Aberrations Of Optical Systems Welford | 193ebff9150817a621b790c7e3709599

Waves in Focal Regions: Propagation, Diffraction and Focusing of Light, Sound and Water Waves provides a full and richly illustrated description of waves in focal regions. Unlike most books, the author treats electromagnetic, acoustic, and water waves in one comprehensive volume. After an introductory section, the book describes approximate diffraction theories and efficient numerical methods to study the focusing of various kinds of waves. It then covers the physical interpretation of the theories, their accuracy, and the computational savings obtained, emphasizing uniform asymptotic results that remain valid in the vicinity of shadow boundaries and caustics. The next part deals with the focusing of scalar waves, including thorough theoretical analyses and detailed contour maps of diffraction patterns in focal regions for a variety of different system parameters, such as f-number, Fresnel number, aperture shape, amplitude distribution, and wavefront aberration. The author proceeds to explore the diffraction and focusing of electromagnetic waves. First solutions are derived for fields radiated by sources, reflected and refracted at plane interfaces, or diffracted by apertures in plane screens, and then these solutions are applied to study the focusing in homogeneous media and through a plane dielectric interface. In both cases, the author includes many computed results of the electromagnetic field distribution near focus. Presenting both theoretical and experimental results, the following part examines the focusing of sound and water waves by means of zone-plate lenses. The book concludes with a detailed study of the diffraction and focusing of water waves and a comparison of the results of both linear and nonlinear theories with those of experiments. A revised version of a text which was first published in 1966. The book is designed as a general reference book for engineers and assumes a broad knowledge of current optical systems and their design. Additional topics include fibre optics, thin films and CAD systems. Annotation -- A new volume in the field's bestselling optics reference -- an entirely new opus focusing on x-ray, nonlinear, and vision optics -- Provides the same mix of tutorial writing with in-depth reference
material that distinguished Volumes I & II. The most comprehensive and up-to-date optics resource available.

Prepared under the auspices of the Optical Society of America, the five carefully architected and cross-referenced volumes of the Handbook of Optics, Third Edition, contain everything a student, scientist, or engineer requires to actively work in the field. From the design of complex optical systems to world-class research and development methods, this definitive publication provides unparalleled access to the fundamentals of the discipline and its greatest minds. Individual chapters are written by the world's most renowned experts who explain, illustrate, and solve the entire field of optics. Each volume contains a complete chapter listing for the entire Handbook, extensive chapter glossaries, and a wealth of references. This pioneering work offers unprecedented coverage of optics data, techniques, and applications. Volume I covers geometrical and physical optics, polarized light, components, and instruments. Volume II covers design, fabrications, testing, sources, detectors, radiometry, and photometry. Volume III, all in full color, covers vision and vision optics. Volume IV covers optical properties of materials, nonlinear optics, and quantum optics. Volume V covers atmospheric optics, modulators, fiber optics, and x-ray and neutron optics. Visit www.HandbookofOpticsOnline.com to search all five volumes and download a comprehensive index.

This second edition describes current techniques for fashioning single-element lenses, two-element achromats, air-spaced triplets and complex wide-angle and zoom lenses. More than 30 types of lens design systems are covered. New information is presented on mechanically and optically compensated zoom lenses for use in television, photography, projection and microscopy. Optical computer programs that solve numerous lens design problems are provided on an IBM-compatible disk. Photographic, mechanical, infrared systems, motion picture, and television engineers; optical physicists; laser scientists; and graduate-level and continuing-education students taking courses in lens design. student price which is available from Marcel Dekker Inc upon request.

Fundamentals and Basic Optical Instruments includes thirteen chapters providing an introductory guide to the basics of optical engineering, instrumentation, and design. Topics include basic geometric optics, basic wave optics, and basic photon and quantum optics. Paraxial ray tracing, aberrations and optical design, and prisms and refractive optical components are included. Polarization and polarizing optical devices are covered, as well as optical instruments such as telescopes, microscopes, and spectrometers. Students and professionals alike have long felt the need of a modern source of practical advice on the use of optical tools in scientific research. Walter T. Welford’s Useful Optics meets this need. Welford offers a succinct review of principles basic to the construction and use of optics in physics. His lucid explanations and clear illustrations will particularly help those whose interests lie in other areas but who nevertheless must understand enough about optics to create the experimental apparatus necessary to their research. Consistently emphasizing applications and practical points of design, Welford covers a host of topics: mirrors and prisms, optical materials, aberration, the limits of image formation and resolution, illumination for image-forming systems, laser beams, interference and interferometry, detectors and light sources, holography, and more. The final chapter deals with putting together an experimental optics system. Many areas of the physical sciences and engineering increasingly demand an appreciation of optics. Welford’s Useful Optics will prove indispensable to any researcher trying to develop and use effective optical apparatus. Walter T. Welford (1916-1990) was professor of physics at Imperial College of Science, Technology and Medicine from 1951 until his death. He was a Fellow of the Royal Society and of the Optical Society of America. This timely publication brings together, in one source, a wealth of information on the optical transfer function. Treats fundamental concepts of spatial frequency, the spread function, wave aberration, and the transfer function. Then relates them to optical systems, including discussion
of how they are measured and calculated, and their uses. Treatment is practical, and includes many illustrations. The state-of-the-art full-colored handbook gives a comprehensive introduction to the principles and the practice of calculation, layout, and understanding of optical systems and lens design. Written by reputed industrial experts in the field, this text introduces the user to the basic properties of optical systems, aberration theory, classification and characterization of systems, advanced simulation models, measuring of system quality and manufacturing issues. In this Volume Volume 2 continues the introduction given in volume 1 with the more advanced texts about the foundations of image formation. Emphasis is placed on an intuitive while theoretically exact presentation. More than 400 color graphs and selected references on the end of each chapter support this undertaking. From the contents: 17 Wave equation 18 Diffraction 19 Interference and coherence 20 Imaging 21 Imaging with partial coherence 22 Three dimensional imaging 23 Polarization 24 Polarization and optical imaging A1 Mathematical appendix Other Volumes Volume 1: Fundamentals of Technical Optics Volume 3: Aberration Theory and Correction of Optical Systems Volume 4: Survey of Optical Instruments Volume 5: Advanced Physical Optics This book provides all the essential and best elements of Kidger’s many courses taught worldwide on lens and optical design. It is written in a direct style that is compact, logical, and to the point—a tutorial in the best sense of the word. “I read my copy late last year and read it straight through, cover to cover. In fact, I read it no less than three times. Its elegant expositions, valuable insights, and up-front espousal of pre-design theory make it an outstanding work. It’s in the same league with Conrady and Kingslake.” Warren Smith. Optical Metrology is a rapidly expanding field in both its scientific foundations and technological developments, being of major concern to measurements, quality control, non-destructive testing and in fundamental research. In order to define the state-of-the-art, and to evaluate present accomplishments, whilst giving an appraisal of how each of the particular topics will evolve the Optical Metrology-Advanced Study Institute was organized with a concourse of the world’s acknowledged experts. Thus, the Institute provided a forum for tutorial reviews blended with topics of current research in the form of a progressive and comprehensive presentation of recent promising developments, leading techniques and instrumentation in incoherent and coherent optics for Metrology, Sensing and Control in Science, Industry and Biomedicine. Optical Metrology is a very broad field which is highly interdisciplinary in its applications, and in its scientific and technological background. It is related to such diverse disciplines as physical and chemical sciences, engineering, electronics, computer sciences, biological sciences and theoretical sciences, such as statistics. Although there was an emphasis on photomechanics and industrial applications, a marked diversity was reflected in the different background and interests of the participants. The vitality and viability of the discipline was enhanced not only by the encouraging number of young scientists and industrialists participating and authoring, but also by the remarkably promising prospects found in the practical applications supported by advanced electronic hybridization. Although the subject of optical design as a branch of applied physics is over one hundred years old, the use of aberration theory has changed considerably. Aberrations of Optical Systems covers elementary optics and aberration theory of various optical systems, including the use of nonaxially symmetric systems and diffractive optical elements in complex designs, such as head-up displays and the increasing use of scanning systems with laser illumination. The book provides the complete range of mathematical tools, formulae, and derivations needed for understanding the process of optical design and for planning optical design programs. While the treatment is mainly based on geometrical optics, some excursions into physical optics are made, particularly in connection with the problems of optical tolerances. Thoroughly revised and expanded to reflect the
substantial changes in the field since its publication in 1978. Strong emphasis on how to effectively use software design packages, indispensable to today’s lens designer. Many new lens design problems and examples—ranging from simple lenses to complex zoom lenses and mirror systems—give insight for both the newcomer and specialist in the field. Rudolf Kingslake is regarded as the American father of lens design; his book, not revised since its publication in 1978, is viewed as a classic in the field. Naturally, the area has developed considerably since the book was published, the most obvious changes being the availability of powerful lens design software packages, theoretical advances, and new surface fabrication technologies. This book provides the skills and knowledge to move into the exciting world of contemporary lens design and develop practical lenses needed for the great variety of 21st-century applications. Continuing to focus on fundamental methods and procedures of lens design, this revision by R. Barry Johnson of a classic modernizes symbology and nomenclature, improves conceptual clarity, broadens the study of aberrations, enhances discussion of multi-mirror systems, adds tilted and decentered systems with eccentric pupils, explores use of aberrations in the optimization process, enlarges field flattener concepts, expands discussion of image analysis, includes many new exemplary examples to illustrate concepts, and much more. Optical engineers working in lens design will find this book an invaluable guide to lens design in traditional and emerging areas of application; it is also suited to advanced undergraduate or graduate course in lens design principles and as a self-learning tutorial and reference for the practitioner. Rudolf Kingslake (1903-2003) was a founding faculty member of the Institute of Optics at The University of Rochester (1929) and remained teaching until 1983. Concurrently, in 1937 he became head of the lens design department at Eastman Kodak until his retirement in 1969. Dr. Kingslake published numerous papers, books, and was awarded many patents. He was a Fellow of SPIE and OSA, and an OSA President (1947-48). He was awarded the Progress Medal from SMPTE (1978), the Frederic Ives Medal (1973), and the Gold Medal of SPIE (1980). R. Barry Johnson has been involved for over 40 years in lens design, optical systems design, and electro-optical systems engineering. He has been a faculty member at three academic institutions engaged in optics education and research, co-founder of the Center for Applied Optics at the University of Alabama in Huntsville, employed by a number of companies, and provided consulting services. Dr. Johnson is an SPIE Fellow and Life Member, OSA Fellow, and an SPIE President (1987). He published numerous papers and has been awarded many patents. Dr. Johnson was founder and Chairman of the SPIE Lens Design Working Group (1988-2002), is an active Program Committee member of the International Optical Design Conference, and perennial co-chair of the annual SPIE Current Developments in Lens Design and Optical Engineering Conference. Thoughly revised and expanded to reflect the substantial changes in the field since its publication in 1978, Strong emphasis on how to effectively use software design packages, indispensable to today’s lens designer. Many new lens design problems and examples—ranging from simple lenses to complex zoom lenses and mirror systems—give insight for both the newcomer and specialist in the field. A practical "hands on" guide to the machining of precision optical surfaces on optical & electronic materials. It enables readers to construct & use equipment in their own production laboratories. Primarily intended for technicians working with optical & electronic materials, it is also relevant to optical devices, metallography, ceramics, geology, gemstones, metrology & production engineering. SPIE Milestones are collections of seminal papers from the world literature covering important discoveries and developments in optics and photonics. The state-of-the-art full-colored handbook gives a comprehensive introduction to the principles and the practice of calculation, layout, and understanding of optical systems and lens design. Written by reputed industrial experts in the field, this text introduces the user to the basic properties of optical systems, aberration theory,
classification and characterization of systems, advanced simulation models, measuring of system quality and manufacturing issues. In this Volume Volume 1 gives a general introduction to the field of technical optics. Although part of the series, it acts as a fully selfstanding book. With more than 700 full color graphs and it is a intuitive introduction for the beginner and a comprehensive reference for the professional. Table of Contents 1 Introduction 2 Paraxial optics 3 Dielectric interfaces 4 Materials 5 Raytracing 6 Photometry 7 Lightsources 8 Sensors and receivers 9 Theory of color 10 Optical systems 11 Aberrations 12 Waveoptics 13 Plates and prisms 14 Gratings 15 Special components 16 Testing Other Volumes Volume 2: Physical Image Formation Volume 3: Aberration Theory and Correction of Optical Systems Volume 4: Survey of Optical Instruments Volume 5: Advanced Physical OpticsAn accessible, well presented introduction to the theory of optical aberrations, covering key topics that are often missing from comparable books. The most comprehensive and up-to-date optics resource available Prepared under the auspices of the Optical Society of America, the five carefully architected and cross-referenced volumes of the Handbook of Optics, Third Edition, contain everything a student, scientist, or engineer requires to actively work in the field. From the design of complex optical systems to world-class research and development methods, this definitive publication provides unparalleled access to the fundamentals of the discipline and its greatest minds. Individual chapters are written by the world's most renowned experts who explain, illustrate, and solve the entire field of optics. Each volume contains a complete chapter listing for the entire Handbook, extensive chapter glossaries, and a wealth of references. This pioneering work offers unprecedented coverage of optics data, techniques, and applications. Volume I covers geometrical and physical optics, polarized light, components, and instruments. Proceedings of SPIE present the original research papers presented at SPIE conferences and other high-quality conferences in the broad-ranging fields of optics and photonics. These books provide prompt access to the latest innovations in research and technology in their respective fields. Proceedings of SPIE are among the most cited references in patent literature. High Collection Nonimaging Optics covers the many developments and the wider range of applications of nonimaging optics. This book is organized into 11 chapters that emphasize the application of nonimaging optics to concentrators for solar energy. This text begins with discussions on the development of formalisms in nonimaging optics, specifically in the use of geometrical vector flux concept, which have led to entirely different concentrator designs. These topics are followed by a description of the so-called compound parabolic concentrator, the prototype of a series of nonimaging concentrators that approach very close to being ideal and having the maximum theoretical concentration ratio. The next chapters examine the concept of the flow line approach to nonimaging concentration; the geometrical optics model of nonimaging optics; and constructional tolerances and manufacturing methods for nonimaging optical components. A chapter highlights the applications of concentrator designs to solar energy concentrations. The last chapter surveys the applications of nonimaging optics to optical system design and to instrument design, with particular reference to utilization of light sources with maximum efficiency. This book will be of great benefit to nonimaging optics scientists and design engineers. Drawn from the author's extensive seminar experience; this book discusses characteristics of a range of optical components; how to determine components to be used; and how to arrange components so that the system measures up to performance objectives. --Selected experts, all internationally known, review aspects of photovoltaic energy conversion. For researchers working on photovoltaics & solar energy in optics, solid state physics, materials science & electronic engineering. Emphasizes a morphological and phenomenological approach to the study of laser-induced damage. Presents a pictorial record of many of the different phenomena observed, as well as a discussion of scaling laws, cumulative damage and measurement techniques. Helpful
appendices provide typical damage thresholds for numerous optical materials over a wide range of wavelengths. Useful for optical and laser physicists, optical system designers and engineers, laser and optical coating manufacturers and students taking courses in optoelectronics, lasers and electro-optics. Although the subject of optical design as a branch of applied physics is over one hundred years old, the use of aberration theory has changed considerably. Aberrations of Optical Systems covers elementary optics and aberration theory of various optical systems, including the use of nonaxially symmetric systems and diffractive optical elements in complex designs, such as head-up displays and the increasing use of scanning systems with laser illumination. The book provides the complete range of mathematical tools, formulae, and derivations needed for understanding the process of optical design and for planning optical design programs. While the treatment is mainly based on geometrical optics, some excursions into physical optics are made, particularly in connection with the problems of optical tolerances. The first edition of Applied Photographic Optics established itself as the standard reference work on all aspects of photographic lenses and their applications. This second edition of this highly acclaimed book has been expanded and updated to take into account the rapid progress in optical technology and electronic imaging in the last decade. It now includes all contemporary lenses and optical systems and many chapters have been rewritten, including those on autofocus, video lenses, video optics, and optical technology. Relevant aspects of electronic imaging have been integrated throughout, and there are more details on aspherics, ID glasses, lens manufacture and coating, video projection, image stabilizing, and diffractive optics. Copyright code: 193ebff9150817a621b790c7e3709599