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Transfer Functions; 2.2.4 Poles and Zeros
2.2.5 Frequency Responses2.2.6 Discrete Fourier Transform; 2.3 Introduction to Random Variables; 2.3.1 Review of Random Variables; 2.3.2 Operations of Random Variables; 2.4 Fixed-Point Representations and Quantization Effects; 2.4.1 Fixed-Point Formats; 2.4.2 Quantization Errors; 2.4.3 Signal Quantization; 2.4.4 Coefficient Quantization; 2.4.5 Roundoff Noise; 2.4.6 Fixed-Point Toolbox; 2.5 Overflow and Solutions; 2.5.1 Saturation Arithmetic; 2.5.2 Overflow Handling; 2.5.3 Scaling of Signals; 2.5.4 Guard Bits; 2.6 Experiments and Program Examples; 2.6.1 Overflow and Saturation Arithmetic
2.6.2 Function Approximations2.6.3 Real-Time Signal Generation Using eZdsp; Exercises; References; 3 Design and Implementation of FIR Filters; 3.1 Introduction to FIR Filters; 3.1.1 Filter Characteristics; 3.1.2 Filter Types; 3.1.3 Filter Specifications; 3.1.4 Linear Phase FIR Filters; 3.1.5 Realization of FIR Filters; 3.2 Design of FIR Filters; 3.2.1 Fourier Series Method; 3.2.2 Gibbs Phenomenon; 3.2.3 Window Functions; 3.2.4 Design of FIR Filters Using MATLAB®; 3.2.5 Design of FIR Filters Using the FDATool; 3.3 Implementation Considerations; 3.3.1 Quantization Effects in FIR Filters
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3.5.7 Interpolation Using Fixed-Point C

Sommario/riassunto

"Real-Time Digital Signal Processing introduces fundamental digital signal processing (DSP) principles and will be updated to include the latest DSP applications, introduce new software development tools and adjust the software design process to reflect the latest advances in the field. In the 3rd edition of the book, the key aspect of hands-on experiments will be enhanced to make the DSP principles more interesting and directly interact with the real-world applications. All of the programs will be carefully updated using the most recent version of software development tools and the new TMS320VC5505 eZdsp USB Stick for real-time experiments. Due to its lower cost and portability, the new software and hardware tools are now widely used in university labs and in commercial industrial companies to replace the older and more expensive generation. The new edition will have a renewed focus on real-time applications and will offer step-by-step hands-on experiments for a complete design cycle starting from floating-point C language program to fixed-point C implementation, code optimization using INTRINSICS, and mixed C-and-assembly programming on fixed-point DSP processors. This new methodology enables readers to concentrate on learning DSP fundamentals and innovative applications by relaxing the intensive programming efforts, namely, the traditional DSP assembly coding efforts. The book is organized into two parts; Part One introduces the digital signal processing principles and theories, and Part Two focuses on practical applications. The topics for the applications are the extensions of the theories in Part One with an emphasis placed on the hands-on experiments, systematic design and implementation approaches. The applications provided in the book are carefully chosen to reflect current advances of DSP that are of most relevance for the intended readership"--