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Nota di contenuto	Digital Signal Processing using MATLAB®; Table of Contents; Preface; Chapter 1. Introduction; 1.1. Brief introduction to MATLAB; 1.1.1. MATLAB software presentation; 1.1.2. Important MATLAB commands and functions; 1.1.3. Operating modes and programming with MATLAB; 1.1.4. Example of work session with MATLAB; 1.1.5. MATLAB language; 1.2. Solved exercises; Chapter 2. Discrete-Time Signals; 2.1. Theoretical background; 2.1.1. Mathematical model of 1D and 2D discrete-time signals; 2.1.2. Basic 1D and 2D discrete-time signals 2.1.3. Periodic 1D and 2D discrete-time signals representation using the discrete-time Fourier series2.1.4. Representation of non-periodic 1D and 2D discrete-time signals by discrete-time Fourier transform; 2.1.5. Analytic signals; 2.2. Solved exercises; 2.3. Exercises; Chapter 3. Discrete-Time Random Signals; 3.1. Theoretical background; 3.1.1. Introduction; 3.1.2. Real random variables; 3.1.3. Random processes; 3.2. Solved exercises; 3.3. Exercises; Chapter 4. Statistical Tests and High Order Moments; 4.1. Theoretical background; 4.1.1. Moments; 4.1.2. Cumulants; 4.1.3. Cumulant properties

4.1.4. Chi-square (Chi2) tests4.1.5. Normality test using the Henry line; 4.2. Solved exercises; 4.3. Exercises; Chapter 5. Discrete Fourier Transform of Discrete-Time Signals; 5.1. Theoretical background; 5.1.1. Discrete Fourier transform of 1D digital signals; 5.1.2. DFT of 2D digital signals; 5.1.3. Z-transform of 1D digital signals; 5.1.4. Z-transform of 2D digital signals; 5.1.5. Methods and algorithms for the DFT calculation; 5.2. Solved exercises; 5.3. Exercises; Chapter 6. Linear and Invariant Discrete-Time Systems; 6.1. Theoretical background; 6.1.1. LTI response calculation
6.1.2. LTI response to basic signals6.2. Solved exercises; 6.3. Exercises; Chapter 7. Infinite Impulse Response Filters; 7.1. Theoretical background; 7.1.1. Transfer function and filter specifications for infinite impulse response (IIR) filters; 7.1.2. Design methods for IIR filters; 7.1.3. Frequency transformations; 7.2. Solved exercises; 7.3. Exercises; Chapter 8. Finite Impulse Response Filters; 8.1. Theoretical background; 8.1.1. Transfer function and properties of FIR filters; 8.1.2. Design methods; 8.1.3. General conclusion about digital filter design; 8.2. Solved exercises
8.3. ExercisesChapter 9. Detection and Estimation; 9.1. Theoretical background; 9.1.1. Matched filtering: optimal detection of a known noisy signal; 9.1.2. Linear optimal estimates; 9.1.3. Least squares (LS) method; 9.1.4. LS method with forgetting factor; 9.2. Solved exercises; 9.3. Exercises; Chapter 10. Power Spectrum Density Estimation; 10.1. Theoretical background; 10.1.1. Estimate properties; 10.1.2. Power spectral density estimation; 10.1.3. Parametric spectral analysis; 10.1.4. Superresolution spectral analysis methods; 10.1.5. Other spectral analysis methods; 10.2. Solved exercises
10.3. Exercises

Sommario/riassunto

This book uses MATLAB as a computing tool to explore traditional DSP topics and solve problems. This greatly expands the range and complexity of problems that students can effectively study in signal processing courses. A large number of worked examples, computer simulations and applications are provided, along with theoretical aspects that are essential in order to gain a good understanding of the main topics. Practicing engineers may also find it useful as an introductory text on the subject.