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Digital Filter Design and Realization

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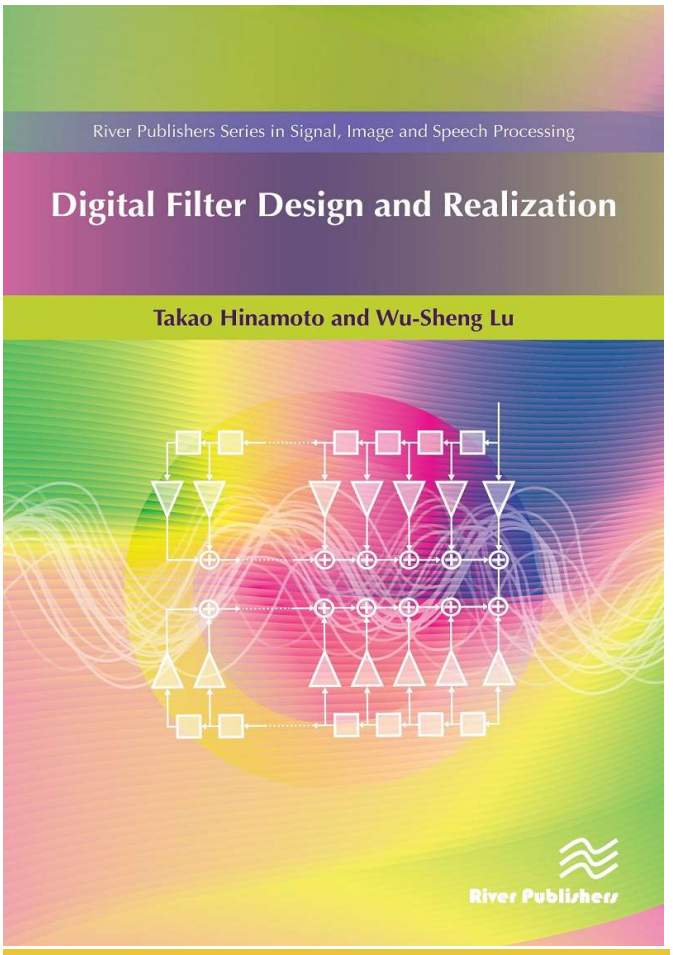
Analysis, design, and realization of digital filters have experienced major developments since the 1970s, and have now become an integral part of the theory and practice in the field of contemporary digital signal processing.

Digital Filter Design and Realization is written to present an up-to-date and comprehensive account of the analysis, design, and realization of digital filters. It is intended to be used as a text for graduate students as well as a reference book for practitioners in the field. Prerequisites for this book include basic knowledge of calculus, linear algebra, signal analysis, and linear system theory.

Technical topics discussed in the book include:

- Discrete-Time Systems and z-Transformation
- Stability and Coefficient Sensitivity
- State-Space Models
- FIR Digital Filter Design
- Frequency-Domain Digital Filter Design
- Time-Domain Digital Filter Design
- Interpolated and Frequency-Response-Masking FIR Digital Filter Design
- Composite Digital Filter Design
- Finite Word Length Effects
- Coefficient Sensitivity Analysis and Minimization
- Error Spectrum Shaping
- Roundoff Noise Analysis and Minimization
- Generalized Transposed Direct-Form II
- Block-State Realization



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Digital filters, frequency-domain design, time-domain design, interpolated FIR filters, frequency-response-masking FIR filters, composite filters, state-space realization, finite-word-length, coefficient sensitivity, round-off noise, overflow oscillations, error feedback, transposed direct-form II, block-state realization

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