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Nota di contenuto	Introduction to Infrared and Electro-Optical Systems; Contents; Preface; Chapter 1 Introduction; 1.1 Introduction to Imaging; 1.2 Infrared and EO Systems; 1.3 Wavelength Dependencies; 1.4 Typical EO Scenario; 1.5 Typical Infrared Scenario; 1.6 Analytical Parameters; 1.7 Sensitivity and Resolution; 1.8 Linear Systems Approach; 1.9 Summary; 1.10 Guide to the References; References; Chapter 2 Mathematics; 2.1 Complex Functions; 2.2 Common One-Dimensional Functions; 2.3 Two-Dimensional Functions; 2.4 Convolution and Correlation; 2.5 The Fourier Transform; 2.6 Properties of the Fourier Transform. 2.7 Transform Pairs2.8 Probability; 2.9 Important Examples; 2.10 Guide to the References; 2.11 Exercises; References; Software; Chapter 3 Linear Shift-Invariant Systems; 3.1 Linear Systems; 3.2 Shift Invariance; 3.3 Basics of LSI Systems; 3.4 Impulse Response; 3.5 Transfer Function; 3.6 System PSF and MTF Versus Component PSF and MTF; 3.7 Spatial Sampling; 3.8 Spatial Sampling and Resolution; 3.9 Sampled Imaging Systems; 3.10 Guide to the References; 3.11 Exercises; References; Chapter 4 Diffraction; 4.1 Electromagnetic Waves; 4.2 Coherence. 4.3 Fresnel and Fraunhofer Diffraction from an ApertureFresnel Diffraction; Fraunhofer Diffraction; 4.4 Fraunhofer Diffraction from a

Thin Lens; 4.5 Thin Lens Optical System Diffraction Psf; 4.6 Thin Lens Diffraction Mtf; Modulation and Modulation Transfer Function; Incoherent Diffraction MTF; Coherent Diffraction MTF; 4.7 Calculating Diffraction Mtf with Pencil and Paper; Circular Pupil: Coherent MTF; Circular Pupil: Incoherent MTF; 4.8 Programs for Calculating Incoherent Diffraction Mtf; 4.9 Applications of Diffraction Theory; 4.10 Exercises; References; Chapter 5 Sources of Radiation. 5.1 Radiometry and PhotometryRadiometric Units; Photometric Units; 5.2 Infrared Targets and Backgrounds; Blackbody Radiation; Emissivity; Equivalent Differential Temperature ( $\Delta T$ ); Apparent Differential Temperature (Apparent  $\Delta T$ ); Technique 1: Temperature-Broadband Beer's Law Product; Technique 2: Temperature-Broadband Transmission as a Function of Range; Technique 3: Flux-Broadband Beer's Law Product; Technique 4: Flux-Temperature Differential; 5.3 Electro-Optical Targets and Backgrounds; External Sources; Contrast; 5.4 Other Sensitivity Considerations. Bidirectional Reflectance Distribution FunctionColor Considerations; 5.5 Target and Background Spatial Characteristics; Bar Target Representation of Targets; Target  $\Delta T$  and Characteristic Dimension; Summary of Target Characteristics; Clutter; Simulation of Target Characteristics; 5.6 Typical Midwave and Longwave Contrasts and Solar Effects; 5.7 Exercises; References; Chapter 6 Atmospherics; 6.1 Atmospheric Components and Structure; 6.2 Atmospheric Transmission; 6.3 Absorption; 6.4 Scattering; 6.5 Path Radiance; 6.6 Turbulence; 6.7 Atmospheric MTF; 6.8 Models; 6.9 Model Discussion.

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### Sommario/riassunto

This newly revised and updated edition of a classic Artech House book offers a current and complete introduction to the analysis and design of Electro-Optical (EO) imaging systems. The Second Edition provides numerous updates and brand new coverage of today's most important areas, including the integrated spatial frequency approach and a focus on the weapons of terrorists as objects of interest. This comprehensive reference details the principles and components of the Linear Shift-Invariant (LSI) infrared and electro-optical systems and shows you how to combine this approach with calculus and d.

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