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Multirate Signal Processing for Communication Systems, Second Edition

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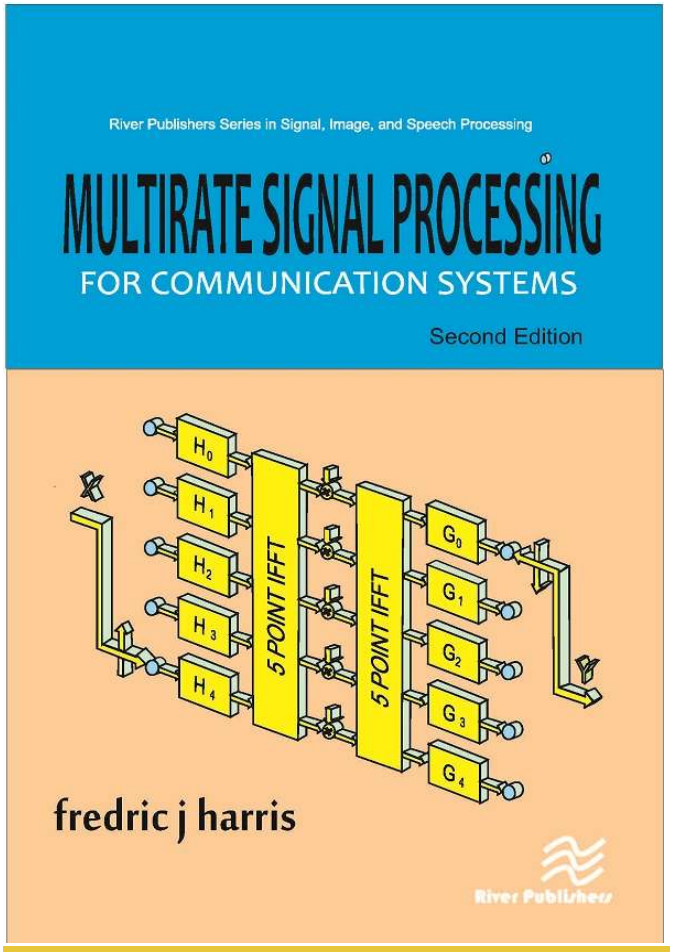
Multirate Signal processing can improve system performance and reduce costs in applications ranging from laboratory instruments, cable modems, wireless systems, satellites, Radar, Sonar, and consumer entertainment products. This second edition continues to offer a systematic, clear, and intuitive introduction to multirate signal processing for working engineers and system designers. Significant new material and fresh concepts, including Green Signal Processing techniques have been introduced.

The author uses extensive examples and figures to illustrate a wide range of multirate techniques, from basic resampling to leading-edge cascade and multi-stage filter structures. Along the way he draws on extensive research and consulting experience to introduce processing "tricks" shown to maximize performance and efficiency. Coverage includes:

- Effect of sampling and resampling in time and frequency domains
- Relationships between FIR filter specifications and filter length (# of taps)
- Window design and equal-ripple (Remez) design techniques
- Square-Root Nyquist and Half-band Filters including new enhancements
- Polyphase FIR filters: up-sampling, down-sampling
- Polyphase M-path analysis and synthesis channelizers and cascade pairs
- Polyphase interpolators for arbitrary sample rate changes
- Dyadic half-band filters, quadrature mirror filters
- Channel banks for multiple arbitrary bandwidths and center frequencies
- Comprehensive coverage of recursive all-pass filters and channelizers, non-uniform and uniform phase, mixed recursive and non-recursive
- Comparisons with traditional DSP designs
- Extensive applications coverage throughout



River Publishers Series in Signal, Image and Speech Processing

ISBN: 9788770222105
e-ISBN: 9788770222099
Available From: March 2021
Price: € 98.50 $ 120.00

KEYWORDS:
Multirate, Intentional Aliasing, Unwrapping Aliases, M-path Analysis Filter Bank, M-Path Synthesis Filter Bank, Coupled Analysis and Synthesis Banks, CIC Filters, All-Pass Filters, All-Pass Channelizers, Enhanced Filter Designs, Green Filter Implementations, Arbitrary Bandwidth, Arbitrary Center Frequencies, Arbitrary Ratio Interpolator.

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