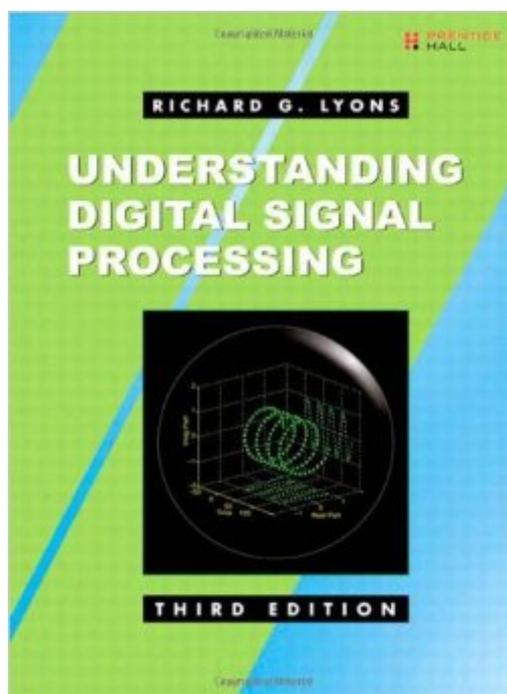


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# Understanding Digital Signal Processing (3rd Edition)



## Synopsis

.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

## Book Information

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## Customer Reviews

If you are planning to get into DSP from a practical point of view, then there are only two books to get - and this is one of them. DSP is a complex subject, and if you are not in an educational environment where you have easy access to teachers who can advise you, then you could easily be turned off by diving into a book such as Schafer and Oppenheim's recognized text book on the subject. I am a retired ex-academic with an interest in signal processing, and decided to get back into the field, which had developed considerably since I was involved in basic continuous signal processing, which then revolved around Fourier analysis and integrals. I researched the market thoroughly and ended up purchasing Steven Smith's excellent book "The Scientist and Engineer's Guide to Digital Signal Processing", which gives a conceptual view of DSP without getting too involved in the mathematics of the subject. Having worked through this book and established a solid basis of what DSP is all about, I decided that I needed a little more mathematical support to the concepts, and settled on the current book. What a good choice. These two books are a perfect complement to each other, and the writing style of the authors is very similar. Anybody getting into DSP is strongly advised to purchase them both. But back to the current book - this book focuses on the reader and makes you feel that you are interacting with a teacher rather than puzzling over equations. It leads you gently through the concepts, but doesn't bypass thorough considerations of the development, for instance, of the Fast Fourier Transform, which can be quite intimidating. This is a chapter that you can scan through without disrupting the rest of the material.

In every field there are books that just stand apart. They are so well written that they change your opinion about the subject. In fact, with most mathematical ideas if you understand them well, they no longer seem tedious, or hard. Richard Lyons book "Understanding Digital Signal Processing" is just such a book. I remember coming across it on [Amazon](#) when I was young. This was before [Amazon](#) had a "look inside" feature and one was generally leery of ordering things on line. There was a introduction to

the book written by the author which I read. The writing style was impressive and so I ordered the book. I still remember looking through and thinking this looks fun! It had more pictures than it had formulas! How often do you get excited looking at a textbook! I read the first chapter that night and felt exhilarated. I had my first aha moment in DSP. Although I was out of graduate school for several years at that time, I felt that I had never really understood the subject. Yes, I could do the transforms for homework etc., but understood, not really. In this book, Lyons starts with discrete signals, goes through sampling and aliasing in the first chapter. Each chapter build gently on the previous. All just a model of clarity and beauty. I particularly loved the filter chapter, with such easy to understand exposition of what the equation meant, the forward part and the reverse part. We all love pictures and the book's strength is its ability to communicate not just in words but also in figures. From DFT to filter design to DSP algorithms, all come alive as explained by Lyons. I think I did read the whole book in about a week. I had been writing papers and felt that this is the way engineering should be taught. This is the way engineering books should be written.

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