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This book is the basis for Instructor Rick Lyons' course, DSP: Understanding Digital Signal Processing from Besser Associates. From the publisher: This is undoubtedly the most accessible book on digital signal processing available to the beginner. Using intuitive explanations and well-chosen examples, this book gives you the tools to develop a fundamental understanding of DSP theory. The author covers the essential mathematics by explaining the meaning and significance of the key DSP equations. Comprehensive in scope and gentle in approach, the book will help you achieve a thorough grasp of the basics and move gradually to more sophisticated DSP concepts and applications. The book begins with a complete explanation of the often misunderstood topic of periodic sampling. The introduction to the important discrete Fourier transform, and its fast Fourier transform (FFT) implementation, is the most lucid and illuminating explanation available anywhere. You will also find extensive information on both finite impulse response (FIR) and infinite impulse response (IIR) digital filters, as well as coverage of the benefits of signal averaging. In addition, the book demystifies the abstruse topics of the Convolution theorem and complex signals. The practical uses of various binary number formats are also carefully described and compared. Finally, a collection of tricks-of-the-trade used by professionals to make DSP algorithms more efficient will help you apply DSP concepts successfully. Besser Associates ContentDSP Digital Signal Processing Amazon.com's Top-Selling DSP Book for Seven Straight Years—Now Fully Updated!Understanding Digital Signal Processing, Third Edition, is quite simply the best resource for engineers and other technical professionals who want to master and apply today's latest DSP techniques. Richard G. Lyons has updated and expanded his best-selling second edition to reflect the newest technologies, building on the exceptionally readable coverage that made it the favorite of DSP professionals worldwide. He has also added hands-on problems to every chapter, giving students even more of the practical experience they need to succeed. Comprehensive in scope and clear in approach, this book achieves the perfect balance between theory and practice, keeps math at a tolerable level, and makes DSP exceptionally accessible to beginners without ever oversimplifying it. Readers can thoroughly grasp the basics and quickly move on to more sophisticated techniques. This edition adds extensive new coverage of FIR and IIR filter analysis techniques, digital differentiators, integrators, and matched filters. Lyons has significantly updated and expanded his discussions of multirate processing techniques, which are crucial to modern wireless and satellite communications. He also presents nearly twice as many DSP Tricks as in the second edition—including techniques even seasoned DSP professionals may have overlooked. Coverage includes New homework problems that deepen your understanding and help you apply what you've learned. Practical, day-to-day DSP implementations and problem-solving throughout Useful new guidance on generalized digital networks, including discrete differentiators, integrators, and matched filters Clear descriptions of statistical measures of signals, variance reduction by averaging, and real-world signal-to-noise ratio (SNR) computation A significantly expanded chapter on sample rate conversion (multirate systems) and associated filtering techniques New guidance on implementing fast convolution, IIR filter scaling, and more Enhanced coverage of analyzing digital filter behavior and performance for diverse communications and biomedical applications Discrete sequences/systems, periodic sampling, DFT, FFT, finite/infinite impulse response filters, quadrature (I/Q) processing, discrete Hilbert transforms, binary number formats, and much more Preface xv About the Author xxiii Chapter 1: Discrete Sequences and Systems 1 1.1 Discrete Sequences and their Notation 2 1.2 Signal Amplitude, 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