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Nota di contenuto	Chapter 1. Optimization -- Special characteristics of lens design as an optimization problem -- The nature of the merit function -- The Strehl ratio -- MTF optimization -- General comments -- Comparison with the optical thin-film design problem -- Nonlinearity of the aberrations -- Changes needed to reduce high-order aberrations -- A method of visualizing the problem of optimization in lens design -- Theory of damped least squares (Levenberg-Marquardt) -- Some details of damped least squares as used in lens design -- Paraxial (first-order) properties -- Seidel and Buchdahl coefficients -- Transverse ray or wavefront aberrations -- Aberration balancing and choice of weighting factors -- Damping -- Control of physical constraints -- Control of glass boundary conditions -- Solves -- Lagrange multipliers -- Some reasons for the success of the DLS method -- Experiments with optimization programs -- Effect of changing the damping factor -- Effect of scaling the parameter changes -- An optimization example -- References. Chapter 2. Buchdahl aberrations -- Third-order coefficients -- Fifth-order coefficients -- Comparison with H.H. Hopkins notation -- Examples -- Double Gauss -- Shafer lens with zero third- and fifth-order aberrations -- References -- Chapter 3. Synthesis of new lens designs -- Choice of a starting point -- Modification of an existing design -- Purchase of a competing lens -- Analytic solutions -- Nonanalytic synthesis of new design forms -- Examples -- A unit magnification telecentric doublet pair -- A simple zoom lens -- The

use of catalog components -- Singlets -- Doublets and triplets -- Meniscus singlets -- Field flatteners -- Cemented triplets -- References -- Chapter 4. Lenses for 35-mm cameras -- The triplet -- The tessar -- The double-Gauss (planar-type) -- The Sonnar -- Wide-angle lenses for rangefinder cameras (Zeiss Biogon) -- Wide-angle lens for rangefinder camera (Schneider Super-Angulon) -- Wide-angle lenses for SLR cameras -- Telephoto lens -- Long-focus telephoto lens -- Lens for compact point-and-shoot camera -- Single lens for disposable cameras -- References.

Chapter 5. Secondary spectrum and apochromats -- Apochromatic doublets -- Apochromatic triplets -- Petzval lenses -- Double-Gauss lenses -- Telephoto lenses -- Zoom lenses -- Microscope objectives -- Secondary spectrum correction with normal glasses -- Liquids -- Diffractive optics -- McCarthy-Wynne principle -- Schupmann principle -- Transverse secondary spectrum -- References -- Chapter 6. Lenses for laser applications -- Gaussian beams -- Laser beam expanders -- Two-lens beam expanders -- Three-lens beam expanders -- F-Theta lenses -- Lenses for optical disks -- Laser diode collimators -- References -- Chapter 7. Microscope objectives -- Classical microscope objectives -- Flat-field microscope objectives -- Oil-immersion objectives -- References -- Chapter 8. Microlithographic Projection Optics -- Unit-magnification zero-power monocentric systems -- Dyson 1x relay -- Offner 1x relay -- Wynne-Dyson 1x relay -- Wynne-Offner 1x relay -- Reduction lenses -- Catadioptric reduction systems -- Catoptric reduction systems -- References.

Chapter 9. Zoom lenses -- General principles -- Control of chromatic aberration -- Field curvature -- Minimization of movements -- Two-component zooms -- Minus-plus plastic disposable zoom -- Plus-minus plastic disposable zoom -- A typical minus-plus zoom -- A typical plus-minus zoom -- Three-component zooms -- Four-component zooms -- Zoom relays -- Zoom telescopes -- Zoom modules -- References -- Chapter 10. Decentered and asymmetric systems -- General properties of decentered systems -- Coordinate systems -- Interpretation of results -- New-axis surface -- Toroids -- Offset surfaces (or off-axis surfaces) -- Convention for mirrors -- Kutter system -- Single parabolic mirror -- Alpha rotations -- Beta rotations -- Alpha and beta rotations -- Scanning systems -- The active side of a surface -- X-ray telescopes -- WOLTER2 example -- WOLTER1 example -- Chapter 11. Design for manufacturability -- Tolerancing -- Simplicity of design -- Air spaces -- Glass components -- Glass choice -- Mirror surfaces -- Redesign for actual melt data -- Use of existing tools and test plates -- Selective assembly and adjustment after assembly -- General points -- References -- Index.

Sommario/riassunto

This second volume based on Michael Kidger's popular short courses and workshops is aimed at readers already familiar with the concepts presented in Fundamental Optical Design (SPIE Press Vol. PM92). It begins with a sweeping discussion of optimization that is written with the user in mind and continues with a unique look at the role of higher-order aberrations. The book's key feature is its astounding presentation of a wide range of practical design examples, covering such problems as secondary spectrum correction, high numerical aperture designs, lasers, zoom lenses, tilted or decentered optical systems, and price and performance requirements. Each scenario is accompanied by an in-depth discussion that goes well beyond the ray aberration plot, including useful insights into an optical designer's thought processes.
