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Nota di contenuto	DIGITAL SIGNAL PROCESSING USING MATLAB FOR STUDENTS AND RESEARCHERS; CONTENTS; PREFACE; CHAPTER 1: WHAT IS SIGNAL PROCESSING?; 1.1 CHAPTER OBJECTIVES; 1.2 INTRODUCTION; 1.3 BOOK OBJECTIVES; 1.4 DSP AND ITS APPLICATIONS; 1.5 APPLICATION CASE STUDIES USING DSP; 1.6 OVERVIEW OF LEARNING OBJECTIVES; 1.7 CONVENTIONS USED IN THIS BOOK; 1.8 CHAPTER SUMMARY; CHAPTER 2: MATLAB FOR SIGNAL PROCESSING; 2.1 CHAPTER OBJECTIVES; 2.2 INTRODUCTION; 2.3 WHAT IS MATLAB?; 2.4 GETTING STARTED; 2.5 EVERYTHING IS A MATRIX; 2.6 INTERACTIVE USE; 2.7 TESTING AND LOOPING; 2.8 FUNCTIONS AND VARIABLES 2.9 PLOTTING AND GRAPHING 2.10 LOADING AND SAVING DATA; 2.11 MULTIDIMENSIONAL ARRAYS; 2.12 BITWISE OPERATORS; 2.13 VECTORIZING CODE; 2.14 USING MATLAB FOR PROCESSING SIGNALS; 2.15 CHAPTER SUMMARY; CHAPTER 3: SAMPLED SIGNALS AND DIGITAL PROCESSING; 3.1 CHAPTER OBJECTIVES; 3.2 INTRODUCTION; 3.3 PROCESSING SIGNALS USING COMPUTER ALGORITHMS; 3.4 DIGITAL REPRESENTATION OF NUMBERS; 3.5 SAMPLING; 3.6 QUANTIZATION; 3.7

IMAGE DISPLAY; 3.8 ALIASING; 3.9 RECONSTRUCTION; 3.10 BLOCK  
 DIAGRAMS AND DIFFERENCE EQUATIONS; 3.11 LINEARITY,  
 SUPERPOSITION, AND TIME INVARIANCE  
 3.12 PRACTICAL ISSUES AND COMPUTATIONAL EFFICIENCY  
 3.13 CHAPTER SUMMARY; CHAPTER 4: RANDOM SIGNALS; 4.1 CHAPTER  
 OBJECTIVES; 4.2 INTRODUCTION; 4.3 RANDOM AND DETERMINISTIC  
 SIGNALS; 4.4 RANDOM NUMBER GENERATION; 4.5 STATISTICAL  
 PARAMETERS; 4.6 PROBABILITY FUNCTIONS; 4.7 COMMON  
 DISTRIBUTIONS; 4.8 CONTINUOUS AND DISCRETE VARIABLES; 4.9  
 SIGNAL CHARACTERIZATION; 4.10 HISTOGRAM OPERATORS; 4.11  
 MEDIAN FILTERS; 4.12 CHAPTER SUMMARY; CHAPTER 5: REPRESENTING  
 SIGNALS AND SYSTEMS; 5.1 CHAPTER OBJECTIVES; 5.2 INTRODUCTION;  
 5.3 DISCRETE-TIME WAVEFORM GENERATION; 5.4 THE  $z$  TRANSFORM  
 5.5 POLYNOMIAL APPROACH  
 The previous section showed how to  
 iterate a difference equation in order to determine the output sequence.  
 It is particularly important to understand the relationship between  
 difference equations and their transforms. The  $z$  transform of a linear  
 system gives us the key to combining systems together to form more  
 complex systems, since the  $z$  transforms in combined blocks are able to  
 be multiplied or added together as necessary. We now give another  
 insight into this approach.  
 5.6 POLES, ZEROS, AND STABILITY; 5.7  
 TRANSFER FUNCTIONS AND FREQUENCY RESPONSE  
 5.8 VECTOR INTERPRETATION OF FREQUENCY RESPONSE  
 5.9 CONVOLUTION; 5.10 CHAPTER SUMMARY; CHAPTER 6: TEMPORAL AND  
 SPATIAL SIGNAL PROCESSING; 6.1 CHAPTER OBJECTIVES; 6.2  
 INTRODUCTION; 6.3 CORRELATION; 6.4 LINEAR PREDICTION; 6.5 NOISE  
 ESTIMATION AND OPTIMAL FILTERING; 6.6 TOMOGRAPHY; 6.7 CHAPTER  
 SUMMARY; CHAPTER 7: FREQUENCY ANALYSIS OF SIGNALS; 7.1  
 CHAPTER OBJECTIVES; 7.2 INTRODUCTION; 7.3 FOURIER SERIES; 7.4  
 HOW DO THE FOURIER SERIES COEFFICIENT EQUATIONS COME ABOUT?;  
 7.5 PHASE-SHIFTED WAVEFORMS; 7.6 THE FOURIER TRANSFORM; 7.7  
 ALIASING IN DISCRETE-TIME SAMPLING  
 7.8 THE FFT AS A SAMPLE INTERPOLATOR

## Sommario/riassunto

"This book uses an active learning approach to the topic of digital  
 signal processing (DSP). DSP is a fundamental technology with wide  
 ranging applications as, for example, digital downloads of movies,  
 mobile and broadband communications, digital television, and many  
 other areas. In this book the subject is taught using a "hands-on"  
 experimental approach with MATLAB examples throughout the text to  
 illustrate the mathematical concepts and DSP algorithms developed and  
 explained. Existing books in this area tends to fall into one of two  
 camps - either a highly mathematical treatment with few practical  
 examples of the everyday uses of DSP, or else very verbose and  
 descriptive treatments with little or no mathematical content to back up  
 the topics. The former type of text is excellent as a standard reference,  
 but poor as a learning vehicle. The latter type of text is good for  
 general knowledge, but fails to meet the needs of University students  
 and practicing industry professionals. Students need a learn-by-doing  
 approach, and industry professionals need to come up to speed as  
 rapidly as possible. The book uses MATLAB throughout, in an  
 established industry and University programming environment.  
 Furthermore, it requires that the reader only have access to the  
 Student/Educational version of MATLAB, not the full commercial  
 version, which is out of reach of most students"--