test to evaluate your understanding.

Signal Processing in Radar Systems

Offering radar-related software for the analysis and design of radar waveform and signal processing, Radar Signal Analysis and Processing Using MATLAB® provides a comprehensive source of theoretical and practical information on radar signals, signal analysis, and radar signal processing with companion MATLAB® code. After an overview of radar systems operation and design, the book reviews elements of signal theory relevant to radar detection and radar

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signal processing, along with random variables and processes. The author then presents the unique characteristic of the matched filter and develops a general formula for the output of the matched filter that is valid for any waveform. He analyzes several analog waveforms, including the linear frequency modulation pulse and stepped frequency waveforms, as well as unmodulated pulse-train, binary, polyphase, and frequency codes. The book explores radar target detection and pulse integration, emphasizing the constant false alarm rate. It also covers the stretch processor, the moving target indicator, radar Doppler processing, beamforming, and adaptive array processing. Using configurable MATLAB code, this book demonstrates how to apply signal processing to radar applications. It includes many examples and problems to illustrate the practical application of the theory.

Basic Radar Analysis, Second Edition

Introduction to Radar Analysis outlines the fundamental principles and applications of radar as well as important mathematical derivations - serving as a reference for engineers, technical managers, and students. This comprehensive book divides into two parts: General analytical treatment of radar signal processing Specific discussion of radar topics and radar types Chapters contain: derivations of the radar equation in many forms for an essential understanding of radar principles examination of radar cross section and receiver noise practical aspects of radar systems, including stretch

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processing, multipath propagation, and track filters analysis of probability of detection and radar losses; CW and pulsed radars; and pulse compression investigation of current research and industry trends, including clutter and wave propagation, Moving Target Indicator (MTI), tracking radars, and array antennas a unique approach in presenting Synthetic Aperture Radar (SAR) 756 equations and formulas providing detailed mathematical derivations 165 examples and exercise problems as well as 149 figures and plots Introduction to Radar Analysis acts as an essential stepping stone toward specialized topics - providing a clear, accessible framework of radar fundamentals as well as a thorough study of advanced topics and radar technology issues.

Advanced Radar Techniques and Systems

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

Design Technology of Synthetic Aperture Radar

This book helps you master critical system analysis and design skills, and shows you how to use digital computer simulation to verify that an analysis is

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correct and that a design is optimal. This comprehensive resource covers a wide range of essential topics, from matrix, vector and linear equations, noise and clutter generation, Filters (FIR and IIR), and fast Fourier transforms to ambiguity functions, antennas, target detection, and the Kalman filter to the Monte Carlo method, constant false alarm rate (CFAR) processing, and moving target indicators (MTI).

Radar Signals

When you need vital data fast, turn to Radar Essentials. This compact yet comprehensive reference has compiled the most used principles, data, tables, and equations that are used by radar and aerospace system designers on a daily basis. Experts and non-experts alike will find this to be their go-to source for recalling and understanding the fundamentals and employing them in design and performance analysis. Key features: Discussion of principles, design, and operation including radar functions, types, frequencies, configurations and nomenclature. Characteristics and capabilities of key subsystems including antennas, transmitters, receivers, T/R modules, and signal and data processing. Radar performance evaluation techniques and data including radar cross section, signal-to-noise ratio, target detection, search, radar measurements, and tracking. Discussion and data on the radar environment including atmospheric refraction and losses, rain attenuation, terrain, sea and rain clutter, terrain masking and multipath, ionospheric effects on

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radar performance, and electronic countermeasures. Radar techniques including waveform design, moving-target indication (MTI), displaced phase-center arrays (DPCA), pulse Doppler operation, space-time adaptive processing (STAP), and target classification, discrimination and identification.

Design of Multi-Frequency CW Radars

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.

Radar Systems, Peak Detection and Tracking

Introduction. Signal Analysis. Amplitude Modulation: Communication Systems. Amplitude Modulation: Radar Systems. Angle Modulation: Communication Systems. Angle Modulation: Radar Systems. Analog Pulse Modulation: Communication Systems. Mixed Modulation: Radar Systems. Probability and Random

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Variables. Stochastic Processes. Noise in Communication Systems. Noise in Radar Systems. Electronic Warfare. These chapter headings show the wide range of coverage of radar and communication systems. Written in a conversational style, this book by Nicolaos S. Tzannes is an easy-to-understand approach to radar and its relationship to communication systems. The author takes radar beyond its military uses into its many civilian applications, pointing out that the two fields have so much in common that the student with some prior background can absorb the material quickly and easily.

System Engineering Analysis, Design, and Development

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.

Surface-based Air Defense System

Analysis

Digital signal processing lies at the heart of the communications revolution and is an essential element of key technologies such as mobile phones and the Internet. This book covers all the major topics in digital signal processing (DSP) design and analysis, supported by MatLab examples and other modelling techniques. The authors explain clearly and concisely why and how to use digital signal processing systems; how to approximate a desired transfer function characteristic using polynomials and ratio of polynomials; why an appropriate mapping of a transfer function on to a suitable structure is important for practical applications; and how to analyse, represent and explore the trade-off between time and frequency representation of signals. An ideal textbook for students, it will also be a useful reference for engineers working on the development of signal processing systems.

Radar Essentials

Here's a thorough overview of the state-of-the-art in design and implementation of advanced tracking for single and multiple sensor systems. This practical resource provides modern system designers and analysts with in-depth evaluations of sensor management, kinematic and attribute data processing, data association, situation assessment, and modern tracking and data fusion methods as applied in both military and non-military arenas.

Introduction to Radar Analysis, Second Edition

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 requirements
- Be able to perform detailed trade-off analysis in the context of radar sizing, modes of operation, frequency selection, waveforms, and signal processing
- Develop loss and error budgets associated with the design

MATLAB Simulations for Radar Systems Design teaches all of this and provides the M-files and hands-on simulation experience needed to design and analyze radar systems. Part I forms a comprehensive description of radar systems, their analysis, and the design process. The authors' unique approach involves a design case study introduced in Chapter 1 and followed throughout the text. As the treatment progresses, the complexity increases and the case study requirements are adjusted accordingly. Part II presents a series of chapters—some authored by other experts in the field—on specialized radar topics important to a full understanding of radar systems design and analysis. A comprehensive set of MATLAB programs and functions support both parts of the book and are available for download from the CRC Press Web site.

Radar Systems Analysis and Design

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Using MATLAB

Developed from the author's graduate-level courses, the first edition of this book filled the need for a comprehensive, self-contained, and hands-on treatment of radar systems analysis and design. It quickly became a bestseller and was widely adopted by many professors. The second edition built on this successful format by rearranging and updating

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