



# Understanding Digital Signal Processing (3rd Edition)

By Richard G. Lyons

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*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.

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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

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### Editorial Review

#### About the Author

**Richard G. Lyons** is a consulting Systems Engineer and lecturer with Besser Associates in Mountain View, California. He is author of the book "Understanding Digital Signal Processing", editor and contributor to the book "Streamlining Digital Signal Processing", and has authored numerous articles on DSP. Lyons has taught DSP at the University of California Santa Cruz Extension and recently received the IEEE Signal Processing Society's *2012 Educator of the Year* award.

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