

<<数字信号处理>>

图书基本信息

书名：<<数字信号处理>>

13位ISBN编号：9787121047633

10位ISBN编号：7121047632

出版时间：2007-8

出版时间：电子工业

作者：蔡坤宝

页数：392

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

<<数字信号处理>>

内容概要

《数字信号处理（英文版）》系统地阐述了数字信号处理所涉及的信号与系统分析和系统设计的基本理论、基本分析与设计方法、基本算法和处理技术。

全书共10章，主要内容包括：离散时间信号与系统的基本概念，离散时间信号与系统的变换域分析，包括z变换和离散时间傅里叶变换、连续时间信号的抽样与重建，离散傅里叶变换及其快速算法（FFT），数字滤波器实现的基本结构，IIR和FIR数字滤波器的设计原理与基本设计方法，数字信号处理中的有限字长效应，多抽样率数字信号处理。

《数字信号处理（英文版）》配有多媒体电子课件、英文版教学大纲、习题指导与实验手册。

《数字信号处理（英文版）》可以作为电子与通信相关专业的本科数字信号处理课程中英文双语教学的教材，或中文授课的英文版教学参考书，也可供从事数字信号处理的工程技术人员学习参考。本书尤其适合初步开展数字信号处理课程中英文双语授课的教师与学生选用。

作者简介

蔡坤宝，博士，重庆大学通信工程学院教授，信号与信息处理硕士学位点负责人。多年来致力于随机信号的产生与处理、生物组织粘弹性波动的有限元分析、现代信号处理及其应用和人工神经网络等方面的研究工作。十余年来，积极探索和实施中英文双语教学，现任重庆市级精品课程“信号与线性系统”的负责人，并参加重庆大学精品课程“数字信号处理”的建设工作。

书籍目录

1 Introduction 1.1 What Is a Signal? 1.2 What Is a System? 1.3 What Is Signal Processing? 1.4 Classification of Signals 1.4.1 Deterministic and Random Signals 1.4.2 Continuous-Time and Discrete-Time Signals 1.4.3 Periodic Signals and Nonperiodic Signals 1.4.4 Energy Signals and Power Signals 1.5 Overview of Digital Signal Processing

2 Discrete-Time Signals and Systems 2.1 Discrete-Time Signals: Sequences 2.1.1 Operation on Sequences 2.2 Basic Sequences 2.2.1 Some Basic Sequences 2.2.2 Periodicity of Sequences 2.2.3 Representation of Arbitrary Sequences 2.3 Discrete-Time systems 2.3.1 Classification of Discrete-Time systems 2.4 Time-Domain Representations of LTI Systems 2.4.1 The Linear Convolution Sum 2.4.2 Interconnections of LTI Systems 2.4.3 Stability Condition of LTI systems 2.4.4 Causality Condition of LTI systems 2.4.5 Causal and Anticausal Sequences 2.5 Linear Constant-Coefficient Difference Equations 2.5.1 Recursive Solution of Difference Equations 2.5.2 Classical Solution of Difference Equations 2.5.3 Zero-Input Response and Zero-State Response 2.5.4 The Impulse Response of Causal LTI Systems 2.5.5 Recursive Solution of Impulse Responses 2.5.6 Classification of LTI Discrete-Time Systems

Problems 3 Transform-Domain Analysis of Discrete-Time Signals and Systems 3.1 The z-Transform 3.1.1 Definition of the z-Transform 3.1.2 A General Shape of the Region of Convergence 3.1.3 Uniqueness of the z-Transform 3.2 Relation Between the ROCs and Sequence Types 3.3 The z-Transform of Basic Sequences 3.4 The Inverse z-Transform 3.4.1 Contour Integral Method 3.4.2 Partial Fraction Expansion Method 3.4.3 Long Division Method 3.4.4 Power Series Expansion Method 3.5 Properties of the z-Transform 3.6 The Discrete-Time Fourier Transform 3.6.1 Definition of the Discrete-Time Fourier Transform 3.6.2 Convergence Criteria 3.6.3 Properties of the Discrete-Time Fourier Transform 3.6.4 Symmetry Properties of the Discrete-Time Fourier Transform 3.7 Transform-Domain Analysis of LTI Discrete-Time Systems 3.7.1 The Frequency Response of Systems 3.7.2 The Transfer Function of LTI Systems 3.7.3 Geometric Evaluation of the Frequency Response 3.8 Sampling of Continuous-Time Signals 3.8.1 Periodic Sampling 3.8.2 Reconstruction of Bandlimited Signals 3.9 Relations of the z-Transform to the Laplace Transform

Problems 4 The Discrete Fourier Transform 4.1 The Discrete Fourier Series 4.2 Properties of the Discrete Fourier Series 4.2.1 Evaluation of the Periodic Convolution Sum 4.3 The Discrete Fourier Transform 4.4 Properties of the Discrete Fourier Transform 4.4.1 Circular Convolution Theorems 4.5 Linear Convolutions Evaluated by the Circular Convolution 4.6 Linear Time-Invariant Systems Implemented by the DFT 4.7 Sampling and Reconstruction in the z-Domain 4.8 Fourier Analysis of Continuous-Time Signals Using the DFT 4.8.1 Fourier Analysis of Nonperiodic Continuous-Time Signals 4.8.2 Practical Considerations 4.8.3 Spectral Analysis of Sinusoidal Signals

Problems 5 Fast Fourier Transform Algorithms 5.1 Direct Computation and Efficiency Improvement of the DFT 5.2 Decimation-in-Time FFT Algorithm with Radix-25.2.1 Butterfly-Branch Transmittance of the Decimation-in-Time FFT 5.2.2 In-Place Computations 5.3 Decimation-in-Frequency FFT Algorithm with Radix-25.4 Computational Method of the Inverse FFT

Problems 6 Digital Filter Structures 6.1 Description of the Digital Filter Structures 6.2 Basic Structures for IIR Digital Filters 6.2.1 Direct Form 6.2.2 Direct Form 6.2.3 Cascade Form 6.2.4 Parallel Form 6.3 Basic Structures for FIR Digital Filters 6.3.1 Direct Forms 6.3.2 Cascade Forms 6.3.3 Linear-Phase Forms 6.3.4 Frequency Sampling Form

Problems 7 Design Techniques of Digital IIR Filters 7.1 Preliminary Considerations 7.1.1 Frequency Response of Digital Filters 7.2 Discrete-Time Systems Characterized by Phase Properties 7.3 Allpass Systems 7.3.1 Nonminimum-Phase Systems Represented by a Cascade Connection 7.3.2 Group Delay of the Minimum-Phase Systems 7.3.3 Energy Delay of the Minimum-Phase Systems 7.4 Analog-to-Digital Filter Transformations 7.4.1 Impulse Invariance Transformation 7.4.2 Step Invariance Transformation 7.4.3 Bilinear Transformation 7.5 Design of Analog Prototype Filters 7.5.1 Analog Butterworth Lowpass Filters 7.5.2 Analog Chebyshev Lowpass Filters 7.6 Design of Lowpass IIR Digital Filters 7.6.1 Design of Lowpass Digital Filters Using the Impulse Invariance 7.6.2 Design of Lowpass Digital Filters Using the Bilinear Transformation 7.7 Design of IIR Digital Filters Using Analog Frequency Transformations 7.7.1 Design of Bandpass IIR Digital Filters 7.7.2 Design of Bandstop IIR Digital

Filters7.7.3 Design of Highpass IIR Digital Filters7.8 Design of IIR Digital Filters Using Digital Frequency Transformations7.8.1 Lowpass-to-Lowpass Transformation7.8.2 Lowpass-to-Highpass Transformation7.8.3 Lowpass-to-Bandpass Transformation7.8.4 Lowpass-to-Bandstop TransformationProblems8 Design of FIR Digital Filters8.1 Properties of Linear Phase FIR Filters8.1.1 The Impulse Response of Linear-Phase FIR Filters8.1.2 The Frequency Response of Linear-Phase FIR Filters8.1.3 Characteristics of Amplitude Functions8.1.4 Constraints on Zero Locations8.2 Design of Linear-Phase FIR Filters Using Windows8.2.1 Basic Techniques8.2.2 Window Functions8.2.3 Design of Linear-Phase FIR Lowpass Filters Using Windows8.2.4 Design of Linear-Phase FIR Bandpass Filters Using Windows8.2.5 Design of Linear-Phase FIR Highpass Filters Using Windows8.2.6 Design of Linear-Phase FIR Bandstop Filters Using WindowsProblems9 Finite-Wordlength Effects in Digital Signal Processing9.1 Binary Number Representation with its Quantization Errors9.1.1 Fixed-Point Binary Representation of Numbers9.1.2 Floating-Point Representation9.1.3 Errors from Truncation and Rounding v9.1.4 Statistical Model of the Quantization Errors9.2 Analysis of the Quantization Errors in A/D Conversion9.2.1 Statistical Model of the Quantization Errors9.2.2 Transmission of the Quantization Noise through LTI Systems9.3 Coefficient Quantization Effects in Digital Filters9.3.1 Coefficient Quantization Effects in IIR Digital Filters9.3.2 Statistical Analysis of Coefficient Quantization Effects9.3.3 Coefficient Quantization Effects in FIR Filters9.4 Round-off Effects in Digital Filters9.4.1 Round-off Effects in Fixed-Point Realizations of ILR Filters9.4.2 Dynamic Range Scaling in Fixed-Point Implementations of IIR Filters9.5 Limit-Cycle Oscillations in Realizations of IIR Digital Filters9.5.1 Zero-Input Limit Cycle Oscillations9.5.2 Limit Cycles Due to Overflow9.6 Round-off Errors in FFT Algorithms9.6.1 Round-off Errors in the Direct DFT Computation9.6.2 Round-off Errors in Fixed-point FFT RealizationProblems10 Multirate Digital Signal Processing10.1 Sampling Rate Changed by an Integer Factor10.1.1 Downsampling with an Integer Factor M10.1.2 Decimation by an Integer Factor M10.1.3 Upsampling with an Integer Factor L10.1.4 Interpolation by an Integer Factor L10.2 Sampling Rate Conversion by a Rational Factor10.3 Efficient Structures for Sampling Rate Conversion10.3.1 Equivalent Cascade Structures10.3.2 Polyphase Decompositions10.3.3 Polyphase Realization of Decimation Filters10.3.4 Polyphase Realization of Interpolation FiltersProblemsAppendix A Tables for the z-TransformAppendix B Table for Properties of the Discrete-Time Fourier TransformAppendix C Table for Properties of the Discrete Fourier SeriesAppendix D Table for Properties of the Discrete Fourier TransformAppendix E Table for the Normalized Butterworth Lowpass FiltersAppendix F Answers To Partial ProblemsReferences

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>