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Nota di contenuto	DIGITAL SIGNAL PROCESSING TECHNIQUES AND APPLICATIONS IN RADAR IMAGE PROCESSING; CONTENTS; Preface; Acknowledgment; List of Symbols; List of Illustrations; 1 Signal Theory and Analysis; 1.1 Special Functions Used in Signal Processing; 1.1.1 Delta or Impulse Function (t); 1.1.2 Sampling or Interpolation Function sinc (t); 1.2 Linear System and Convolution; 1.2.1 Key Properties of Convolution; 1.2.1.1 Commutative; 1.2.1.2 Associative; 1.2.1.3 Distributive; 1.2.1.4 Timeshift; 1.3 Fourier Series Representation of Periodic Signals; 1.3.1 Trigonometric Fourier Series 1.3.2 Compact Trigonometric Fourier Series1.3.3 Exponential Fourier Series; 1.4 Nonperiodic Signal Representation by Fourier Transform; 1.5 Fourier Transform of a Periodic Signal; 1.6 Sampling Theory and Interpolation; 1.7 Advanced Sampling Techniques; 1.7.1 Sampling with Bandpass Signal; 1.7.2 Resampling by Evenly Spaced Decimation; 1.7.3 Resampling by Evenly Spaced Interpolation; 1.7.4 Resampling by Fractional Rate Interpolation; 1.7.5 Resampling from Unevenly Spaced

Data; 1.7.5.1 Jacobian of Transformation; 2 Discrete Time and Frequency Transformation
2.1 Continuous and Discrete Fourier Transform2.2 Key Properties of Discrete Fourier Transform; 2.2.1 Shifting and Symmetry; 2.2.2 Linear and Circular Convolution; 2.2.3 Sectioned Convolution; 2.2.3.1 Overlap-and-Add Method; 2.2.3.2 Overlap-and-Save Method; 2.2.4 Zero Stuffing and Discrete Fourier Transform (DFT) Resolution; 2.3 Widows and Discrete Fourier Transform; 2.4 Fast Fourier Transform; 2.4.1 Radix-2 Fast Fourier Transform (FFT) Algorithms; 2.5 Discrete Cosine Transform (DCT); 2.5.1 Two-Dimensional DCT; 2.6 Continuous and Discrete Signals in Time and Frequency Domains
2.6.1 Graphical Representation of DFT2.6.2 Resampling with Fractional Interpolation Based on DFT; 3 Basics of Antenna Theory; 3.1 Maxwell and Wave Equations; 3.1.1 Harmonic Time Dependence; 3.2 Radiation from an Infinitesimal Current Dipole; 3.2.1 Magnetic Vector Potential Due to a Small but Finite Current Element; 3.2.2 Field Vectors Due to Small but Finite Current Radiation; 3.2.3 Far-Field Region; 3.2.4 Summary of Radiation Fields; 3.3 Radiation from a Half-Wavelength Dipole; 3.4 Radiation from a Linear Array; 3.4.1 Power Radiation Pattern from a Linear Array
3.5 Power Radiation Pattern from a 2D Rectangular Array3.6 Fundamentals of Antenna Parameters; 3.6.1 Radiation Beamwidth; 3.6.2 Solid Angle, Power Density, and Radiation Intensity; 3.6.3 Directivity and Gain; 3.6.4 Antenna Impedance; 3.6.5 Antenna Efficiency; 3.6.6 Effective Area and Antenna Gain; 3.6.7 Polarization; 3.7 Commonly Used Antenna Geometries; 3.7.1 Single-Element Radiators; 3.7.2 Microstrip Antennas and Antenna Array; 4 Fundamentals of Radar; 4.1 Principles of Radar Operation; 4.2 Basic Configuration of Radar; 4.2.1 Waveform Generator; 4.2.2 Transmitter; 4.2.3 Antenna System
4.2.4 Receiver

Sommario/riassunto

A self-contained approach to DSP techniques and applications in radar imagingThe processing of radar images, in general, consists of three major fields: Digital Signal Processing (DSP); antenna and radar operation; and algorithms used to process the radar images. This book brings together material from these different areas to allow readers to gain a thorough understanding of how radar images are processed.The book is divided into three main parts and covers:* DSP principles and signal characteristics in both analog and digital domains, advanced signal sampling, and