

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

Master the basic concepts and methodologies of digital signal processing with this systematic introduction, without the need for an extensive mathematical background. The authors lead the reader through the fundamental mathematical principles underlying the operation of key signal processing techniques, providing simple arguments and cases rather than detailed general proofs. Coverage of practical implementation, discussion of the limitations of particular methods and plentiful MATLAB illustrations allow readers to better connect theory and practice. A focus on algorithms that are of theoretical importance or useful in real-world applications ensures that students cover material relevant to engineering practice, and equips students and practitioners alike with the basic principles necessary to apply DSP techniques to a variety of applications. Chapters include worked examples, problems and computer experiments, helping students to absorb the material they have just read. Lecture slides for all figures and solutions to the numerous problems are available to instructors.

This comprehensive and engaging textbook introduces the basic principles and techniques of signal processing, from the fundamental ideas of signals and systems theory to real-world applications. Students are introduced to the powerful foundations of modern signal processing, including the basic geometry of Hilbert space, the mathematics of Fourier transforms, and essentials of sampling, interpolation, approximation and compression. The authors discuss real-world issues and hurdles to using these tools, and ways of adapting them to overcome problems of finiteness and localization, the limitations of uncertainty, and computational costs. It includes over 160 homework problems and over 220 worked examples, specifically designed to test and expand students' understanding of the fundamentals of signal processing, and is accompanied by extensive online materials designed to aid learning, including Mathematica® resources and interactive demonstrations.

A synergistic approach to signal integrity for high-speed digital design. This book is designed to provide contemporary readers with an understanding of the emerging high-speed signal integrity issues that are creating roadblocks in digital design. Written by the foremost experts on the subject, it leverages concepts and techniques from non-related fields such as applied physics and microwave engineering and applies them to high-speed digital design—creating the optimal combination between theory and practical applications. Following an introduction to the importance of signal integrity, chapter coverage includes: Electromagnetic fundamentals for signal integrity Transmission line fundamentals Crosstalk Non-ideal conductor models, including surface roughness and frequency-dependent inductance Frequency-dependent properties of dielectrics Differential signaling Mathematical requirements of physical channels S-parameters for digital engineers Non-ideal return paths and via resonance I/O circuits and models Equalization Modeling and budgeting of timing jitter and noise System analysis using response surface modeling Each chapter includes many figures and numerous examples to help readers relate the concepts to everyday design and concludes with problems for readers to test their understanding of the material. Advanced Signal Integrity for High-Speed Digital Designs is suitable as a textbook for graduate-level courses on signal integrity, for programs taught in industry for professional engineers, and as a reference for the high-speed digital designer.

Designed for graduate students and signal processing practitioners with an introductory background in DSP, this new text gives representative coverage of advanced topics (orthogonal expansions, optimal filters, and two-dimensional DSP), and advanced aspects of familiar topics (fast transforms beyond the FFT, non-uniform sampling and quantization). Providing a self-contained blending of DSP theory, applications to speech and image processing, and state-of-the-art DSP hardware, Digital Signal Processing includes: introductory DSP concepts summarized in five appendixes; DSP filter algorithms - e.g. subband and median filters; least squares, optimal, and adaptive filters spectral estimation and deconvolution; speech and image processing applications; and DSP hardware realizations.

This textbook gives a fresh approach to an introductory course in signal processing. Its unique feature is to alternate chapters on continuous-time (analog) and discrete-time (digital) signal processing concepts in a parallel and synchronized manner. This presentation style helps readers to realize and understand the close relationships between continuous and discrete time signal processing, and lays a solid foundation for the study of practical applications such as the analysis and design of analog and digital filters. The compendium provides motivation and necessary mathematical rigor. It generalizes the Fourier transform to Laplace and Z transforms, applies these transforms to linear system analysis, covers the time and frequency-domain analysis of differential and difference equations, and presents practical applications of these techniques to convince readers of their usefulness. MATLAB® examples are provided throughout, and over 100 pages of solved homework problems are included in the appendix. Contents: Introduction to Signal Processing Discrete-Time Signals and Operations Continuous-Time Signals and Operations Frequency Analysis of Discrete-Time Signals Frequency Analysis of Continuous-Time Signals Sampling Theory and Practice Frequency Analysis of Discrete-Time Systems Frequency Analysis of Continuous-Time Systems Z-Domain Signal Processing S-Domain Signal Processing Applications of Z-Domain Signal Processing Applications of S-Domain Signal Processing Appendix: Solved Homework Problems Readership: Researchers, academics, professionals and undergraduate students in signal processing. Keywords: Signal Processing; Introduction; Analog and Digital; Practical; Applications; Solved Homework Problems Review: 0

Nonlinear Optical Systems: Principles, Phenomena, and Advanced Signal Processing is a simplified overview of the evolution of technology associated with nonlinear systems and advanced signal processing. This book's coverage ranges from fundamentals to phenomena to the most cutting-edge aspects of systems for next-generation biomedical monitoring and nonlinear optical transmission. The authors address how these systems are applied through photonic signal processing in contemporary optical systems for communications and/or laser systems. They include a concise but sufficient explanation of mathematical representation of nonlinear equations to provide insight into nonlinear dynamics at different phases. The book also describes advanced aspects of solitons and bound solitons for passive- and active-mode locked fiber lasers, in which higher-order differential equations can be employed to represent the dynamics of amplitude evolution in the current or voltages of lightwaves in such systems. Covering a wide range of topics, this book: Introduces nonlinear systems and some mathematical representations, particularly the routes to chaos and bifurcation Describes nonlinear fiber lightwave lasing systems Covers nonlinear phenomena in fiber lasers, including both passive and active energy storage cavities Experimentally and theoretically demonstrates soliton pulses, in which lightwaves are the carrier under their envelopes Assembles and demonstrates sequences of both single and multiple solitons in a group and then assesses their dynamics in detail Examines the evolution of bound solitons, which are transmitted through single-mode optical fibers that compose a phase variation system This text outlines the theory and techniques used in nonlinear physics and applications for physical systems. It also illustrates the use of MATLAB® and Simulink® computer models and processing techniques for nonlinear signals. Building on readers' newly acquired fundamental understanding of nonlinear systems and associated signal processing, the book then demonstrates the use of such applications in real-world, practical environments.

Presents an advanced overview of Digital Signal Processing and its applications to exploration seismology, for electrical engineers, geophysicists and petroleum professionals.

A young man begins a journey from Saudi Arabia, believing it will end with his death in England. If his mission succeeds, he will go to his god a martyr - and many innocents will die with him. For David Banks, an armed protection officer, charged with neutralizing the threat to London's safety, his role is no longer clear-cut: one man's terrorist is another man's freedom fighter: dangerous distinctions to a police officer

with his finger on the trigger. Soon the two men's paths will cross. Before then, their commitment will be shaken by the journeys that take them there. The suicide bomber and the policeman will have cause to question the roads they've chosen. Win or lose, neither will be the same again...

The requirement of causality in system theory is inevitably accompanied by the appearance of certain mathematical operations, namely the Riesz projection, the Hilbert transform, and the spectral factorization mapping. A classical example illustrating this is the determination of the so-called Wiener filter (the linear, minimum means square error estimation filter for stationary stochastic sequences [88]). If the filter is not required to be causal, the transfer function of the Wiener filter is simply given by $H(\omega) = \frac{S_{xy}(\omega)}{S_{xx}(\omega)}$, where $S_{xy}(\omega)$ and $S_{xx}(\omega)$ are certain given functions. However, if one requires that the estimation filter is causal, the transfer function of the optimal filter is given by $H(\omega) = \frac{S_{xy}(\omega)}{P(\omega)}$. Here $P(\omega)$ and $Q(\omega)$ represent the so called spectral factors of $S_{xx}(\omega)$ and $S_{yy}(\omega)$. P is the so called Riesz projection. Thus, compared to the non-causal filter, two additional operations are necessary for the determination of the causal filter, namely the spectral factorization mapping $S_{xx}(\omega) = P(\omega)Q(\omega)$, and the Riesz projection P .

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 last 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.

A problem-solving approach to statistical signal processing for practicing engineers, technicians, and graduate students This book takes a pragmatic approach in solving a set of common problems engineers and technicians encounter when processing signals. In writing it, the author drew on his vast theoretical and practical experience in the field to provide a quick-solution manual for technicians and engineers, offering field-tested solutions to most problems engineers can encounter. At the same time, the book delineates the basic concepts and applied mathematics underlying each solution so that readers can go deeper into the theory to gain a better idea of the solution's limitations and potential pitfalls, and thus tailor the best solution for the specific engineering application. Uniquely, Statistical Signal Processing in Engineering can also function as a textbook for engineering graduates and post-graduates. Dr. Spagnolini, who has had a quarter of a century of experience teaching graduate-level courses in digital and statistical signal processing methods, provides a detailed axiomatic presentation of the conceptual and mathematical foundations of statistical signal processing that will challenge students' analytical skills and motivate them to develop new applications on their own, or better understand the motivation underlining the existing solutions. Throughout the book, some real-world examples demonstrate how powerful a tool statistical signal processing is in practice across a wide range of applications. Takes an interdisciplinary approach, integrating basic concepts and tools for statistical signal processing Informed by its author's vast experience as both a practitioner and teacher Offers a hands-on approach to solving problems in statistical signal processing Covers a broad range of applications, including communication systems, machine learning, wavefield and array processing, remote sensing, image filtering and distributed computations Features numerous real-world examples from a wide range of applications showing the mathematical concepts involved in practice Includes MATLAB code of many of the experiments in the book Statistical Signal Processing in Engineering is an indispensable working resource for electrical engineers, especially those working in the information and communication technology (ICT) industry. It is also an ideal text for engineering students at large, applied mathematics post-graduates and advanced undergraduates in electrical engineering, applied statistics, and pure mathematics, studying statistical signal processing.

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 monograph contains a number of problems with signal detection theory, presenting a generalized observation model for signal detection problems. The model includes several interesting and common special cases, such as those describing additive noise, multiplicative noise and signal-dependent noise.

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.

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.

This book is about general and specific areas involved in electrical and electronics engineering which comprises broad subjects such as MEMS and Microfluidics, VLSI, Communication and Signal Processing. This book discusses the recent trends in various aspects of research areas for diverse applications like biomedical, biochemical, and power source systems. It also discusses modelling, simulating, and prototyping of the different electronic-based systems for carrying out varied applications. With this book, the readers will understand the multiplatform fundamentals guiding electrical and biomedical devices that form the current features such as automation, integration, and miniaturization of a particular device. This book showcases a unique platform as it covers the different areas of research in this trending era as a benchmark. This book is a link between the electronics and cutting-edge technologies that are being used for numerous applications representing the physical and virtual developments of electronic devices. Therefore, this book will mostly uphold the innovation and originality involved in the development of miniaturized devices, and proposing new methods, emphasizing with different areas of electrical and electronics engineering. This book entitles various approaches involved in electrical, biomedical, and electronics for modern distribution of research strategies and covers the state-of-art research themes. These include signal sensing, signal simulators, 3D printing technology, power systems, data acquisition systems, instrumentation, electrochemical sensing, electromechanical measurements, and signal analysis. The book will provide the academic perspectives of the cutting-edge R&D outputs from the faculty members and Ph.D. students, amalgamating the newer cross-dimensional areas, such as cyber-physical systems, nanoelectronics, smart-sensors, point-of-need devices, etc. The book will become a benchmark to the readers to understand the academic aspect of the contemporary work and the way forward on how this will lead to help the society-at-large.

Advanced Signal Processing Theory and Implementation for Sonar, Radar, and Non-Invasive Medical Diagnostic Systems, Second Edition CRC Press

"Blind Signal Processing: Theory and Practice" not only introduces related fundamental mathematics, but also reflects the numerous advances in the field, such as probability density estimation-based processing algorithms, underdetermined models, complex value methods, uncertainty of order in the separation of convolutive mixtures in frequency domains, and feature extraction using Independent Component Analysis (ICA). At the end of the book, results from a study conducted at Shanghai Jiao Tong University in the areas of speech signal processing, underwater signals, image feature extraction, data compression, and the like are discussed. This book will be of particular interest to advanced undergraduate students, graduate students, university instructors and research scientists in related disciplines. Xizhi Shi is a Professor at Shanghai Jiao Tong University.

This previously included a CD. The CD contents can be accessed via World Wide Web.

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.

Arising from courses taught by the authors, this largely self-contained treatment is ideal for mathematicians who are interested in applications or for students from applied fields who want to understand the mathematics behind their subject. Early chapters cover Fourier analysis, functional analysis, probability and linear algebra, all of which have been chosen to prepare the reader for the applications to come. The book includes rigorous proofs of core results in compressive sensing and wavelet convergence. Fundamental is the treatment of the linear system $y=?x$ in both finite and infinite dimensions. There are three possibilities: the system is determined, overdetermined or underdetermined, each with different aspects. The authors assume only basic familiarity with advanced calculus, linear algebra and matrix theory and modest familiarity with signal processing, so the book is accessible to students from the advanced undergraduate level. Many exercises are also included.

In recent years, pseudo random signal processing has proven to be a critical enabler of modern communication, information, security and measurement systems. The signal's pseudo random, noise-like properties make it vitally important as a tool for protecting against interference, alleviating multipath propagation and allowing the potential of sharing bandwidth with other users. Taking a practical approach to the topic, this text provides a comprehensive and systematic guide to understanding and using pseudo random signals. Covering theoretical principles, design methodologies and applications, Pseudo Random Signal Processing: Theory and Application: sets out the mathematical foundations needed to implement powerful pseudo random signal processing techniques; presents information about binary and nonbinary pseudo random sequence generation and design objectives; examines the creation of system architectures, including those with microprocessors, digital signal processors, memory circuits and software suits; gives a detailed discussion of sophisticated applications such as spread spectrum communications, ranging and satellite navigation systems, scrambling, system verification, and sensor and optical fibre systems. Pseudo Random Signal Processing: Theory and Application is an essential introduction to the subject for practising Electronics Engineers and researchers in the fields of mobile communications, satellite navigation, signal analysis, circuit testing, cryptology, watermarking, and measurement. It is also a useful reference for graduate students taking courses in Electronics, Communications and Computer Engineering.

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]

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.

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.

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

Digital signal processing is essential for improving the accuracy and reliability of a range of engineering systems, including communications, networking, and audio and video applications. Using a combination of programming and mathematical techniques, it clarifies, or standardizes the levels or states of a signal, in order to meet the demands of designing high performance digital hardware. Written by authors with a wealth of practical experience working with digital signal processing, this text is an excellent step-by-step guide for practitioners and researchers needing to understand and quickly implement the technology. Split into six, self-contained chapters, Digital Signal Processing: A Practitioner's Approach covers: basic principles of signal processing such as linearity, stability, convolution, time and frequency domains, and noise; descriptions of digital filters and their realization, including fixed point implementation, pipelining, and field programmable gate array (FPGA) implementation; Fourier transforms, especially discrete (DFT), and fast Fourier transforms (FFT); case studies demonstrating difference equations, direction of arrival (DoA), and electronic rotating elements, and MATLAB programs to accompany each chapter. A valuable reference for engineers developing digital signal processing applications, this book is also a useful resource for electrical and computer engineering graduates taking courses in signal processing.

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.

Introduced nearly three decades ago as a variable resolution alternative to the Fourier transform, a wavelet is a short oscillatory waveform for analysis of transients. The discrete wavelet transform has remarkable multi-resolution and energy-compactness properties. Amir-Homayoon Najmi's introduction to wavelet theory explains this mathematical concept clearly and succinctly. Wavelets are used in processing digital signals and imagery from myriad sources. They form the backbone of the JPEG2000 compression standard, and the Federal Bureau of Investigation uses biorthogonal wavelets to compress and store its vast database of fingerprints. Najmi provides the mathematics that demonstrate how wavelets work, describes how to construct them, and discusses their importance as a tool to investigate and process signals and imagery. He reviews key concepts such as frames, localizing transforms, orthogonal and biorthogonal bases, and multi-resolution. His examples include the Haar, the Shannon, and the Daubechies families of orthogonal and biorthogonal wavelets. Our capacity and need for collecting and transmitting digital data is increasing at an astonishing rate. So too is the importance of wavelets to anyone working with and analyzing digital data. Najmi's primer will be an indispensable resource for those in computer science, the physical sciences, applied mathematics, and engineering who wish to obtain an in-depth understanding and working knowledge of this fascinating and evolving field.

Continuous Signals and Systems with MATLAB is the first undergraduate text fully focused on continuous systems. It presents all of the material needed to master the subject and its related MATLAB problem-solving techniques. The authors cover all of the traditional topics and include chapters on system design, state-space techniques, linearizing nonlinear systems, and the design and analysis of analog filters. They also discuss the five representations of continuous systems and explain how to go from one representation to another.

Digital signal transforms are of a fundamental value in digital signal and image processing. Their role is manifold. Transforms selected appropriately enable substantial compressing signals and images for storage and transmission. No signal recovery, image reconstruction and restoration task can be efficiently solved without using digital signal transforms. Transforms are successfully used for logic design and digital data encryption. Fast transforms are the main tools for acceleration of computations in digital signal and image processing. The volume collects in one book most recent developments in the theory and practice of the design and usage of transforms in digital signal and image processing. It emerged from the series of reports published by Tampere International Centre for Signal Processing, Tampere University of Technology. For the volume, all contributions are appropriately updated to represent the state of the art in the field and to cover the most recent developments in different aspects of the theory and applications of transforms. The book consists of two parts that represent two major directions in the field:

development of new transforms and development of transform based signal and image processing algorithms. The first part contains four chapters devoted to recent advances in transforms for image compression and switching and logic design and to new fast transforms for digital holography and tomography. In the second part, advanced transform based signal and image algorithms are considered: signal and image local adaptive restoration methods and two complementing families of signal and image re-sampling algorithms, fast transform based discrete sinc-interpolation and spline theory based ones.

With a novel, less classical approach to the subject, the authors have written a book with the conviction that signal processing should be taught to be fun. The treatment is therefore less focused on the mathematics and more on the conceptual aspects, the idea being to allow the readers to think about the subject at a higher conceptual level, thus building the foundations for more advanced topics. The book remains an engineering text, with the goal of helping students solve real-world problems. In this vein, the last chapter pulls together the individual topics as discussed throughout the book into an in-depth look at the development of an end-to-end communication system, namely, a modem for communicating digital information over an analog channel.

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

This excellent advanced text rigorously covers several topics. Geared toward students of electrical engineering, its material is sufficiently general to be applicable to other engineering fields. 1994 edition.

Digital Signal Processing, Second Edition enables electrical engineers and technicians in the fields of biomedical, computer, and electronics engineering to master the essential fundamentals of DSP principles and practice. Many instructive worked examples are used to illustrate the material, and the use of mathematics is minimized for easier grasp of concepts. As such, this title is also useful to undergraduates in electrical engineering, and as a reference for science students and practicing engineers. The book goes beyond DSP theory, to show implementation of algorithms in hardware and software. Additional topics covered include adaptive filtering with noise reduction and echo cancellations, speech compression, signal sampling, digital filter realizations, filter design, multimedia applications, over-sampling, etc. More advanced topics are also covered, such as adaptive filters, speech compression such as PCM, u-law, ADPCM, and multi-rate DSP and over-sampling ADC. New to this edition: MATLAB projects dealing with practical applications added throughout the book New chapter (chapter 13) covering sub-band coding and wavelet transforms, methods that have become popular in the DSP field New applications included in many chapters, including applications of DFT to seismic signals, electrocardiography data, and vibration signals All real-time C programs revised for the TMS320C6713 DSK Covers DSP principles with emphasis on communications and control applications Chapter objectives, worked examples, and end-of-chapter exercises aid the reader in grasping key concepts and solving related problems Website with MATLAB programs for simulation and C programs for real-time DSP

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.

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