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Two-dimensional Signal and Image Processing - Joo S. Lim - 1990
New to P-H Signal Processing Series (Alan Oppenheim, Series Ed) this text covers the principles and applications of “multidimensional” and “image” digital signal processing. For Sr/grad level courses in image processing in EE departments.

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Two-dimensional Signal Analysis - René Garello - 2013-03-01
This title sets out to show that 2-D signal analysis has its own role to play alongside signal processing and image processing. Concentrating its coverage on those 2-D signals coming from physical sensors (such as radars and sonars), the discussion explores a 2-D spectral approach but develops the modeling of 2-D signals and proposes several data-oriented analysis techniques for dealing with them. Coverage is also given to potential future developments in this area.

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Solutions Manual - Joo S. Lim - 1990
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An Innovative Approach to Multidimensional Signals and Systems Theory for Image and Video Processing In this volume, Eric Dubois further develops the theory of multi-D signal processing wherein input and output are vector-value signals. With this framework, he introduces the reader to central concepts in signal processing such as continuous- and discrete-domain signals and systems, discrete-domain periodic signals, sampling and reconstruction, light and color, random field models, image representation and more. While most treatments use normalized representations for non-rectangular sampling, this approach obscures much of the geometrical and scale information of the signal. In contrast, Dr. Dubois uses actual units of space-time and frequency. Basis-independent representations appear as much as possible, and the basis is introduced where needed to perform calculations or implementations. Thus, lattice theory is developed from the beginning and rectangular sampling is treated as a special case. This is especially significant in the treatment of color and color image processing and for discrete transform representations based on symmetry groups, including fast computational algorithms. Other features include: An entire chapter on lattices, giving the reader a thorough grounding in the use of lattices in signal processing Extensive treatment of lattices as used to describe discrete-domain signals and signal periodicities Chapters on sampling and reconstruction, random field models, symmetry invariant signals and systems and multidimensional Fourier transformation properties Supplemented throughout with MATLAB examples and accompanying downloadable source code Graduate and doctoral students as well as senior undergraduates and professionals working in signal processing or video/image processing in imaging will appreciate this fresh approach to multidimensional signals and systems theory, both as a thorough introduction to the subject and as inspiration for future research.

Two-Dimensional Digital Signal Processing I - T.S. Huang - 2014-08-23
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Two-dimensional Signal Processing with Application to Image Restoration - T. Assefi - 1974

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Biomedical Signal and Image Processing - Kayvan Najarian - 2016-04-19
Written for senior-level and first year graduate students in biomedical signal and image processing, this book describes fundamental signal and image processing techniques that are used to process biomedical information. The book also describes applications of these techniques in the processing of some of the main biomedical signals and images, such as EEG, ECG, MRI, and CT. New features of this edition include the technical updating of each chapter along with the addition of many more examples, the majority of which are MATLAB based.

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Digital Signal and Image Processing - Tamal Bose - 2004
Introducing the first text to integrate the topics of digital signal processing (DSP), digital image processing (DIP), and adaptive signal processing (ASP)!, Digital Signal and Image Processing helps students develop a well-rounded understanding of these key areas by focusing on fundamental concepts, mathematical foundations, and advanced algorithms. The presentation is mathematically thorough with clear explanations, numerous examples, illustrations, and applications. In addition to problems, MATLAB-based book ideal for laboratory-based courses.

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Two-Dimensional Wavelets and their Relatives - Jean-Pierre Antoine - 2008-06-12
Two-dimensional wavelets offer a number of advantages over discrete wavelet transforms when processing rapidly varying functions and signals. In particular, they offer benefits for real-time applications such as medical imaging, fluid dynamics, shape recognition, image enhancement and target tracking. This book introduces the reader to 2-D wavelets via 1-D continuous wavelet transforms, and includes a long list of useful applications. The authors then describe in detail the underlying mathematics before moving on to more advanced topics such as matrix geometry of wavelet analysis, three-dimensional wavelets and wavelets on a sphere. Throughout the book, practical applications and illustrative examples are used extensively, ensuring the book's value to engineers, physicists and mathematicians alike.

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The Analysis of Multichannel Two-Dimensional Random Signals - Charles W. Therrien - 1986
The analysis of multiple correlated two-dimensional random signals or multichannel 2-D signals is described. The emphasis is on estimation (linear prediction) and modeling of the 2-D random signals. Applications to spectrum analysis and image processing are considered. Keywords include: Multi-dimensional signal processing; Multichannel image processing; 2-D spectral analysis; Two-dimensional linear prediction, 2-D AR modeling.

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Two-Dimensional Digital Filters - Wu-Sheng Lu - 2020-08-12

Presents basic theories, techniques, and procedures used to analyze, design, and implement two-dimensional filters; and surveys a number of applications in image and seismic data processing that demonstrate their use in real-world signal processing. For graduate students in electrical and computer engineering.

A Wavelet Tour of Signal Processing - Stephane Mallat - 1999-09-14

This book is intended to serve as an invaluable reference for anyone concerned with the application of wavelets to signal processing. It has evolved from material used to teach “wavelet signal processing” courses in electrical engineering departments at Massachusetts Institute of Technology and Tel Aviv University, as well as applied mathematics departments at the Courant Institute of New York University and École Polytechnique in Paris. Provides a broad perspective on the principles and applications of transient signal processing with wavelets. Emphasizes intuitive understanding, while providing the mathematical foundations and description of fast algorithms. Numerous examples of real applications to noise removal, deconvolution, audio and image compression, singularity and edge detection, multifractal analysis, and time-varying frequency measurements. Algorithms and numerical examples are implemented in Wavelet, which is a Matlab toolbox freely available over the Internet. Context is accessible on several levels of complexity, depending on the individual reader’s needs. New to the Second Edition: optical flow calculation and video compression algorithms. Image models with bounded variation functions. Bayes and Minimax theories for signal estimation. 200 pages rewritten and most illustrations redrawn. More problems and topics for a graduate course in wavelet signal processing, in engineering and applied mathematics.

Quaternion Fourier Transforms for Signal and Image Processing - Todd A. Ell - 2014-06-23

Based on updates to signal and image processing technology made in the last two decades, this text examines the most recent research results pertaining to Quaternion Fourier Transforms. QFT is a central component of processing color images and complex valued signals. The book’s attention to mathematical concepts, imaging applications, and Matlab compatibility render it an irreplaceable resource for students, scientists, researchers, and engineers.

Two-Dimensional Signal Processing, Optical Information Storage and Processing, and Electromagnetic Measurements - 1992

This is an annual report on research conducted under the auspices of the Joint Services Electronics Program. Specific topics covered are: multidimensional digital signal processing, signal restoration and detection, morphological systems for multidimensional signal processing, multidimensional processing for sensory arrays, multiprocessor systems and tools for digital signal processing, linear and nonlinear image processing, two-dimensional optical storage and processing, semiconductor quantum wave devices, electromagnetic theory, and field flow and frequency domains, and automated radiation measurements for near- and far-field transformations.

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3D Imaging Technologies—Multi-dimensional Signal Processing and
Deep Learning—Lakhmi C. Jain - 2021-10-01
This book presents high-quality research in the field of 3D imaging
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established by the first 3DIT conference (IC3DIT2019) to provide a wide
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Mathematical Methods for Signal and Image Analysis and
Representation - Luc Florack - 2012-01-12
Mathematical Methods for Signal and Image Analysis and Representation
presents the mathematical methodology for generic image analysis tasks. In
the context of this book an image may be any m-dimensional empirical
signal living on an n-dimensional smooth manifold (typically, but not
necessarily, a subset of spacetime). The existing literature on image
methodology is rather scattered and often limited to either a deterministic
seemingly different points of view in order to stress their conceptual
relations and formal analogies. Furthermore, it does not focus on specific
applications, although some are detailed for the sake of illustration, but on
the methodological frameworks on which such applications are built,
making it an ideal companion for those seeking a rigorous methodological
basis for specific algorithms as well as for those interested in the
fundamental methodology per se. Covering many topics at the forefront of
current research, including anisotropic diffusion filtering of tensor fields,
this book will be of particular interest to graduate and postgraduate
students and researchers in the fields of computer vision, medical imaging
and visual perception.

Digital Signal Filtering, Analysis and Restoration - Jiří Jan - 2000
In the belief that every engineer and scientist working with signals or data
should have a knowledge of them, Jan (electrical engineering and computer
science, Technical U. of Brno, Czech Republic) explains some of the
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Digital Image Processing and Analysis - Scott E Umbleaug - 2010-11-19
Whether for computer evaluation of otherworldly terrain or the latest high
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an applications-oriented, engineering approach, Digital Image Processing
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a logical, as-needed fashion, the author presents topics as they become
necessary for understanding the practical imaging model under study. He
offers a conceptual presentation of the material for a solid understanding of
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field. With liberal use of color through-out and more materials on the processing
of color images than the previous edition, this book provides supplementary
exercises, a new chapter on applications, and two major new tools that
allow for batch processing, the analysis of imaging algorithms, and the
overall research and development of imaging applications. It includes two
new software tools, the Computer Vision and Image Processing Algorithm
Test and Analysis Tool (CVIP-ATAT) and the CVIP Feature Extraction and
Pattern Classification Tool (CVIP-FEPC). Divided into five major sections,
this book provides the concepts and models required to analyze digital
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Image Analysis and Recognition - Mohamed Kamel - 2007-08-07
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3D Image Processing - D. Caramella - 2012-12-06
Few fields have witnessed such impressive advances as the application of computer technology to radiology. The progress achieved has revolutionized diagnosis and greatly facilitated treatment selection and accurate planning of procedures. This book, written by leading experts from many different countries, provides a comprehensive and up-to-date overview of the role of 3D image processing. The first section covers a wide range of technical aspects in an informative way. This is followed by the main section, in which the principal clinical applications are described and discussed in depth. To complete the picture, the final section focuses on recent developments in functional imaging and computer-aided surgery. This book will prove invaluable to all who have an interest in this complex but vitally important field.

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One- and Multidimensional Signal Processing - Hartmut Schröder - 2000-12-19
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Underwater Acoustics and Signal Processing - L. Bjerna - 2012-12-06
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Signal Analysis - Ronald L. Allen - 2004-06-07
Offers a well-rounded, mathematical approach to problems in signal interpretation using the latest time, frequency, and mixed-domain methods. Equally useful as a reference, an up-to-date review, a learning tool, and a resource for signal analysis techniques Provides a gradual introduction to the mathematics so that the less mathematically adept reader will not be overwhelmed with instant hard analysis Covers Hilbert spaces, complex analysis, distributions, random signals, analog Fourier transforms, and more

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Medical Image Processing, Reconstruction and Analysis - Jiri Jan - 2019-09-05
Differently oriented specialists and students involved in image processing and analysis need to have a firm grasp of concepts and methods used in this now widely utilized area. This book aims at being a single-source reference providing such foundations in the form of theoretical yet clear and easy to follow explanations. It covers generic methods. Medical Image Processing, Reconstruction and Analysis - Concepts and Methods explains the general principles and methods of image processing and analysis, focusing namely on applications used in medical imaging. The content of this book is divided into three parts: Part I - Images as Multidimensional Signals provides the introduction to basic image processing theory, explaining it for both analog and digital image representations. Part II - Imaging Systems as Data Sources offers a non-traditional view on imaging modalities, explaining their principles influencing properties of the obtained images that are to be subsequently processed by methods described in this book. Newly, principles of novel modalities, as spectral CT, functional MRI, ultrafast planar-wave ultrasonography and optical coherence tomography are included. Part III - Image Processing and Analysis focuses on tomographic image reconstruction, image fusion and methods of image enhancement and restoration; further it explains concepts of low-level image analysis as texture analysis, image segmentation and morphological transforms. A new chapter deals with selected areas of higher-level analysis, as principal and independent component analysis and particularly the novel analytic approach in deep learning. Briefly, also the medical image-processing environment is treated, including processes for image archiving and communication. Features Presents a theoretically exact yet understandable explanation of image processing and analysis concepts and methods Offers practical interpretations of all theoretical conclusions, as derived in the consistent explanation Provides a concise treatment of a wide variety of medical imaging modalities including novel ones, with respect to properties of provided image data

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Signal Systems for Bioengineers - John L. Semmlow - 2012
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Bring the power and flexibility of C++ to all your DSP applications The multimedia revolution has created hundreds of new uses for Digital Signal Processing, but most software guides have continued to focus on outdated languages such as FORTRAN and Pascal for managing new applications. C++ Algorithms for Digital Signal Processing equips professional programmers with computational tools to this growing field with software you can implement on your desktop PC. C++ Algorithms for Digital Signal Processing's programming methods can be used for applications as diverse as: Digital audio and video Speech and image processing Digital communications Radar, sonar, and ultrasound signal processing Complete coverage is provided, including: Overviews of DSP and C++ Hands-on study with dozens of exercises Extensive library of customizable source code Import and Export of Microsoft WAV and Matlab data files Multimedia professionals, managers, and even advanced hobbyists will appreciate C++ Algorithms for Digital Signal Processing as much as students, engineers, and programmers. It’s the ideal bridge between programming and signal processing that can be applied to biological systems and are therefore important to biomedical studies. The basic engineering concepts that underlie biomedical systems, medical devices, biocontrol, and bio-signal analysis are explained in detail. This textbook serves as a bioengineering course usually offered in conjunction with a laboratory on signals and measurements which presents the fundamentals of systems and signal analysis. The target course occupies a pivotal position in the future development of bioengineering students. There are extensive questions and problems that are available through a companion site to enhance the learning experience. New to this edition: Reorganized to emphasize signal and system analysis Increased coverage of time-domain signal analysis Expanded coverage of biomasurement, using examples in ultrasound and electrophysiology New applications in biocontrol, with examples from physiological systems modeling such as the respiratory system Double the number of Matlab and non-Matlab exercises to provide ample practice solving problems - by hand and with computational tools More Biomedical and real-world examples More biomedical figures throughout For instructors using this text in their course, accompanying website includes support materials such as MATLAB data and functions needed to solve the problems, a few helpful routines, and all of the MATLAB examples. Visit www.elsevierdirect.com and search “Semmlow.”
This introduction to the discrete wavelet transform and its applications is based on a novel approach to discrete wavelets called lifting. After an elementary introduction, connections of filter theory are presented, and wavelet packet transforms are defined. The time-frequency plane is used for interpretation of signals, problems with finite length signals are detailed, and MATLAB is used for examples and implementation of transforms.

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Digital Signal and Image Processing Using MATLAB, Volume 2 - Gérard Blanchet - 2015-02-16

Volume 2 of the second edition of the fully revised and updated Digital Signal and Image Processing using MATLAB® is essentially a collection of examples and exercises which also presents applications of digital signal- or image processing, and techniques which were not touched upon in the previous volume. It will be of particular benefit to readers who already possess a good knowledge of MATLAB®, a command of the fundamental elements of digital signal processing and who are familiar with both the fundamentals of continuous-spectrum spectral analysis and who have a certain mathematical knowledge concerning Hilbert spaces. More than 200 programs and functions are provided in the MATLAB language, with useful comments and guidance, to enable numerical experiments to be carried out, thus allowing readers to develop a deeper understanding of both the theoretical and practical aspects of this subject.

Two-Dimensional Information Theory and Coding - Jarn Justesen - 2010

A complete introduction to the subject, providing the key techniques for modeling two-dimensional data and estimating their information content.


Now in its fifth edition, John C. Russ’s monumental image processing reference is an even more complete, modern, and hands-on tool than ever before. The Image Processing Handbook, Fifth Edition is fully updated and expanded to reflect the latest developments in the field. Written by an expert with unparalleled experience and authority, it offers clear guidance on how to create, select, and use the most appropriate algorithms for a specific application. What’s new in the Fifth Edition? - A new chapter on the human visual process that explains which visual cues elicit a response from the viewer - Description of the latest hardware and software for image acquisition and printing, reflecting the proliferation of the digital camera - New material on multichannel images, including a major section on principal components analysis - Expanded sections on deconvolution, extended dynamic range images, and image enlargement and interpolation - More than 600 new and revised figures and illustrations for a total of more than 2000 illustrations - 20% more references to the most up-to-date literature Written in a relaxed and reader-friendly style, The Image Processing Handbook, Fifth Edition guides you through the myriad tools available for image processing and helps you understand how to select and apply each one.

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Motion Analysis and Image Sequence Processing - M. Ibrahim Sezan - 2012-12-06

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**Blind Equalization and System Identification** - Chong-Yung Chi - 2006-05-20

The absence of training signals from many kinds of transmission necessitates the widespread use of blind equalization and system identification. There have been many algorithms developed for these purposes, working with one- or two-dimensional signals and with single-input single-output or multiple-input multiple-output, real or complex systems. It is now time for a unified treatment of this subject, pointing out the common characteristics of these algorithms as well as learning from their different perspectives. "Blind Equalization and System Identification" provides such a unified treatment presenting theory, performance analysis, simulation, implementation and applications. This is a textbook for graduate courses in discrete-time random processes, statistical signal processing, and blind equalization and system identification. It contains material which will also interest researchers and engineers working in digital communications, source separation, speech processing, and other, similar applications.

**Three Dimensional Analysis of Spinal Deformities** - M. D’Amico - 1995

Changes in Shape of the Spine with Idiopathic Scoliosis after Harrington or C-D Instrumentation: The Plan View -- 3-D Correction Obtained with the C-D Procedure During Surgery -- Results of Treatment of Scoliosis with the Cotrel-Dubousset Technique -- Technics and Preliminary Results Colorado -- A Preliminary Report on the Surgical Realignment of Adolescent Idiopathic Scoliosis with Isola Instrumentation -- Osteoporotic Fractures with Neurological Complications -- Simulation of Surgical Maneuvers with C-D Instrumentation -- Adolescence and Orthopaedic Braces: Psychological Conflicts? -- Preliminary Results of Specific Exercises During In-Patient Scoliosis Rehabilitation -- Cardiopulmonary Performance in Patients with Severe Scoliosis - Outcome after Specific Rehabilitation -- Scoliotic Flatback and Specific Rehabilitation -- Chapter 6. Surface Topography & Internal 3-D Spinal and/or Trunk Anatomy -- Scoliosis Follow-Up by Back Shape Analysis -- Evaluation of Its Reliability -- Digital 3D Moiré - Topography -- Evolution of Scoliosis by Optical Scanner I.S.I.S. -- Automated 360° Degree Profilometry of Human Trunk for Spinal Deformity Analysis -- Spinal Surface Digitization Using ‘Meteorcom’ in Scoliosis Screening -- High-Resolution Rasterstereography -- Reproducibility and Reliability of the Quantec Surface Imaging System in the Assessment of Spinal Deformity -- Investigation of the Diurnal Variation in the Water Content of the Intervertebral Disc Using MRI and Its Implications for Scoliosis -- Author Index