Advanced Signal Processing Theory And Implementation For Sonar Radar And Non Invasive Medical Diagnostic Systems Second Edition Electrical Engineering Applied Signal Processing Series

Noise cancellation is particularly important in the new mobile communications field, with respect to background noise and acoustic interference in moving vehicles. This comprehensive text develops a coherent and structured presentation of a broad range of the theory and application of statistical signal processing, with emphasis on digital noise reduction algorithms. Other applications covered are spectral estimation, channel equalisation, speech coding over noisy channels, speech recognition in adverse environments, active noise control, echo cancellation, restoration of lost filters, and adaptive notch filters.

Digital signal processing plays a central role in the development of modern communication and information processing systems. The theory and application of signal processing is concerned with the identification, modelling and utilisation of patterns and structures in a signal process. The observation signals are often

distorted, incomplete and noisy and therefore noise reduction, the removal of channel distortion, and replacement of lost samples are important parts of a signal processing system. The fourth edition of Advanced Digital Signal Processing and Noise Reduction updates and extends the chapters in the previous edition and includes two new chapters on MIMO systems, Correlation and Eigen analysis and independent component analysis. The wide range of topics covered in this book include Wiener filters, echo cancellation, channel equalisation, spectral estimation, detection and removal of impulsive and transient noise, interpolation of missing data segments, speech enhancement and noise/interference in mobile communication environments. This book provides a coherent and structured presentation of the theory and applications of statistical signal processing and noise reduction methods. Two new chapters on MIMO systems, correlation and Eigen analysis and independent component analysis Comprehensive coverage of advanced digital signal processing and noise reduction methods for communication and information processing systems Examples and applications in signal and information extraction from noisy data Comprehensive but accessible coverage of signal processing theory including probability models, Bayesian inference, hidden Markov models, adaptive filters and Linear prediction models Advanced Digital Signal Processing and Noise

Reduction is an invaluable text for postgraduates, senior undergraduates and researchers in the fields of digital signal processing, telecommunications and statistical data analysis. It will also be of interest to professional engineers in telecommunications and audio and signal processing industries and network planners and implementers in mobile and wireless communication communities. Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. A comprehensive introduction to the mathematical principles and algorithms in statistical signal processing and modern neural networks. This text is an expanded version of a graduate course on advanced signal processing at the Johns Hopkins University Whiting school program for professionals with students from electrical engineering, physics, computer and data science, and mathematics backgrounds. It covers the theory underlying applications in statistical signal processing including spectral estimation, linear prediction, adaptive filters, and optimal processing of uniform spatial arrays. Unique among books on the subject, it also includes a comprehensive introduction to modern neural networks with examples in time series and image classification. Coverage includes: Mathematical structures of signal spaces and matrix factorizations linear time-invariant systems and transforms Least squares

filters Random variables, estimation theory, and random processes Spectral estimation and autoregressive signal models linear prediction and adaptive filters Optimal processing of linear arrays Neural networks

This four volume set, edited and authored by world leading experts, gives a review of the principles, methods and techniques of important and emerging research topics and technologies in machine learning, advanced signal processing theory, communications and radar signal processing, array and statistical signal processing, Image, Video Processing and Analysis, Hardware, Audio, Acoustic and Speech Processing. With this reference source you will: Quickly grasp a new area of research Understand the underlying principles of a topic and its application Ascertain how a topic relates to other areas and learn of the research issues yet to be resolved Quick tutorial reviews of important and emerging topics of research Presents core principles in signal processing theory and shows their application Reference content on core principles, technologies, algorithms and applications Comprehensive references to journal articles and other literature on which to build further, more specific and detailed knowledge Edited by leading people in the field who, through their reputation, have been able to commission experts to write on a particular topic

Advanced Signal Processing for Communication Systems consists of 20

contributions from researchers and experts. The first group of chapters deals with the audio and video processing for communications applications, including topics ranging from multimedia content delivery over the Internet, through the speech processing and recognition to recognition of non-speech sounds that can be attributed to the surrounding environment. The book also includes sections on applications of error control coding, information theory, and digital signal processing for communication systems like modulation, software-defined radio, and channel estimation. Advanced Signal Processing for Communication Systems is written for researchers working on communication systems and signal processing, as well as telecommunications industry professionals.

Multimodal signal processing is an important research and development field that processes signals and combines information from a variety of modalities – speech, vision, language, text – which significantly enhance the understanding, modelling, and performance of human-computer interaction devices or systems enhancing human-human communication. The overarching theme of this book is the application of signal processing and statistical machine learning techniques to problems arising in this multi-disciplinary field. It describes the capabilities and limitations of current technologies, and discusses the technical challenges that must be overcome to develop efficient and user-friendly multimodal interactive

systems. With contributions from the leading experts in the field, the present book should serve as a reference in multimodal signal processing for signal processing researchers, graduate students, R&D engineers, and computer engineers who are interested in this emerging field. Presents state-of-art methods for multimodal signal processing, analysis, and modeling Contains numerous examples of systems with different modalities combined Describes advanced applications in multimodal Human-Computer Interaction (HCI) as well as in computer-based analysis and modelling of multimodal human-human communication scenes. Additive and multiplicative noise in the information signal can significantly limit the potential of complex signal processing systems, especially when those systems use signals with complex phase structure. During the last few years this problem has been the focus of much research, and its solution could lead to profound improvements in applications of complex signals and coherent signal processing. Signal Processing Noise sets forth a generalized approach to signal processing in multiplicative and additive noise that represents a remarkable advance in signal processing and detection theory. This approach extends the boundaries of the noise immunity set by classical and modern signal processing theories, and systems constructed on this basis achieve better detection performance than that of systems currently in use. Featuring the results of the

author's own research, the book is filled with examples and applications, and each chapter contains an analysis of recent observations obtained by computer modelling and experiments. Tables and illustrations clearly show the superiority of the generalized approach over both classical and modern approaches to signal processing noise. Addressing a fundamental problem in complex signal processing systems, this book offers not only theoretical development, but practical recommendations for raising noise immunity in a wide range of applications.

This book presents basic and advanced topics in the areas of sig nal theory and processing as applied to acoustic echo-location (sonar). It is written at the advanced undergraduate or graduate level, and as sumes that the reader is conversant with the concepts and mathematics associated with introductory graduate courses in signal processing such as linear and complex algebra, Fourier analysis, probability, advanced calculus, and linear system theory. The material is presented in a tuto rial fashion as a logical development starting with basic principles and leading to the development of topics in detection and estimation theory, waveform design, echo modeling, scattering theory, and spatial process ing. Examples are provided throughout the book to illustrate impor tant concepts and especially important relationships are boxed. The book addresses the practical aspects of receiver and waveform design, and therefore should

be of interest to the practicing engineer as well as the student. Although much of the book is applicable to the general echo-location problem that includes radar, its emphasis is on acoustic echo location especially in regard to time mapping and the wideband or wavelet description of Doppler. Introductory signal theory material is included in the first chapter to provide a foundation for the material covered in the later chapters. A consistent notational convention is ob served throughout the book so that the various mathematical entities are readily identified. This is described in the glossary and symbol list.

Applied Signal Processing: A MATLAB-Based Proof of Concept benefits readers by including the teaching background of experts in various applied signal processing fields and presenting them in a project-oriented framework. Unlike many other MATLAB-based textbooks which only use MATLAB to illustrate theoretical aspects, this book provides fully commented MATLAB code for working proofs-of-concept. The MATLAB code provided on the accompanying online files is the very heart of the material. In addition each chapter offers a functional introduction to the theory required to understand the code as well as a formatted presentation of the contents and outputs of the MATLAB code. Each chapter exposes how digital signal processing is applied for solving a real engineering problem used in a consumer product. The chapters are organized with a description of the problem in its applicative context and a functional review of the theory related to its solution appearing first. Equations are only used for a

precise description of the problem and its final solutions. Then a step-by-step MATLAB-based proof of concept, with full code, graphs, and comments follows. The solutions are simple enough for readers with general signal processing background to understand and they use state-of-the-art signal processing principles. Applied Signal Processing: A MATLAB-Based Proof of Concept is an ideal companion for most signal processing course books. It can be used for preparing student labs and projects.

Because most real-world signals, including speech, sonar, communication, and biological signals, are non-stationary, traditional signal analysis tools such as Fourier transforms are of limited use because they do not provide easily accessible information about the localization of a given frequency component. A more suitable approach for those studying non-stationary signals is the use of time frequency representations that are functions of both time and frequency. Applications in Time-Frequency Signal Processing investigates the use of various time-frequency representations, such as the Wigner distribution and the spectrogram, in diverse application areas. Other books tend to focus on theoretical development. This book differs by highlighting particular applications of time-frequency representations and demonstrating how to use them. It also provides pseudo-code of the computational algorithms for these representations so that you can apply them to your own specific problems. Written by leaders in the field, this book offers the opportunity to learn from experts. Time-Frequency Representation (TFR) algorithms are simplified, enabling you to understand the complex theories

behind TFRs and easily implement them. The numerous examples and figures, review of concepts, and extensive references allow for easy learning and application of the various time-frequency representations.

This book highlights the latest advances and trends in advanced signal processing (such as wavelet theory, time-frequency analysis, empirical mode decomposition, compressive sensing and sparse representation, and stochastic resonance) for structural health monitoring (SHM). Its primary focus is on the utilization of advanced signal processing techniques to help monitor the health status of critical structures and machines encountered in our daily lives: wind turbines, gas turbines, machine tools, etc. As such, it offers a key reference guide for researchers, graduate students, and industry professionals who work in the field of SHM.

Stochastic signal processing plays a central role in telecommunication and information processing systems, and has a wide range of applications in speech technology, audio signal processing, channel equalisation, radar signal processing, pattern analysis, data forecasting, decision making systems etc. The theory and application of signal processing is concerned with the identification, modelling, and utilisation of patterns and structures in a signal process. The observation signals are often distorted, incomplete and noisy. Hence, noise reduction and the removal of channel distortions is an important part of a signal processing system. The aim of this book is to provide a coherent and structured presentation of the theory and applications of stochastic signal

processing and noise reduction methods. This book is organised in fourteen chapters. Chapter 1 begins with an introduction to signal processing, and provides a brief review of the signal processing methodologies and applications. The basic operations of sampling and quantisation are reviewed in this chapter. Chapter 2 provides an introduction to the theory and applications of stochastic signal processing. The chapter begins with an introduction to random signals, stochastic processes, probabilistic models and statistical measures. The concepts of stationary, non-stationary and ergodic processes are introduced in this chapter, and some important classes of random processes such as Gaussian, mixture Gaussian, Markov chains, and Poisson processes are considered. The effects of transformation of a signal on its distribution are considered.

Based on fundamental principles from mathematics, linear systems, and signal analysis, digital signal processing (DSP) algorithms are useful for extracting information from signals collected all around us. Combined with today's powerful computing capabilities, they can be used in a wide range of application areas, including engineering, communicati

This final report discusses the technical results from four independent tasks. The effectiveness of the complex cepstrum technique to resolve multipathed acoustic signals was evaluated and compared to autocorrelation techniques. Significant improvements were made in a curvilinear ray theory propagation model, extending

accuracy and improving certain algorithms. The maximum entropy spectrum analysis technique was evaluated in terms of estimation accuracy and parameter behavior. A brief description is given of software developed for the OASIS computer system.

This first volume, edited and authored by world leading experts, gives a review of the principles, methods and techniques of important and emerging research topics and technologies in machine learning and advanced signal processing theory. With this reference source you will: Quickly grasp a new area of research Understand the underlying principles of a topic and its application Ascertain how a topic relates to other areas and learn of the research issues yet to be resolved Quick tutorial reviews of important and emerging topics of research in machine learning Presents core principles in signal processing theory and shows their applications Reference content on core principles, technologies, algorithms and applications Comprehensive references to journal articles and other literature on which to build further, more specific and detailed knowledge Edited by leading people in the field who, through their reputation, have been able to commission experts to write on a particular topic

The book discusses receiving signals that most electrical engineers detect and study. The vast majority of signals could never be detected due to random additive signals, known as noise, that distorts them or completely overshadows them. Such examples include an audio signal of the pilot communicating with the ground over the engine noise or a bioengineer listening for a fetus' heartbeat over the mother's. The text

presents the methods for extracting the desired signals from the noise. Each new development includes examples and exercises that use MATLAB to provide the answer in graphic forms for the reader's comprehension and understanding.

The latest, completely revised edition of this highly successful volume outlines the techniques for the digital processing of signals (DSP) providing a clear discussion of the technical problems. Essential theories of DSP are discussed in a clear and concise manner and the merits of the various techniques are also compared. New developments such as Fourier transforms, filter banks, and applications of DSP in telecommunications are covered in detail. Special features include: * exercises which enable the reader to have a more pragmatic understanding of the topics discussed * a new chapter on filter banks * updated information on finite impulse response (FIR) filters It will prove an invaluable text for practising development engineers, researchers and students working in advanced electronic and electrical engineering.

This book is devoted to the application of advanced signal processing on event-related potentials (ERPs) in the context of electroencephalography (EEG) for the cognitive neuroscience. ERPs are usually produced through averaging single-trials of preprocessed EEG, and then, the interpretation of underlying brain activities is based on the ordinarily averaged EEG. We find that randomly fluctuating activities and artifacts can still present in the averaged EEG data, and that constant brain activities over single trials can overlap with each other in time, frequency and spatial domains.

Therefore, before interpretation, it will be beneficial to further separate the averaged EEG into individual brain activities. The book proposes systematic approaches pre-process wavelet transform (WT), independent component analysis (ICA), and nonnegative tensor factorization (NTF) to filter averaged EEG in time, frequency and space domains to sequentially and simultaneously obtain the pure ERP of interest. Software of the proposed approaches will be open-accessed.
Contents:IntroductionWavelet Filter Design Based on Frequency Responses for Filtering ERP Data With Duration of One EpochIndividual-Level ICA to Extract the ERP Components from the Averaged EEG DataMulti-Domain Feature of the ERP Extracted by NTF: New Approach for Group-Level Analysis of ERPsAnalysis of Ongoing EEG by NTF During Real-World Music ExperiencesAppendix: Introduction to Basic Knowledge of Mismatch Negativity Readership: Undergraduate, graduate, researchers and professionals in the field of neurology/neuroscience, medical imaging, psychology, biomedical engineering and computer science. Key Features:Advanced signal processing approaches can be applied on averaged EEG to extract ERPs' componentsFiltering ERPs in time, frequency and space domains sequentially and simultaneouslyDemo of ERP data and MATLAB codes are open-access for the advanced signal processing approaches on ERPsKeywords:Event-Related Potentials (ERPs);Digital Filter;Wavelet Filter;Independent Component Analysis;Tensor Decomposition;Nonnegative Tensor Factorization;Time-Frequency Representation

Signal processing plays an increasingly central role in the development of modern telecommunication and information processing systems, with a wide range of applications in areas such as multimedia technology, audio-visual signal processing, cellular mobile communication, radar systems and financial data forecasting. The theory and application of signal processing deals with the identification, modelling and utilisation of patterns and structures in a signal process. The observation signals are often distorted, incomplete and noisy and hence, noise reduction and the removal of channel distortion is an important part of a signal processing system. Advanced Digital Signal Processing and Noise Reduction, Third Edition, provides a fully updated and structured presentation of the theory and applications of statistical signal processing and noise reduction methods. Noise is the eternal bane of communications engineers, who are always striving to find new ways to improve the signal-to-noise ratio in communications systems and this resource will help them with this task. * Features two new chapters on Noise, Distortion and Diversity in Mobile Environments and Noise Reduction Methods for Speech Enhancement over Noisy Mobile Devices. * Topics discussed include: probability theory, Bayesian estimation and classification, hidden Markov models, adaptive filters, multi-band linear prediction, spectral estimation, and impulsive and transient noise removal. * Explores practical solutions to interpolation of missing signals, echo cancellation, impulsive and transient noise removal, channel equalisation, HMM-based signal and noise decomposition. This is an invaluable text for

senior undergraduates, postgraduates and researchers in the fields of digital signal processing, telecommunications and statistical data analysis. It will also appeal to engineers in telecommunications and audio and signal processing industries.

A self-contained approach to DSP techniques and applications in radar imaging The processing of radar images, in general, consists of three major fields: Digital Signal Processing (DSP); antenna and radar operation; and algorithms used to process the radar images. This book brings together material from these different areas to allow readers to gain a thorough understanding of how radar images are processed. The book is divided into three main parts and covers: * DSP principles and signal characteristics in both analog and digital domains, advanced signal sampling, and interpolation techniques * Antenna theory (Maxwell equation, radiation field from dipole, and linear phased array), radar fundamentals, radar modulation, and target-detection techniques (continuous wave, pulsed Linear Frequency Modulation, and stepped Frequency Modulation) * Properties of radar images, algorithms used for radar image processing, simulation examples, and results of satellite image files processed by Range-Doppler and Stolt interpolation algorithms The book fully utilizes the computing and graphical capability of MATLAB? to display the signals at various processing stages in 3D and/or cross-sectional views. Additionally, the text is complemented with flowcharts and system block diagrams to aid in readers' comprehension. Digital Signal Processing Techniques and Applications in Radar Image Processing serves as an ideal

textbook for graduate students and practicing engineers who wish to gain firsthand experience in applying DSP principles and technologies to radar imaging.

The creation of the text really began in 1976 with the author being involved with a group of researchers at Stanford University and the Naval Ocean Systems Center, San Diego. At that time, adaptive techniques were more laboratory (and mental) curiosities than the accepted and pervasive categories of signal processing that they have become. Over the lasl 10 years, adaptive filters have become standard components in telephony, data communications, and signal detection and tracking systems. Their use and consumer acceptance will undoubtedly only increase in the future. The mathematical principles underlying adaptive signal processing were initially fascinating and were my first experience in seeing applied mathematics work for a paycheck. Since that time, the application of even more advanced mathematical techniques have kept the area of adaptive signal processing as exciting as those initial days. The text seeks to be a bridge between the open literature in the professional journals, which is usually quite concentrated, concise, and advanced, and the graduate classroom and research environment where underlying principles are often more important.

This book documents the significant progress in studies concerning linear circuits and systems, including their applications to digital filters, in Japan. It considers rational approximations in circuit and system theory and deals with the digital lattice filters used in digital signal processing.

Discover the Applicability, Benefits, and Potential of New Technologies As advances in algorithms and computer technology have bolstered the digital signal processing capabilities of real-time sonar, radar, and non-invasive medical diagnostics systems, cutting-edge military and defense research has established conceptual similarities in these areas. Now civilian enterprises can use government innovations to facilitate optimal functionality of complex real-time systems. Advanced Signal Processing details a cost-efficient generic processing structure that exploits these commonalities to benefit commercial applications. Learn from a Renowned Defense Scientist, Researcher, and Innovator The author preserves the mathematical focus and key information from the first edition that provided invaluable coverage of topics including adaptive systems, advanced beamformers, and volume visualization methods in medicine. Integrating the best features of non-linear and conventional algorithms and explaining their application in PC-based architectures, this text contains new data on: Advances in biometrics, image segmentation, registration, and fusion techniques for 3D/4D ultrasound, CT, and MRI Fully digital 3D/ (4D: 3D+time) ultrasound system technology, computing architecture requirements, and relevant implementation issues State-of-the-art non-invasive medical procedures, non-destructive 3D tomography imaging and biometrics, and monitoring of vital signs Cardiac motion correction in multi-slice X-ray CT imaging Space-time adaptive processing and detection of targets interference-intense backgrounds comprised of clutter and jamming With its detailed explanation of

adaptive, synthetic-aperture, and fusion-processing schemes with near-instantaneous convergence in 2-D and 3-D sensors (including planar, circular, cylindrical, and spherical arrays), the quality and illustration of this text's concepts and techniques will make it a favored reference.

Research under this grant led to a number of new and promising developments in the use of signal processing methodology and algorithms including multirate system theory in the solution of wireless and related communication problems.

An excellent introductory text, this book covers the basic theoretical, algorithmic and real-time aspects of digital signal processing (DSP). Detailed information is provided on off-line, real-time and DSP programming and the reader is effortlessly guided through advanced topics such as DSP hardware design, FIR and IIR filter design and difference equation manipulation.

Advances in digital signal processing algorithms and computer technology have combined to produce real-time systems with capabilities far beyond those of just few years ago. Nonlinear, adaptive methods for signal processing have emerged to provide better array gain performance, however, they lack the robustness of conventional algorithms. The challenge remains to develop a concept that exploits the advantages of both-a scheme that integrates these methods in practical, real-time systems. The Advanced Signal Processing Handbook helps you meet that challenge. Beyond offering an outstanding introduction to the principles and applications of advanced signal

processing, it develops a generic processing structure that takes advantage of the similarities that exist among radar, sonar, and medical imaging systems and integrates conventional and nonlinear processing schemes.

The topics covered in this extensive book deal with the core areas of digital signal processing. It is compiled in such a manner, that it will provide in-depth knowledge about the theory and practices of signal processing through detailed discussions of concepts such as time and space domains, wavelet, discrete signals, etc. There has been rapid progress in this field and its applications are finding their way across multiple industries. This book compiles significant researches contributed by scientists and engineers. It will prove beneficial for students of engineering. Academicians and research scholars will also find this book useful.

6.7 Concept Demonstration: Simulations and Experimental Results -- 6.8 Conclusion -- 7 Advanced Applications of Volume Visualization Methods in Medicine -- 7.1 Volume Visualization Principles -- 7.2 Applications to Medical Data -- Appendix Principles of Image Processing: Pixel Brightness Transformations, Image Filtering and Image Restoration -- 8 Target Tracking Wolfgang Koch -- 8.1 Introduction -- 8.2 Discussion of the Problem -- 8.3 Statistical Models -- 8.4 Bayesian Track Maintenance -- 8.5 Suboptimal Realization -- 8.6 Selected Applications -- 9 Target Motion Analysis (TMA) Klaus Becker -- 9.1 Introduction -- 9.2 Features of the TMA Problem -- 9.3 Solution of the TMA Problem -- 9.4 Conclusion -- SECTION II Sonar and Radar System

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The book provides a comprehensive exposition of all major topics in digital signal processing (DSP). With numerous illustrative examples for easy understanding of the topics, it also includes MATLAB-based examples with codes in order to encourage the readers to become more confident of the fundamentals and to gain insights into DSP. Further, it presents real-world signal processing design problems using MATLAB and programmable DSP processors. In addition to problems that require analytical solutions, it discusses problems that require solutions using MATLAB at the end of each chapter. Divided into 13 chapters, it addresses

many emerging topics, which are not typically found in advanced texts on DSP. It includes a chapter on adaptive digital filters used in the signal processing problems for faster acceptable results in the presence of changing environments and changing system requirements. Moreover, it offers an overview of wavelets, enabling readers to easily understand the basics and applications of this powerful mathematical tool for signal and image processing. The final chapter explores DSP processors, which is an area of growing interest for researchers. A valuable resource for undergraduate and graduate students, it can also be used for self-study by researchers, practicing engineers and scientists in electronics, communications, and computer engineering as well as for teaching one- to two-semester courses.

Engineers in all fields will appreciate a practical guide that combines several new effective MATLAB® problem-solving approaches and the very latest in discrete random signal processing and filtering. Numerous Useful Examples, Problems, and Solutions – An Extensive and Powerful Review Written for practicing engineers seeking to strengthen their practical grasp of random signal processing, Discrete Random Signal Processing and Filtering Primer with MATLAB provides the opportunity to doubly enhance their skills. The author, a leading expert in the field of electrical and computer engineering, offers a solid review of recent developments in discrete signal processing. The book also details the latest progress in the revolutionary MATLAB language. A Practical Self-Tutorial That Transcends Theory The author introduces an incremental discussion of signal processing and filtering, and presents several new methods that can be used for a more dynamic analysis of random digital signals with both linear and non-linear filtering. Ideal as a self-tutorial, this book includes numerous examples and functions, which can be used to select parameters, perform simulations, and analyze

results. This concise guide encourages readers to use MATLAB functions – and those new ones introduced as Book MATLAB Functions – to substitute many different combinations of parameters, giving them a firm grasp of how much each parameter affects results. Much more than a simple review of theory, this book emphasizes problem solving and result analysis, enabling readers to take a hands-on approach to advance their own understanding of MATLAB and the way it is used within signal processing and filtering.

This book presents worldwide outstanding research and recent progress in the applications of neural networks, fuzzy logic, chaos, independent component analysis, etc to fields related to speech recognition enhancement, supervised Fourier demixing noise elimination, acoustic databases, the human hearing system, cancer detection, image processing, and visual communications.

Proceedings of SPIE present the original research papers presented at SPIE conferences and other high-quality conferences in the broad-ranging fields of optics and photonics. These books provide prompt access to the latest innovations in research and technology in their respective fields. Proceedings of SPIE are among the most cited references in patent literature.

In a field as rapidly expanding as digital signal processing, even the topics relevant to the basics change over time both in their nature and their relative importance. It is important, therefore, to have an up-to-date text that not only covers the fundamentals, but that also follows a logical development that leaves no gaps readers must somehow bridge by themselves. Digital Signal Processing with Examples in MATLAB® is just such a text. The presentation does not focus on DSP in isolation, but relates it to continuous signal processing and treats digital signals as samples of physical phenomena. The author also takes care to

introduce important topics not usually addressed in signal processing texts, including the discrete cosine and wavelet transforms, multirate signal processing, signal coding and compression, least squares systems design, and adaptive signal processing. He also uses the industry-standard software MATLAB to provide examples of signal processing, system design, spectral analysis, filtering, coding and compression, and exercise solutions. All of the examples and functions used in the text are available online at www.crcpress.com. Designed for a one-semester upper-level course but also ideal for self-study and reference, Digital Signal Processing with Examples in MATLAB is complete, self-contained, and rigorous. For basic DSP, it is quite simply the only book you need.

Advanced Signal Processing HandbookTheory and Implementation for Radar, Sonar, and Medical Imaging Real Time SystemsCRC Press

Provides a detailed treatment of the concepts and applications of advanced digital signal processing.