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Introduction to Digital Signal Processing and Filter Design
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MELENDEZ CHOI

Soft Computing and Signal Processing CRC Press

The demand to explore the largest and also one of the richest parts of our planet, the advances in signal processing promoted by an exponential growth in computation power and a thorough study of sound propagation in the underwater realm, have led to remarkable advances in sonar technology in the last years. The work on hand is a sum of knowledge of several authors who contributed in various aspects of sonar technology. This book intends to give a broad overview of the advances in sonar technology of the last years that resulted from the research effort of the authors in both sonar systems and their applications. It is intended for scientist and engineers from a variety of backgrounds and even those that never had contact with sonar technology before will find an easy introduction with the topics and principles exposed here.

Introduction to Synthetic Aperture Radar Using Python and MATLAB® Springer Science & Business Media

Digital Filters and Signal Processing, Third Edition ... with MATLAB Exercises presents a general survey of digital signal processing concepts, design methods, and implementation considerations, with an emphasis on digital filters. It is suitable as a textbook for senior undergraduate or first-year graduate courses in digital signal processing. While mathematically rigorous, the book stresses an intuitive understanding of digital filters and signal processing systems, with numerous realistic and relevant examples. Hence, practicing engineers and scientists will also find the book to be a most useful reference. The Third Edition contains a substantial amount of new material including, in particular, the addition of MATLAB exercises to deepen the students' understanding of basic DSP principles and increase their proficiency in the application of these principles. The use of the exercises is not mandatory, but is highly recommended. Other new features include: normalized frequency utilized in the DTFT, e.g., $X(ej\omega)$; new computer generated drawings and MATLAB plots throughout the book; Chapter 6 on sampling the DTFT has been completely rewritten; expanded coverage of Types I-IV linear-phase FIR filters; new material on power and doubly-complementary filters; new section on quadrature-mirror filters and their application in filter banks; new section on the design of maximally-flat FIR filters; new section on roundoff-noise reduction using error feedback; and many new problems added throughout.

Discrete Random Signal Processing and Filtering Primer with MATLAB Springer Science & Business Media

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. Aft

Neural Information Processing IGI Global

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.

Underwater Acoustic Digital Signal Processing and Communication Systems Artech House

Spectral estimation is important in many fields including astronomy, meteorology, seismology, communications, economics, speech analysis, medical imaging, radar, sonar, and underwater acoustics. Most existing spectral estimation algorithms are devised for uniformly sampled complete-data sequences. However, the spectral estimation for data sequences with missing samples is also important in many applications ranging from astronomical time series analysis to synthetic aperture radar imaging with angular diversity. For spectral estimation in the missing-data case, the challenge is how to extend the existing spectral estimation techniques to deal with these missing-data samples. Recently, nonparametric adaptive filtering based techniques have been developed successfully for various missing-data problems. Collectively, these algorithms provide a comprehensive toolset for the missing-data problem based exclusively on the nonparametric adaptive filter-bank approaches, which are robust and accurate, and can provide high resolution and low sidelobes. In this book, we present these algorithms for both one-dimensional and two-dimensional spectral estimation problems.

Phonocardiography Signal Processing CRC Press

This book introduces sonar system and acoustic channel model, average energy channel, coherent multipath channel, the theoretical basis for the stochastic time-varying space-variant channel, slowly time-varying coherent multipath channel, and reverberation channel. Based on the basic theory of underwater acoustic channels and the various characteristics of the marine acoustic environment factor, this textbook aims to help students understand the impact of the marine

acoustic channel on the sonar system. It helps students to grasp underwater acoustic signal processing principles and obtain the ability to solve practical problems in underwater acoustic channel engineering. Finally, it aims at laying a foundation for the further sonar system design. This textbook is recommended for graduate or undergraduate students in the field of sonar signal processing, underwater acoustic engineering, as well as some related subjects of marine technology.

Digital Signal Processing Using MATLAB Artech House

The auscultation method is an important diagnostic indicator for hemodynamic anomalies. Heart sound classification and analysis play an important role in the auscultative diagnosis. The term phonocardiography refers to the tracing technique of heart sounds and the recording of cardiac acoustics vibration by means of a microphone-transducer. Therefore, understanding the nature and source of this signal is important to give us a tendency for developing a competent tool for further analysis and processing, in order to enhance and optimize cardiac clinical diagnostic approach. This book gives the reader an inclusive view of the main aspects in phonocardiography signal processing. Table of Contents: Introduction to Phonocardiography Signal Processing / Phonocardiography Acoustics Measurement / PCG Signal Processing Framework / Phonocardiography Wavelets Analysis / Phonocardiography Spectral Analysis / PCG Pattern Classification / Special Application of Phonocardiography / Phonocardiography Acoustic Imaging and Mapping

Digital Sonar Design in Underwater Acoustics Morgan & Claypool Publishers

This updated edition gives readers hands-on experience in real-time DSP using a practical, step-by-step framework that also incorporates demonstrations, exercises, and problems, coupled with brief overviews of applicable theory and MATLAB applications. Organized in three sections that cover enduring fundamentals and present practical projects and invaluable appendices, this new edition provides support for the most recent and powerful of the inexpensive DSP development boards currently available from Texas Instruments: the OMAP-L138 LCDK. It includes two new real-time DSP projects, as well as three new appendices: an introduction to the Code Generation tools available with MATLAB, a guide on how to turn the LCDK into a portable battery-operated device, and a comparison of the three DSP boards directly supported by this edition.

Principles of Radar and Sonar Signal Processing Artech House

A unique treatment of signal processing using a model-based perspective Signal processing is primarily aimed at extracting useful information, while rejecting the extraneous from noisy data. If signal levels are high, then basic techniques can be applied. However, low signal levels require using the underlying physics to correct the problem causing these low levels and extracting the desired information. Model-based signal processing incorporates the physical phenomena, measurements, and noise in the form of mathematical models to solve this problem. Not only does the approach enable signal processors to work directly in terms of the problem's physics, instrumentation, and uncertainties, but it provides far superior performance over the standard techniques. Model-based signal processing is both a modeler's as well as a signal processor's tool. Model-Based Signal Processing develops the model-based approach in a unified manner and follows it through the text in the algorithms, examples, applications, and case studies. The approach, coupled with the hierarchy of physics-based models that the author develops, including linear as well as nonlinear representations, makes it a unique contribution to the field of signal processing. The text includes

parametric (e.g., autoregressive or all-pole), sinusoidal, wave-based, and state-space models as some of the model sets with its focus on how they may be used to solve signal processing problems. Special features are provided that assist readers in understanding the material and learning how to apply their new knowledge to solving real-life problems. * Unified treatment of well-known signal processing models including physics-based model sets * Simple applications demonstrate how the model-based approach works, while detailed case studies demonstrate problem solutions in their entirety from concept to model development, through simulation, application to real data, and detailed performance analysis * Summaries provided with each chapter ensure that readers understand the key points needed to move forward in the text as well as MATLAB(r) Notes that describe the key commands and toolboxes readily available to perform the algorithms discussed * References lead to more in-depth coverage of specialized topics * Problem sets test readers' knowledge and help them put their new skills into practice The author demonstrates how the basic idea of model-based signal processing is a highly effective and natural way to solve both basic as well as complex processing problems. Designed as a graduate-level text, this book is also essential reading for practicing signal-processing professionals and scientists, who will find the variety of case studies to be invaluable. An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department

Signal Processing for Passive Bistatic Radar CRC Press

This book provides comprehensive coverage of the detection and processing of signals in underwater acoustics. Background material on active and passive sonar systems, underwater acoustics, and statistical signal processing makes the book a self-contained and valuable resource for graduate students, researchers, and active practitioners alike. Signal detection topics span a range of common signal types including signals of known form such as active sonar or communications signals; signals of unknown form, including passive sonar and narrowband signals; and transient signals such as marine mammal vocalizations. This text, along with its companion volume on beamforming, provides a thorough treatment of underwater acoustic signal processing that speaks to its author's broad experience in the field.

Principles of Sonar Performance Modelling Artech House

A practical and accessible guide to understanding digital signal processing Introduction to Digital Signal Processing and Filter Design was developed and fine-tuned from the author's twenty-five years of experience teaching classes in digital signal processing. Following a step-by-step approach, students and professionals quickly master the fundamental concepts and applications of discrete-time signals and systems as well as the synthesis of these systems to meet specifications in the time and frequency domains. Striking the right balance between mathematical derivations and theory, the book features: * Discrete-time signals and systems * Linear difference equations * Solutions by recursive algorithms * Convolution * Time and frequency domain analysis * Discrete Fourier series * Design of FIR and IIR filters * Practical methods for hardware implementation A unique feature of this book is a complete chapter on the use of a MATLAB(r) tool, known as the FDA (Filter Design and Analysis) tool, to investigate the effect of finite word length and different formats of quantization, different realization structures, and different methods for filter design. This chapter contains material of practical importance that is not found in many books used in academic courses.

It introduces students in digital signal processing to what they need to know to design digital systems using DSP chips currently available from industry. With its unique, classroom-tested approach, Introduction to Digital Signal Processing and Filter Design is the ideal text for students in electrical and electronic engineering, computer science, and applied mathematics, and an accessible introduction or refresher for engineers and scientists in the field.

An Introduction to the Theory and Design of Sonar Transducers Springer

Are you looking for: a clear and accessible introduction to 'signals and systems'? a text that integrates the use of MATLAB throughout and provides an introductory tutorial to the software? comprehensive coverage of both continuous and discrete-time signal processing? a book that will be useful for further study? If the answer to any of the above questions is 'Yes' then this is the ideal coursebook for you. System Analysis and Signal Processing provides a self-contained text suitable for students of 'signals and systems' and signal processing, from introductory to graduate level; it also serves as a useful companion for those studying network analysis and communications. Clear explanations and easy-to-follow examples using practical situations help to make this book one of the most accessible on the topic. This is the only book you will need on the subject. Key Features a readable and concise treatment of the essential topics, emphasizing physical interpretations the smooth introduction of relevant mathematics in context a broad subject coverage including sections on spectral estimation, digital filter design, network analysis, transforms, analogue filters, automatic control, correlators and the processing of narrow-band signals practical and straightforward design and analysis techniques examples and problems that can be solved with Versions 4 and 5 of the student edition of MATLAB well-designed end of chapter problems that contribute to the learning process FREE solutions manual available to adopting lecturers

Real-Time Digital Signal Processing from MATLAB to C with the TMS320C6x DSPs Nelson Books
Detailed closed-loop bandwidth and transient response approach is a subject rarely found in current literature. This innovative resource offers practical explanations of closed-loop radar tracking techniques in range, Doppler and angle tracking. To address analog closed loop trackers, a review of basic control theory and modeling is included. In addition, control theory, radar receivers, signal processors, and circuitry and algorithms necessary to form the signals needed in a tracker are presented. Digital trackers and multiple target tracking are also covered, focusing on g-h and g-h-k filters. Readers learn techniques for modeling digital, closed-loop trackers. The radar circuitry/block diagrams necessary for range, Doppler and angle tracking are presented and described, with examples and simulations included. Factors such as noise and Swerling type fluctuations are taken into account. In addition to numerous worked examples, this approachable reference includes MATLAB® code associated with analysis, simulations and figures. The book contains solutions to practical problems, making it useful for both novice and advanced radar practitioners. Software will be available for download on this page.

Digital Filters and Signal Processing BoD – Books on Demand

This supplement to any standard DSP text is one of the first books to successfully integrate the use of MATLAB® in the study of DSP concepts. In this book, MATLAB® is used as a computing tool to explore traditional DSP topics, and solve problems to gain insight. This greatly expands the range and complexity of problems that students can effectively study in the course. Since DSP applications

are primarily algorithms implemented on a DSP processor or software, a fair amount of programming is required. Using interactive software such as MATLAB® makes it possible to place more emphasis on learning new and difficult concepts than on programming algorithms. Interesting practical examples are discussed and useful problems are explored. This updated second edition includes new homework problems and revises the scripts in the book, available functions, and m-files to MATLAB® V7.

Sonar Signal Processing Springer Nature

This book uses MATLAB as a computing tool to explore traditional DSP topics and solve problems. This greatly expands the range and complexity of problems that students can effectively study in signal processing courses. A large number of worked examples, computer simulations and applications are provided, along with theoretical aspects that are essential in order to gain a good understanding of the main topics. Practicing engineers may also find it useful as an introductory text on the subject.

Digital Filters Cambridge University Press

This is the second volume in a trilogy on modern Signal Processing. The three books provide a concise exposition of signal processing topics, and a guide to support individual practical exploration based on MATLAB programs. This second book focuses on recent developments in response to the demands of new digital technologies. It is divided into two parts: the first part includes four chapters on the decomposition and recovery of signals, with special emphasis on images. In turn, the second part includes three chapters and addresses important data-based actions, such as adaptive filtering, experimental modeling, and classification.

Digital Signal Processing with Matlab Examples, Volume 2 John Wiley & Sons

The book includes research papers on current developments in the field of soft computing and signal processing, selected from papers presented at the International Conference on Soft Computing and Signal Processing (ICSCSP 2018). It features papers on current topics, such as soft sets, rough sets, fuzzy logic, neural networks, genetic algorithms and machine learning. It also discusses various aspects of these topics, like technologies, product implementation, and application issues.

Principles of Radar and Sonar Signal Processing John Wiley & Sons

Signal Processing for Intelligent Sensors with MATLAB, Second Edition once again presents the key topics and salient information required for sensor design and application. Organized to make it accessible to engineers in school as well as those practicing in the field, this reference explores a broad array of subjects and is divided into sections:

Introduction to Sonar Systems Engineering BoD – Books on Demand

The book is an edited collection of research articles covering the current state of sonar systems, the signal processing methods and their applications prepared by experts in the field. The first section is dedicated to the theory and applications of innovative synthetic aperture, interferometric, multistatic sonars and modeling and simulation. Special section in the book is dedicated to sonar signal processing methods covering: passive sonar array beamforming, direction of arrival estimation, signal detection and classification using DEMON and LOFAR principles, adaptive matched field signal processing. The image processing techniques include: image denoising, detection and classification of artificial mine like objects and application of hidden Markov model and artificial

neural networks for signal classification. The biology applications include the analysis of biosonar capabilities and underwater sound influence on human hearing. The marine science applications include fish species target strength modeling, identification and discrimination from bottom scattering and pelagic biomass neural network estimation methods. Marine geology has place in the book with geomorphological parameters estimation from side scan sonar images. The book will be

interesting not only for specialists in the area but also for readers as a guide in sonar systems principles of operation, signal processing methods and marine applications.

Advances in Sonar Technology Springer Science & Business Media

"This book covers basic and the advanced approaches in the design and implementation of multirate filtering"--Provided by publisher.

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