Think Dsp Digital Signal Processing

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.

If you understand basic mathematics and know how to program with Python, you're ready to dive into signal processing. While most resources start with theory to teach this complex subject, this practical book introduces techniques by showing you how they're applied in the real world. In the first chapter alone, you'll be able to decompose a sound into its harmonics, modify the harmonics, and generate new sounds. Author Allen Downey explains techniques such as spectral decomposition, filtering, convolution, and the Fast Fourier Transform. This book also provides exercises and code examples to help you understand the material. You'll explore: Periodic signals and their spectrums Harmonic structure of simple waveforms Chirps and other sounds whose spectrum changes over time Noise signals and natural sources of noise The autocorrelation function for estimating pitch The discrete cosine transform (DCT) for compression The Fast Fourier Transform for spectral analysis Relating operations in time to filters in the frequency domain Linear time-invariant (LTI) system theory Amplitude modulation (AM) used in radio Other books in this series include Think Stats and Think Bayes, also by Allen Downey.

This excellent Senior undergraduate/graduate textbook offers an unprecedented measurement of science perspective on DSP theory and applications, a wealth of definitions and real-life examples making it invaluable for students, while practical. What are the relations between continuous-time and discrete-time/sampled-data systems, signals, and their spectra? How can digital systems be designed to replace existing analog systems? What is the reason for having so many transforms, and how do you know which one to use? What do s and z really means and how are they related? How can you use the fast Fourier transform (FFT) and other digital signal processing (DSP) algorithms to successfully process sampled signals? Inside, you'll find the answers to these and other fundamental questions on DSP. You'll gain a solid understanding of the key principles that will help you compare, select, and properly use existing DSP algorithms for an application. You'll also learn how to create original working algorithms or conceptual insights, design frequency-selective and optimal digital filters, participate in DSP research, and select or construct appropriate hardware implementations. Key Features * MATLAB graphics are integrated throughout the text to help clarify DSP concepts. Complete numerical examples clearly illustrate the practical uses of DSP. * Uniquely detailed coverage of fundamental DSP principles provides the rationales behind definitions, algorithms, and transform properties. * Practical real-world examples combined with a student-friendly writing style enhance the material. * Unexpected results and thought-provoking questions are provided to further spark reader interest. * Over 525 end-of-chapter problems are included, with complete solutions available to the instructor (168 are MATLAB-oriented).

This edition adds extensive new coverage of quadrature signals for digital communications, recent improvements in digital filtering, and much more. It also contains more than twice as many "DSP Tips and Tricks"...including clever techniques even seasoned professionals may have overlooked.

Thinking Machines: Machine Learning and Its Hardware Implementation covers the theory and application of machine learning, neuromorphic computing and neural networks. This is the first book that focuses on machine learning accelerators and hardware development for machine learning. It presents not only a summary of the latest trends and examples of machine learning hardware and basic knowledge of machine learning in general, but also the main issues involved in its implementation. Readers will learn what is required for the design of machine learning hardware for neuromorphic computing and/or neural networks. This is a recommended book for those who have basic knowledge of machine learning or those who want to learn more about the current trends of machine learning. Presents a clear understanding of various available machine learning hardware accelerator solutions that can be applied to selected machine learning algorithms Offers key insights into the development of hardware, from algorithms, software, logic circuits, to hardware accelerators Introduces the baseline characteristics of deep neural network models that should be treated by hardware as well Presents readers with a thorough review of past research and products, explaining how to design through ASIC and FPGA approaches for target machine learning models Surveys current trends and models in neuromorphic computing and neural network hardware architectures Outlines the strategy for advanced hardware development through the example of deep learning accelerators

Think D.S.P. is an introduction to Digital Signal Processing in Python. The premise of this book (and the other books in the Think X series) is that if you know how to program, you can use that skill to learn other things. The author is writing this book because he thinks the conventional approach to digital signal processing is backward: most books (and the classes that use them) present the material bottom-up, starting with mathematical abstractions like phasors.

From the Foreword: "...There are many good textbooks today to teach digital signal processing, but most of them are content to teach the theory, and perhaps some MATLAB® simulations. This book has taken a bold step forward. It not only presents the theory, it reinforces it with simulations, and then it shows us how to actually use the results in real-time applications. This last step is not a trivial step, and that is why so many books, and courses, present only theory and simulations. With the combined expertise of the three authors of this text...the reader can step into the real-time world of applications with a text that presents an accessible path..." —Delores M. Etter, Texas Instruments Distinguished Chair in Electrical Engineering and Executive Director, Caruth Institute for Engineering Education, Southern Methodist University, Dallas, Texas, USA Mastering practical application of real-time digital signal processing (DSP) remains one of the most challenging and time-consuming pursuits in the field. It is even more difficult without a resource to bridge the gap between theory and practice. Filling that void, Real-Time Digital Signal Processing from MATLAB® to C with the TMS320C6x DSPs, Second Edition is organized in three sections that cover enduring fundamentals and present practical projects and invaluable appendices. 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® application. Engineers, educators, and students rely on this book for precise, simplified instruction on use of real-time DSP applications. The book’s software supports the latest high-performance hardware, including the powerful, inexpensive, and versatile OMAP-L138 Experimenter Kit and other development boards. Incorporating readers' valuable feedback and suggestions, this installment covers additional topics (such as PN sequences) and more advanced real-time DSP projects (including higher-order digital communications projects), making it even more valuable as a learning tool.

The aim of this book is to introduce the general area of Digital Signal Processing from a practical point of view with a working minimum of mathematics. The emphasis is placed on the practical applications of DSP: implementation issues, tricks and pitfalls. Intuitive explanations and appropriate examples are used to develop a fundamental understanding of DSP theory, laying a firm foundation for the reader to pursue the matter further. The reader will develop a clear understanding of DSP technology in a variety of fields from process control to communications. * Covers the use of DSP in different engineering sectors, from communications to process control * Ideal for a wide audience wanting to take advantage of the strong movement towards digital signal processing techniques in the engineering world * Includes numerous practical exercises and diagrams covering many of the fundamental aspects of digital signal processing

Welcome to the second volume of Game Audio Programming: Principles and Practices – the first series of its kind dedicated to the art of game audio programming! This volume features more than 20 chapters containing advanced techniques from some of the top game audio programmers and sound designers in the industry. This book continues the tradition of collecting more knowledge and wisdom about game audio programming than any other volume in history. Both audio programming beginners and seasoned veterans will find content in this book that is valuable, with topics ranging from extreme low-level mixing to high-level game integration. Each chapter contains techniques that were used in games that have shipped, and there is a plethora of code samples and diagrams. There are chapters on threading, DSP implementation, advanced middleware techniques in FMOD Studio and Audiokinetic Wwise, ambiences, mixing, music, and more. This book has something for everyone who is programming audio for a game: programmers new to the art of audio programming, experienced audio programmers, and those souls who just got assigned the audio code. This book is for you!

Think DSPDigital Signal Processing in Python"O'Reilly Media, Inc."

Digital Signal Processing:A Primer with MATLAB® provides excellent coverage of discrete-time signals and systems. At the beginning of each chapter, an abstract states the chapter objectives. All principles are also presented in a lucid, logical, step-by-step approach. As much as possible, the authors avoid wordiness and detail overload that could hide concepts and impede understanding. In recognition of requirements by the Accreditation Board for Engineering and Technology (ABET) on integrating computer tools, the use of MATLAB® is encouraged in a student-friendly manner. MATLAB is introduced in Appendix C and applied gradually throughout the book. Each illustrative example is immediately followed by practice problems along with its answer. Students can follow the example step-by-step to solve the practice problems without flipping pages or looking at the end of the book for answers. These practice problems test students' comprehension and reinforce key concepts before moving onto the next section. Toward the end of each chapter, the authors discuss some application aspects of the concepts covered in the chapter. The material covered in the chapter is applied to at least one or two practical problems. It helps students see how the concepts are used in real-life situations. Also, thoroughly worked examples are given liberally at the end of every section. These examples give students a solid grasp of the solutions as well as the confidence to solve similar problems themselves. Some of hte problems are solved in two or three ways to facilitate a deeper understanding and comparison of different approaches. Designed for a three-hour semester course, Digital Signal Processing:A Primer with MATLAB® is intended as a textbook for a senior-level undergraduate student in electrical and computer engineering. The prerequisites for a course based on this book are knowledge of standard mathematics,

including calculus and complex numbers.
Practical Art of Motion Picture Sound, 4th edition relies on the professional experience of the author and other top sound craftspeople to provide a comprehensive explanation of film sound, including mixing, dubbing, workflow, budgeting, and digital audio techniques.
Electrical Engineering 101 covers the basic theory and practice of electronics, starting by answering the question "What is electricity?" It goes on to explain the fundamental principles and components, relating them constantly to real-world examples. Sections on tools and troubleshooting give engineers deeper understanding and the know-how to create and maintain their own electronic design projects. Unlike other books that simply describe electronics and provide step-by-step build instructions, EE101 delves into how and why electricity and electronics work, giving the reader the tools to take their electronics education to the next level. It is written in a down-to-earth style and explains jargon, technical terms and schematics as they arise. The author builds a genuine understanding of the fundamentals and shows how they can be applied to a range of engineering problems. This third edition includes more real-world examples and a glossary of formulae. It contains new coverage of: Microcontrollers FPGAs Classes of components Memory (RAM, ROM, etc.) Surface mount High speed design Board layout Advanced digital electronics (e.g. processors) Transistor circuits and circuit design Op-amp and logic circuits Use of test equipment Gives readers a simple explanation of complex concepts, in terms they can understand and relate to everyday life. Updated content throughout and new material on the latest technological advances. Provides readers with an invaluable set of tools and references that they can use in their everyday work.
From personal music players to anti-lock brakes and advanced digital flight controllers, the demand for real-time digital signal processing (DSP) continues to grow. Mastering real-time DSP is one of the most challenging and time-consuming pursuits in the field, exacerbated by the lack of a resource that solidly bridges the gap between theory and practice. Recognizing that there is a better way forward, accomplished experts Welch, Wright, and Morrow offer Real-Time Digital Signal Processing from MATLAB to C with the TMS320C6x DSK. This book collects all of the necessary tools in a single, field-tested source of unrivaled authority. The authors seamlessly integrate theory with easy-to-use, inexpensive hardware and software tools in an approachable and hands-on manner. Using abundant examples and exercises in a step-by-step approach, they work from familiar interfaces such as MATLAB® to running algorithms in real-time on industry-standard DSP hardware. For each concept, the book uses a four-step methodology: a brief review of relevant theory; demonstration of the concept in winDSK6, an easy-to-use software tool; explanation and demonstration of MATLAB techniques for implementation; and explanation of the necessary C code to implement the algorithms in real time. Covering a broad spectrum of topics in a hands-on, concise, and approachable way, Real-Time Digital Signal Processing from MATLAB to C with the TMS320C6x DSK paves the way toward mastery of real-time DSP. Essential source code is available for download.
"This book covers basic and the advanced approaches in the design and implementation of multirate filtering"--Provided by publisher.
All the design and development inspiration and direction an digital engineer needs in one blockbuster book! Kenton Williston, author, columnist, and editor of DSP DesignLine has selected the very best digital signal processing design material from the Newnes portfolio and has compiled it into this volume. The result is a book covering the gamut of DSP design'from design fundamentals to optimized multimedia techniques'with a strong pragmatic emphasis. In addition to specific design techniques and practices, this book also discusses various approaches to solving DSP design problems and how to successfully apply theory to actual design tasks. The material has been selected for its timelessness as well as for its relevance to contemporary embedded design issues. CONTENTS: Chapter 1 ADCs, DACs, and Sampling

Theory Chapter 2 Digital Filters Chapter 3 Frequency Domain Processing Chapter 4 Audio Coding Chapter 5 Video Processing Chapter 6 Modulation Chapter 7 DSP Hardware Options Chapter 8 DSP Processors and Fixed-Point Arithmetic Chapter 9 Code Optimization and Resource Partitioning Chapter 10 Testing and Debugging DSP Systems *Hand-picked content selected by Kenton Williston, Editor of DSP DesignLine *Proven best design practices for image, audio, and video processing *Case histories and design examples get you off and running on your current project

Digital Signal Processing 101: Everything You Need to Know to Get Started provides a basic tutorial on digital signal processing (DSP). Beginning with discussions of numerical representation and complex numbers and exponentials, it goes on to explain difficult concepts such as sampling, aliasing, imaginary numbers, and frequency response. It does so using easy-to-understand examples with minimum mathematics. In addition, there is an overview of the DSP functions and implementation used in several DSP-intensive fields or applications, from error correction to CDMA mobile communication to airborne radar systems. This book has been updated to include the latest developments in Digital Signal Processing, and has eight new chapters on: Automotive Radar Signal Processing Space-Time Adaptive Processing Radar Field Orientated Motor Control Matrix Inversion algorithms GPUs for computing Machine Learning Entropy and Predictive Coding Video compression Features eight new chapters on Automotive Radar Signal Processing, Space-Time Adaptive Processing Radar, Field Orientated Motor Control, Matrix Inversion algorithms, GPUs for computing, Machine Learning, Entropy and Predictive Coding, and Video compression Provides clear examples and a non-mathematical approach to get you up to speed quickly Includes an overview of the DSP functions and implementation used in typical DSP-intensive applications, including error correction, CDMA mobile communication, and radar systems

Despite what you may have read in the popular press and in social media, Precision Medicine is not devoted to finding unique treatments for individuals, based on analyzing their DNA. To the contrary, the goal of Precision Medicine is to find general treatments that are highly effective for large numbers of individuals who fall into precisely diagnosed groups. We now know that every disease develops over time, through a sequence of defined biological steps, and that these steps may differ among individuals, based on genetic and environmental conditions. We are currently developing rational therapies and preventive measures, based on our precise understanding of the steps leading to the clinical expression of diseases. Precision Medicine and the Reinvention of Human Disease explains the scientific breakthroughs that have changed the way that we understand diseases, and reveals how medical scientists are using this new knowledge to launch a medical revolution. Clarifies the foundational concepts of Precision Medicine, distinguishing this field from its predecessors such as genomics, pharmacogenetics, and personalized medicine. Gathers the chief conceptual advances in the fields of genetics, pathology, and bioinformatics, and synthesizes a coherent narrative for the field of Precision Medicine. Delivers its message in plain language, and in a relaxed, conversational writing style, making it easy to understand the complex subject matter. Guides the reader through a coherent and logical narrative, gradually providing expertise and skills along the way. Covers the importance of data sharing in Precision Medicine, and the many data-related challenges that confront this fragile new field.

This proceedings is a representation of decades of reasearch, teaching and application in the field. Image Processing, Fusion and Information Technology areas, Digital radio Communication, Wimax, Electrical engg, VLSI approach to processor design, embedded systems design are dealt in detail through models and illustrative techniques.

This book is recommended to readers who can ponder on the collection of chapters authored/co-authored by various researchers as well as to researchers around the world covering the field of digital signal processing. This book highlights current research in the digital signal processing area such as communication engineering, image processing and power conversion system. The entire work available in the book mainly focusses on researchers who can do quality research in the area of digital signal processing and related fields. Each chapter is an independent research, which will definitely motivate young researchers to further study the subject. These six chapters divided into three sections will be an eye-opener for all those engaged in systematic research in these fields.

Digital signal processing is commonplace in most electronics including MP3 players, HDTVs, and phones, just to name a few of the applications. The engineers creating these devices are in need of essential information at a moment's notice. The Instant Access Series provides all the critical content that a signal or communications engineer needs in his or her daily work. This book provides an introduction to DSPs as well as succinct overviews of linear systems, digital filters, and digital compression. This book is filled with images, figures, tables, and easy to find tips and tricks for the engineer that needs material fast to complete projects to deadline. Tips and tricks feature that will help engineers get info fast and move on to the next issue Easily searchable content complete with tabs, chapter table of contents, bulleted lists, and boxed features Just the essentials, no need to page through material not needed for the current project

All too often, individuals engaged in the biomedical sciences assume that numeric data must be left to the proper authorities (e.g., statisticians and data analysts) who are trained to apply sophisticated mathematical algorithms to sets of data. This is a terrible mistake. Individuals with keen observational skills, regardless of their mathematical training, are in the best position to draw correct inferences from their own data and to guide the subsequent implementation of robust, mathematical analyses. Volume 2 of Logic and Critical Thinking in the Biomedical Sciences provides readers with a repertoire of deductive non-mathematical methods that will help them draw useful inferences from their own data. Volumes 1 and 2 of Logic and Critical Thinking in the Biomedical Sciences are written for biomedical scientists and college-level students engaged in any of the life sciences, including bioinformatics and related data sciences. Demonstrates that a great deal can be deduced from quantitative data, without applying any statistical or mathematical analyses Provides readers with simple techniques for quickly reviewing and finding important relationships hidden within large and complex sets of data Using examples drawn from the biomedical literature, discusses common pitfalls in data interpretation and how they can be avoided

Provides a new methodology for performing system design of signal processing applications, offering easy-to-follow procedures which can be implemented on personal computers. Topics covered include a structured approach to filter design with closed form equations for classical IIR filter implementations in 2nd order cascaded stages; radix 4 & 8 FFT implementation algorithms for bit reversal, read/write data addressing and twiddle factors; overlap FFT processing gain computation procedure and results for popular windows, and comprehensive finite arithmetic analysis procedure for cascaded implementations. Multirate processing is covered, along with a system design of a high resolution detection application showing the procedure for analyzing the hardware and software architecture requirements. BASIC routines are provided for several DSP operations.

PSpice for Digital Signal Processing is the last in a series of five books using Cadence Orcad PSpice version 10.5 and introduces a very novel approach to learning digital signal processing (DSP). DSP is traditionally taught using Matlab/Simulink software but has some inherent weaknesses for students particularly at the introductory level. The ‘plug in variables and play’ nature of these software packages can lure the student into thinking they possess an understanding they don’t actually have because these systems produce results quicklywithout revealing what is going on. However, it must be said that, for advanced level work Matlab/Simulink really excel. In this book we start by examining basic signals starting with

sampled signals and dealing with the concept of digital frequency. The delay part, which is the heart of DSP, is explained and applied initially to simple FIR and IIR filters. We examine linear time invariant systems starting with the difference equation and applying the z-transform to produce a range of filter type i.e. low-pass, high-pass and bandpass. The important concept of convolution is examined and here we demonstrate the usefulness of the 'log' command in Probe for giving the correct display to demonstrate the 'flip n slip' method. Digital oscillators, including quadrature carrier generation, are then examined. Several filter design methods are considered and include the bilinear transform, impulse invariant, and window techniques. Included also is a treatment of the raised-cosine family of filters. A range of DSP applications are then considered and include the Hilbert transform, single sideband modulator using the Hilbert transform and quad oscillators, integrators and differentiators. Decimation and interpolation are simulated to demonstrate the usefulness of the multi-sampling environment. Decimation is also applied in a treatment on digital receivers. Lastly, we look at some musical applications for DSP such as reverberation/echo using real-world signals imported into PSpice using the program Wav2Ascii. The zero-forcing equalizer is dealt with in a simplistic manner and illustrates the effectiveness of equalizing signals in a receiver after transmission.
Principles and Practice of Big Data: Preparing, Sharing, and Analyzing Complex Information, Second Edition updates and expands on the first edition, bringing a set of techniques and algorithms that are tailored to Big Data projects. The book stresses the point that most data analyses conducted on large, complex data sets can be achieved without the use of specialized suites of software (e.g., Hadoop), and without expensive hardware (e.g., supercomputers). The core of every algorithm described in the book can be implemented in a few lines of code using just about any popular programming language (Python snippets are provided). Through the use of new multiple examples, this edition demonstrates that if we understand our data, and if we know how to ask the right questions, we can learn a great deal from large and complex data collections. The book will assist students and professionals from all scientific backgrounds who are interested in stepping outside the traditional boundaries of their chosen academic disciplines. Presents new methodologies that are widely applicable to just about any project involving large and complex datasets Offers readers informative new case studies across a range scientific and engineering disciplines Provides insights into semantics, identification, de-identification, vulnerabilities and regulatory/legal issues Utilizes a combination of pseudocode and very short snippets of Python code to show readers how they may develop their own projects without downloading or learning new software
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
A significant revision of a best-selling text for the introductory digital signal processing course. This book presents the fundamentals of discrete-time signals, systems, and modern digital processing and applications for students in electrical engineering, computer engineering, and computer science.The book is suitable for either a one-semester or a two-semester undergraduate level course in discrete systems and digital signal processing. It is also intended for use in a one-semester first-year graduate-level course in digital signal processing.
This textbook offers a fresh approach to digital signal processing (DSP) that combines heuristic reasoning and physical appreciation with sound mathematical methods to illuminate DSP concepts and practices. It uses metaphors, analogies and creative explanations, along with examples and exercises to provide deep and intuitive insights into DSP concepts. Practical DSP requires hybrid systems including both discrete- and continuous-time components. This book follows a holistic approach and presents discrete-time processing as a seamless continuation of continuous-time signals and systems, beginning with a review of continuous-

time signals and systems, frequency response, and filtering. The synergistic combination of continuous-time and discrete-time perspectives leads to a deeper appreciation and understanding of DSP concepts and practices. • For upper-level undergraduates • Illustrates concepts with 500 high-quality figures, more than 170 fully worked examples, and hundreds of end-of-chapter problems, more than 150 drill exercises, including complete and detailed solutions • Seamlessly integrates MATLAB throughout the text to enhance learning

This book is a uniquely practical DSP text which places the emphasis on understanding the principles and applications of DSP with a minimum of mathematics. In one volume, it covers a broad area of digital signal processing systems such as A/D and D/A converters, adaptive filters, spectral estimation, neural networks, Kalman filters, fuzzy logic, data compression, error correction and DSP programming. Many courses will find that this book will replace several texts currently in use. The level is ideal for introductory university modules, and similar courses such as HNC/D. As DSP has come to be studied at a lower academic level over recent years this text meets a genuine need. It is also suitable for use on industrial training courses and ideal as a reference text for professionals. A readable introduction to the practical application of DSP Broad coverage of the subject means this will cover a typical undergraduate module in just one book Practical focus with maths treated as a practical tool - not an advanced maths text

Genomic signal processing (GSP) can be defined as the analysis, processing, and use of genomic signals to gain biological knowledge, and the translation of that knowledge into systems-based applications that can be used to diagnose and treat genetic diseases. Situated at the crossroads of engineering, biology, mathematics, statistics, and computer science, GSP requires the development of both nonlinear dynamical models that adequately represent genomic regulation, and diagnostic and therapeutic tools based on these models. This book facilitates these developments by providing rigorous mathematical definitions and propositions for the main elements of GSP and by paying attention to the validity of models relative to the data. Ilya Shmulevich and Edward Dougherty cover real-world situations and explain their mathematical modeling in relation to systems biology and systems medicine. Genomic Signal Processing makes a major contribution to computational biology, systems biology, and translational genomics by providing a self-contained explanation of the fundamental mathematical issues facing researchers in four areas: classification, clustering, network modeling, and network intervention.

A critical step in the design of a DSP system is to identify for each of its components an implementation architecture that provides the desired degree of flexibility/programmability and optimises the area-delay-power parameters. This essential book covers architectures that offer varying degrees of programmability.

Digital audio, speech recognition, cable modems, radar, high-definition television-these are but a few of the modern computer and communications applications relying on digital signal processing (DSP) and the attendant application-specific integrated circuits (ASICs). As information-age industries constantly reinvent ASIC chips for lower power consumption and higher efficiency, there is a growing need for designers who are current and fluent in VLSI design methodologies for DSP. Enter VLSI Digital Signal Processing Systems-a unique, comprehensive guide to performance optimization techniques in VLSI signal processing. Based on Keshab Parhi's highly respected and popular graduate-level courses, this volume is destined to become the standard text and reference in the field. This text integrates VLSI architecture theory and algorithms, addresses various architectures at the implementation level, and presents several approaches to analysis, estimation, and reduction of power consumption. Throughout this book, Dr. Parhi explains how to design high-speed, low-area, and low-power VLSI systems for a broad range of DSP applications. He covers pipelining extensively as well as numerous other techniques, from parallel processing to scaling and roundoff noise computation. Readers are shown how to apply all techniques to improve implementations of several DSP algorithms, using both ASICs and off-the-shelf programmable digital signal processors. The book features hundreds of graphs illustrating the various DSP algorithms, examples based on digital filters and transforms clarifying key concepts, and interesting end-of-chapter exercises that help match techniques with applications. In addition, the abundance of readily available techniques makes this an extremely useful resource for designers of DSP systems in wired, wireless, or multimedia communications. The material can be easily adopted in new courses on either VLSI digital signal processing architectures or high-performance VLSI system design. An invaluable reference and practical guide to VLSI digital signal processing. A tremendous source of optimization techniques indispensable in modern

VLSI signal processing, VLSI Digital Signal Processing Systems promises to become the standard in the field. It offers a rich training ground for students of VLSI design for digital signal processing and provides immediate access to state-of-the-art, proven techniques for designers of DSP applications-in wired, wireless, or multimedia communications. Topics include: * Transformations for high speed using pipelining, retiming, and parallel processing techniques * Power reduction transformations for supply voltage reduction as well as for strength or capacitance reduction * Area reduction using folding techniques * Strategies for arithmetic implementation * Synchronous, wave, and asynchronous pipelining * Design of programmable DSPs. An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department.

Data Simplification: Taming Information With Open Source Tools addresses the simple fact that modern data is too big and complex to analyze in its native form. Data simplification is the process whereby large and complex data is rendered usable. Complex data must be simplified before it can be analyzed, but the process of data simplification is anything but simple, requiring a specialized set of skills and tools. This book provides data scientists from every scientific discipline with the methods and tools to simplify their data for immediate analysis or long-term storage in a form that can be readily repurposed or integrated with other data. Drawing upon years of practical experience, and using numerous examples and use cases, Jules Berman discusses the principles, methods, and tools that must be studied and mastered to achieve data simplification, open source tools, free utilities and snippets of code that can be reused and repurposed to simplify data, natural language processing and machine translation as a tool to simplify data, and data summarization and visualization and the role they play in making data useful for the end user. Discusses data simplification principles, methods, and tools that must be studied and mastered Provides open source tools, free utilities, and snippets of code that can be reused and repurposed to simplify data Explains how to best utilize indexes to search, retrieve, and analyze textual data Shows the data scientist how to apply ontologies, classifications, classes, properties, and instances to data using tried and true methods