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	Nota di contenuto	Chapter 1. Image formation: 1.1. Introduction -- 1.2. Rayleigh-Sommerfeld theory of diffraction and Huygens-Fresnel principle -- 1.3. Gaussian image -- 1.4. Diffraction image -- 1.5. Physical significance of PSF -- 1.6. Optical transfer function (OTF) -- 1.7. Asymptotic behavior of PSF -- 1.8. PSF centroid -- 1.9. Strehl ratio -- 1.10. Hopkins ratio -- 1.11. Line- and edge-spread functions (LSF and ESF) -- 1.12. Shift-invariant imaging of a coherent object -- Appendix A. Fourier transform definitions -- Appendix B. Some frequently used integrals -- References -- Problems. Chapter 2. Optical systems with circular pupils: 2.1. Introduction -- 2.2. Aberration-free system -- 2.3. Strehl ratio and aberration tolerance -- 2.4. Balanced aberrations and Zernike circle polynomials -- 2.5. Defocused system -- 2.6. PSFs for rotationally symmetric aberrations -- 2.7. Symmetry properties of an aberrated PSF -- 2.8. PSFs for primary aberrations -- 2.9. Line of sight of an aberrated system -- 2.10. Diffraction OTF for primary a berrations -- 2.11. Hopkins ratio -- 2.12. Geometrical OTF -- 2.13. Incoherent line- and edge-spread functions -- 2.14. Miscellaneous topics -- 2.15. Coherent

imaging -- References -- Problems.

Chapter 3. Optical systems with annular pupils: 3.1. Introduction -- 3.2. Aberration-free system -- 3.3. Strehl ratio and aberration tolerance -- 3.4. Balanced aberrations and Zernike annular polynomials -- 3.5. Defocused system -- 3.6. Symmetry properties of an aberrated PSF -- 3.7. PSFs and axial irradiance for primary aberrations -- 3.8. 2-D PSFs -- 3.9. Line of sight of an aberrated system -- References -- Problems.

Chapter 4. Optical systems with Gaussian pupils: 4.1. Introduction -- 4.2. General theory -- 4.3. Systems with circular pupils -- 4.4. Systems with annular pupils -- 4.5. Line of sight of an aberrated system -- 4.6. Summary -- References -- Problems.

Chapter 5. Random aberrations: 5.1 Introduction -- 5.2 Random image motion -- 5.3 Imaging through atmospheric turbulence -- Appendix. Fourier transform of Zernike polynomials -- References -- Problems -- Bibliography -- References for additional reading -- Index.

Sommario/riassunto

This book discusses the characteristics of a diffraction image of an incoherent or a coherent object formed by an aberrated imaging system. Numerical results in aberrated imaging have been emphasized to maximize the practical use of the material. This new, second printing includes a number of updates and corrections to the first printing. Beginning with a description of the diffraction theory of image formation, the book describes both aberration-free and aberrated imaging by optical systems with circular, annular, or Gaussian pupils. As in part I, the primary aberrations are emphasized. Their effects on Strehl, Hopkins, and Struve ratios are discussed in detail. The balanced aberrations are identified with Zernike polynomials appropriate for each type of system. Imaging in the presence of random aberrations is also discussed that includes the effects of image motion and propagation through atmospheric turbulence. Each chapter ends with a set of practical problems.