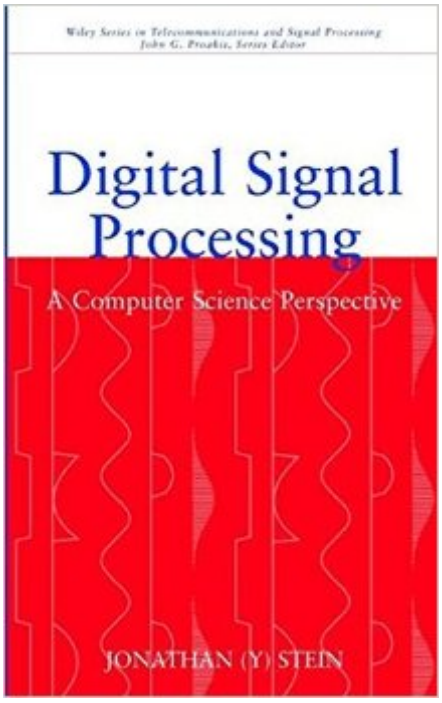
Digital Signal Processing: A Computer Science Perspective



Synopsis

Get a working knowledge of digital signal processing for computer science applications The field of digital signal processing (DSP) is rapidly exploding, yet most books on the subject do not reflect the real world of algorithm development, coding for applications, and software engineering. This important new work fills the gap in the field, providing computer professionals with a comprehensive introduction to those aspects of DSP essential for working on today's cutting-edge applications in speech compression and recognition and modem design. The author walks readers through a variety of advanced topics, clearly demonstrating how even such areas as spectral analysis, adaptive and nonlinear filtering, or communications and speech signal processing can be made readily accessible through clear presentations and a practical hands-on approach. In a light, reader-friendly style, Digital Signal Processing: A Computer Science Perspective provides: * A unified treatment of the theory and practice of DSP at a level sufficient for exploring the contemporary professional literature * Thorough coverage of the fundamental algorithms and structures needed for designing and coding DSP applications in a high level language * Detailed explanations of the principles of digital signal processors that will allow readers to investigate assembly languages of specific processors * A review of special algorithms used in several important areas of DSP, including speech compression/recognition and digital communications * More than 200 illustrations as well as an appendix containing the essential mathematical background

Book Information

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Customer Reviews

This is a true work of art. The do science correctly you need to step back and look at it as more than equations and math. Johnathon Stein hs accomplished this in his book. Even the structure of the book is unique. Each concept is covered in bite size pieces with emphasis on intuitive understanding without flinching on the math, which is like a walk as if through a field of flowers. At the end of each little chapter are questions of such depth and beauty that I am as an author of engineering articles left tin awe of this author. Most professors I am sure do understand their topics well but to convey the knowledge to others is a special talent only a few possess.The book seems to be targeted to Computer Science, however, it is far more relevent to the EEs. It will provide you with needed intuitive and comprehensively deep understanding of this field. No topic is left unturned, from description of signals to spectrum of deterministic and random signals, both stationery and non. In most cases, you can open the book and read from anywhere and if you are familiar with the topic you will find your self admiring the explanations. I jut opened it randomly to page 435 under topic titled "Speech" and here is passage I find, " It is a curious fact that although we can input and process much more visual information than acoustic, the main mode of communications between humans is speech. Wouldn’t it have been more efficient for us to communicate via some elaborate sign language or perhaps by creating rapidly changing color patterns on our skin? Apparently the main reason for our preferring acoustic wave sis their long wavelengths and thus their diffraction around obstacles. We can broadcast our speech to many people in different people in different place?

This book does what no other book I know does - lays out the theory of DSP in plain language for the computer scientist. This book will probably seem a little on the light side for electrical engineering students and professionals, but even they will benefit from the author’s plain-language descriptions and instructive figures. The author has an easy test to see if you have sufficient mathematical background to understand this book - he says you should look at the appendix, which is entitled "Whirlwind Exposition of Mathematics", and if at least half of the subject matter is familiar, then you are mathematically qualified.The material is presented in a very unconventional fashion. Although the title of part one, "Signals", indicates a traditionally organized DSP textbook, this section contains a chapter on Noise that doesn’t seem to fit in with the other four chapters.Part two is entitled "Systems", and covers ground you wouldn’t generally expect in a general DSP text. It goes all the way from answering the simple question "Why Convolve?" to filter design techniques to correlation and biological signal processing. You won’t be ready to design biomedical devices after

you read this chapter, but it outlines some underlying principles of speech processing and neural networks in very accessible language and prepares the student for further study.Part 3, "Architectures and Algorithms", is where this textbook really shines. In this section the author equates many DSP problems to graph theory and manipulation, deals with spectral analysis and correlates matrix algebra techniques to finding sinusoids in noise, and presents filter implementation in computer program format via pseudocode.