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Nota di contenuto	INTRODUCTION TO DIGITAL SIGNAL PROCESSING AND FILTER DESIGN; CONTENTS; Preface; 1 Introduction; 1.1 Introduction; 1.2 Applications of DSP; 1.3 Discrete-Time Signals; 1.3.1 Modeling and Properties of Discrete-Time Signals; 1.3.2 Unit Pulse Function; 1.3.3 Constant Sequence; 1.3.4 Unit Step Function; 1.3.5 Real Exponential Function; 1.3.6 Complex Exponential Function; 1.3.7 Properties of $\cos(w(0)n)$; 1.4

History of Filter Design; 1.5 Analog and Digital Signal Processing; 1.5.1 Operation of a Mobile Phone Network; 1.6 Summary; Problems; References; 2 Time-Domain Analysis and z Transform
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2.1.1 Models of the Discrete-Time System; 2.1.2 Recursive Algorithm; 2.1.3 Convolution Sum; 2.2 z Transform Theory; 2.2.1 Definition; 2.2.2 Zero Input and Zero State Response; 2.2.3 Linearity of the System; 2.2.4 Time-Invariant System; 2.3 Using z Transform to Solve Difference Equations; 2.3.1 More Applications of z Transform; 2.3.2 Natural Response and Forced Response; 2.4 Solving Difference Equations Using the Classical Method; 2.4.1 Transient Response and Steady-State Response; 2.5 z Transform Method Revisited; 2.6 Convolution Revisited
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2.7.1 Review of Model Generation; 2.8 Stability; 2.8.1 Jury-Marden Test; 2.9 Solution Using MATLAB Functions; 2.10 Summary; Problems; References; 3 Frequency-Domain Analysis; 3.1 Introduction; 3.2 Theory of Sampling; 3.2.1 Sampling of Bandpass Signals; 3.3 DTFT and IDTFT; 3.3.1 Time-Domain Analysis of Noncausal Inputs; 3.3.2 Time-Shifting Property; 3.3.3 Frequency-Shifting Property; 3.3.4 Time Reversal Property; 3.4 DTFT of Unit Step Sequence; 3.4.1 Differentiation Property; 3.4.2 Multiplication Property; 3.4.3 Conjugation Property; 3.4.4 Symmetry Property
3.5 Use of MATLAB to Compute DTFT
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5 Finite Impulse Response Filters

Sommario/riassunto

A practical and accessible guide to understanding digital signal processing. Introduction to Digital Signal Processing and Filter Design was developed and fine-tuned from the author's twenty-five years of experience teaching classes in digital signal processing. Following a step-by-step approach, students and professionals quickly master the fundamental concepts and applications of discrete-time signals and systems as well as the synthesis of these systems to meet specifications in the time and frequency domains. Striking the right balance between mathematical derivations and theory, the
