

# Hologram Matlab Code

Introduction to Modern Digital Holography  
Optical Scanning Holography with MATLAB®  
Analog and Digital Holography with MATLAB  
Contemporary Optical Image Processing with MATLAB  
Analog and Digital Holography with MATLAB  
MATLAB® for Photomechanics- A Primer  
Computer-Generated Phase-Only Holograms for 3D Displays  
Computational Optical Phase Imaging  
Optical Tweezers  
Engineering Optics with MATLAB◆  
Optics  
7th International Conference on the Development of Biomedical Engineering in Vietnam (BME7)  
Digital Holography  
6th International Conference on Nanotechnologies and Biomedical Engineering  
Theoretical Foundations of Digital Imaging Using MATLAB®  
Advanced Digital Imaging Laboratory Using MATLAB®  
Hardware Acceleration of Computational Holography  
Metasurface Holography  
Handbook of Holographic Interferometry  
Digital Holographic Methods  
Spatial Augmented Reality  
Holographic Materials and Optical Systems  
Advanced Holography  
Data-Driven Science and Engineering  
Optical Cryptosystems  
Introduction to Finite Element Analysis Using MATLAB® and Abaqus  
Advances in Signal Transforms  
Open-Source Electronics Platforms  
Zebra Stripes  
Online Experimentation: Emerging Technologies and IoT  
Holographic Sensors  
Monte Carlo Simulation and Resampling Methods for Social Science  
MATLAB Recipes  
Modern Optics  
Holography  
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Modern Information Optics with MATLAB

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2014-01-23 Ting-Chung Poon  
Get up to speed with digital holography with this concise and straightforward introduction to modern techniques and conventions. Building up from the basic principles of optics, this book describes key techniques in digital holography, such as phase-shifting holography, low-coherence holography, diffraction tomographic holography and optical scanning holography, discussing their practical applications, and accompanied by all the theory necessary to understand the underlying principles at work. A further chapter covers advanced techniques for producing computer-generated holograms. Extensive Matlab code is integrated with the text throughout and available for download online, illustrating both theoretical results and practical considerations such as aliasing, zero padding and sampling. Accompanied by end-of-chapter problems and an online solutions manual for instructors, this is an indispensable resource for students, researchers and engineers in the fields of optical image processing and digital holography.

2007-04-10 Ting-Chung Poon  
Optical Scanning Holography is an exciting new field with many potential novel applications. This book contains tutorials, research materials, as well as

new ideas and insights that will be useful for those working in the field of optics and holography. The book has been written by one of the leading researchers in the field. It covers the basic principles of the topic which will make the book relevant for years to come.

2015 Georges T. Nehmetallah  
Holography is the only truly three-dimensional imaging method available, and MATLAB has become the programming language of choice for engineering and physics students. Whereas most books solely address the theory behind these 3D imaging techniques, this monograph concentrates on the exact code needed to perform complex mathematical and physical operations. The text and included examples spare students and researchers from the tedium of programming complex equations so that they can focus on their experiments instead. Topics include a brief introduction to the history, types, and materials of holography; the basic principles of analog and digital holography; a detailed explanation of famous fringe-deciphering techniques for holographic interferometry; holographic and non-holographic 3D display technologies; and cutting-edge concepts such as compressive, coherence, nonlinear, and polarization holography.

2001-04-18 T.-C. Poon  
This book serves two purposes: first to introduce readers to the concepts of geometrical optics, physical optics and techniques of optical imaging and image processing, and secondly to provide them with experience in modeling the theory and applications using the commonly used software tool MATLAB®. A comprehensively revised version of the authors' earlier book Principles of Applied Optics, Contemporary Optical Image Processing with MATLAB brings out the systems aspect of optics. This includes ray optics, Fourier Optics, Gaussian beam propagation, the split-step beam propagation method, holography and complex spatial filtering, ray theory of holograms, optical scanning holography, acousto-optic image processing, edge enhancement and correlation using photorefractive materials, holographic phase distortion correction, to name a few. MATLAB examples are given throughout the text. MATLAB is emphasized since it is now a widely accepted software tool very routinely used in signal processing. A sizeable portion of this book is based on the authors' own in-class presentations, as well as research in the area. Instructive problems and MATLAB assignments are included at the end of each Chapter to enhance even

further the value of this book to its readers. MATLAB is a registered trademark of The MathWorks, Inc.

2015 Georges T. Nehmetallah Holography is the only truly three-dimensional imaging method available, and MATLAB has become the programming language of choice for engineering and physics students. Whereas most books solely address the theory behind these 3D imaging techniques, this monograph concentrates on the exact code needed to perform complex mathematical and physical operations.

2002-12-10 A. Asundi The term "photomechanics" describes a suite of experimental techniques which use optics (photo) for studying problems in mechanics. The field has been in existence for some time, but has always lagged behind other experimental and numerical techniques. The main reason for this is that the interpretation of data, which whilst providing whole-field visualization, is not in a form readily amenable to the end-user. Digital image processing has become common within the photomechanics community. However, one approach does not fit all, and subtle variations in technique and method have been developed by different groups working on specific applications. This primer enables the user to get started with their experimental analysis quickly. It is based on the universally popular MATLAB® software, which includes dedicated and optimized functions for a variety of image processing

tasks. These can readily be scripted, along with the necessary mathematical expressions, for particular experimental techniques. The book provides an introduction to some of the optical techniques, and then introduces MATLAB® routines specific to the image processing in experimental mechanics. There are also case studies on particular techniques. As part of the book, a collection of M-files is provided on CD-ROM, which also contains example images and test code. This provides a starting point for the user, who can then easily add or edit statements or function for their own images. MATLAB® is a registered trademark of The MathWorks, Inc. For product information, visit <http://www.mathworks.com>  
<http://www.mathworks.com>  
2021-01-21 Peter Wai Ming Tsang Explore core concepts, theories and formulations of phase-only Fresnel holograms, which paves the way for 3-D holographic display system.  
2022-04-11 Cheng Liu In this book, computational optical phase imaging techniques are presented along with Matlab codes that allow the reader to run their own simulations and gain a thorough understanding of the current state-of-the-art. The book focuses on modern applications of computational optical phase imaging in engineering measurements and biomedical imaging. Additionally, it discusses the future of computational optical phase imaging, especially in terms of system miniaturization and deep learning-based phase

retrieval.

2015-12-03 Philip H. Jones A comprehensive guide to the theory, practice and applications of optical tweezers, combining state-of-the-art research with a strong pedagogic approach.

2017-10-10 Ting-Chung Poon This invaluable second edition provides more in-depth discussions and examples in various chapters. Based largely on the authors' own in-class lectures as well as research in the area, the comprehensive textbook serves two purposes. The first introduces some traditional topics such as matrix formalism of geometrical optics, wave propagation and diffraction, and some fundamental background on Fourier optics. The second presents the essentials of acousto-optics and electro-optics, and provides the students with experience in modeling the theory and applications using a commonly used software tool MATLAB®. Request Inspection Copy  
2007-08-08 Karl Dieter Moeller This new edition is intended for a one semester course in optics for juniors and seniors in science and engineering. It uses scripts from Maple, MathCad, Mathematica, and MATLAB to provide a simulated laboratory where students can learn by exploration and discovery instead of passive absorption. The text covers all the standard topics of a traditional optics course. It contains step by step derivations of all basic formulas in geometrical, wave and Fourier optics. The threefold arrangement of text,

applications, and files makes the book suitable for "self-learning" by scientists or engineers who would like to refresh their knowledge of optics.

2019-06-05 Vo Van Toi This volume presents the proceedings of the 7th International Conference on the Development of Biomedical Engineering in Vietnam which was held from June 27-29, 2018 in Ho Chi Minh City. The volume reflects the progress of Biomedical Engineering and discusses problems and solutions. It aims to identify new challenges, and shaping future directions for research in biomedical engineering fields including medical instrumentation, bioinformatics, biomechanics, medical imaging, drug delivery therapy, regenerative medicine and entrepreneurship in medical devices.

2013-01-24 Pascal Picart This book presents a substantial description of the principles and applications of digital holography. The first part of the book deals with mathematical basics and the linear filtering theory necessary to approach the topic. The next part describes the fundamentals of diffraction theory and exhaustively details the numerical computation of diffracted fields using FFT algorithms. A thorough presentation of the principles of holography and digital holography, including digital color holography, is proposed in the third part. A special section is devoted to the algorithms and methods for the numerical reconstruction of

holograms. There is also a chapter devoted to digital holographic interferometry with applications in holographic microscopy, quantitative phase contrast imaging, multidimensional deformation investigations, surface shape measurements, fluid mechanics, refractive index investigations, synthetic aperture imaging and information encrypting. Keys so as to understand the differences between digital holography and speckle interferometry and examples of software for hologram reconstructions are also treated in brief. Contents 1. Mathematical Prerequisites. 2. The Scalar Theory of Diffraction. 3. Calculating Diffraction by Fast Fourier Transform. 4. Fundamentals of Holography. 5. Digital Off-Axis Fresnel Holography. 6. Reconstructing Wavefronts Propagated through an Optical System. 7. Digital Holographic Interferometry and Its Applications. Appendix. Examples of Digital Hologram Reconstruction Programs

2023-09-11 Victor Sontea This book reports on advances in fundamental and applied research at the interface between nanotechnology and biomedical engineering. Gathering peer-reviewed contributions to the 6th International Conference on Nanotechnologies and Biomedical Engineering, ICNBME held on September 20-23, 2023, in Chisinau, Republic of Moldova, this first volume of the proceedings focuses on nanotechnologies and nano-biomaterials, and

their applications in medicine. With a good balance of theory and practice, the book offers a timely snapshot of multidisciplinary research at the interface between physics, chemistry, biomedicine, materials science, and engineering.

2012-11-26 Leonid P. Yaroslavsky With the ubiquitous use of digital imaging, a new profession has emerged: imaging engineering. Designed for newcomers to imaging science and engineering, *Theoretical Foundations of Digital Imaging Using MATLAB®* treats the theory of digital imaging as a specific branch of science. It covers the subject in its entirety, from image formation to image perfecting. Based on the author's 50 years of working and teaching in the field, the text first addresses the problem of converting images into digital signals that can be stored, transmitted, and processed on digital computers. It then explains how to adequately represent image transformations on computers. After presenting several examples of computational imaging, including numerical reconstruction of holograms and virtual image formation through computer-generated display holograms, the author introduces methods for image perfect resampling and building continuous image models. He also examines the fundamental problem of the optimal estimation of image parameters, such as how to localize targets in images. The book concludes with a

comprehensive discussion of linear and nonlinear filtering methods for image perfecting and enhancement. Helping you master digital imaging, this book presents a unified theoretical basis for understanding and designing methods of imaging and image processing. To facilitate a deeper understanding of the major results, it offers a number of exercises supported by MATLAB programs, with the code available at [www.crcpress.com](http://www.crcpress.com).

2014 Leonid P. Yaroslavsky Intended for graduate level students and practitioners in imaging engineering, this book is designed to help readers to master digital imaging on both fundamental theoretical and practical levels. To this end, the book provides a set of exercises in Matlab in all major topics of the subject and supports them by outlining the theoretical foundations, which the exercises are intended to illustrate. The book is based on the courses that have been taught by the author in Tel Aviv University, Israel, and in a number of other universities of Europe and Japan.

2023-07-17 Tomoyoshi Shimobaba This book explains the hardware implementation of computational holography and hardware acceleration techniques, along with a number of concrete example source codes that enable fast computation. Computational holography includes computer-based holographic technologies such as computer-generated hologram and digital holography, for which acceleration of wave-optics

computation is highly desirable. This book describes hardware implementations on CPUs (Central Processing Units), GPUs (Graphics Processing Units) and FPGAs (Field Programmable Gate Arrays). This book is intended for readers involved in holography as well as anyone interested in hardware acceleration.

2022-05-31 Zi-Lan Deng The merging of metasurface and holography brings about unprecedented opportunities for versatile manipulation of light in terms of both far-field wavefront and near-field profile. In this book, a brief evolving history from surface plasmon polariton holography to metamaterial holography and finally to metasurface holography is introduced at first. Basic physical mechanisms that govern the phase modulation rules behind metasurface holography design are discussed later. Next, extended functionalities such as arbitrary polarization holography, vectorial holography, full-color holography, and hybrid holography achieved in the metasurface platform are presented. Surface wave and metagrating holography that bridges the on-chip surface wave and free-space wave is also introduced. In the end, we envisage practical applications of high-fidelity 3D holographic display, high-secure encryption, and high capacity digital encoding and also indicate remaining challenges based on metasurface holography.

2006-04-20 Thomas Kreis The

book presents the principles and methods of holographic interferometry - a coherent-optical measurement technique for deformation and stress analysis, for the determination of refractive-index distributions, or applied to non-destructive testing. Emphasis of the book is on the quantitative computer-aided evaluation of the holographic interferograms. Based upon wave-optics the evaluation methods, their implementation in computer-algorithms, and their applications in engineering are described.

2018-10-12 Stephan Stuerwald This book presents not only the simultaneous combination of optical methods based on holographic principles for marker-free imaging, real-time trapping, identification and tracking of micro objects, but also the application of substantial low coherent light sources and non-diffractive beams. It first provides an overview of digital holographic microscopy (DHM) and holographic optical tweezers as well as non-diffracting beam types for minimal-invasive, real-time and marker-free imaging as well as manipulation of micro and nano objects. It then investigates the design concepts for the optical layout of holographic optical tweezers (HOTs) and their optimization using optical simulations and experimental methods. In a further part, the book characterizes the corresponding system modules that allow the addition of HOTs to commercial microscopes with regard to stability and diffraction efficiency. Further,



based on experiments and microfluidic applications, it demonstrates the functionality of the combined setup, and discusses several types of non-diffracting beams and their application in optical manipulation. The book shows that holographic optical tweezers, including several non-diffracting beam types like Mathieu beams, combined parabolic and Airy beams, not only open up the possibility of generating efficient multiple dynamic traps for micro and nano particles with forces in the pico and nano newton range, but also the opportunity to exert optical torque with special beams like Bessel beams, which can facilitate the movement and rotation of particles by generating microfluidic flows. The last part discusses the potential use of a slightly modified DHM-HOT-system to explore the functionality of direct laser writing based on a two photon absorption process in a negative photoresist with a continuous wave laser

2005-08-08 Oliver Bimber Like virtual reality, augmented reality is becoming an emerging platform in new application areas for museums, edutainment, home entertainment, research, industry, and the art communities using novel approaches which have taken augmented reality beyond traditional eye-worn or hand-held displays. In this book, the authors discuss spatial augmented r

2017-03-22 Izabela Naydenova Holographic Materials and Optical Systems covers recent

research achievements in the areas of volume holographic optical elements and systems, development of functionalized holographic recording materials, and applications in holographic imaging and metrology. Designs of single and multiplexed volume holographic optical elements for laser beam shaping, combining, and redirection are covered, and their properties are studied theoretically and experimentally. The high impact of holography in imaging and metrology is demonstrated by applications spreading from thickness and surface measurements, through antenna metrology and analyzing high-density gradients in fluid mechanics to characterization of live objects in clinical diagnostics. Novel functionalized materials used in dynamic or permanent holographic recording cover photopolymers, photochromics, photo-thermo-refractive glasses, and hybrid organic-inorganic media.

2011-11-09 Izabela Naydenova Advanced Holography - Metrology and Imaging covers digital holographic microscopy and interferometry, including interferometry in the infra red. Other topics include synthetic imaging, the use of reflective spatial light modulators for writing dynamic holograms and image display using holographic screens. Holography is discussed as a vehicle for artistic expression and the use of software for the acquisition of skills in optics and holography is also presented. Each chapter provides a comprehensive

introduction to a specific topic, with a survey of developments to date.

2022-05-05 Steven L. Brunton A textbook covering data-science and machine learning methods for modelling and control in engineering and science, with Python and MATLAB®.

2019-12-27 NISHCHAL Advanced technologies such as artificial intelligence, big data, cloud computing, and the Internet of Things have changed the digital landscape, providing many new and exciting opportunities. However, they also provide ever-shifting gateways for information theft or misuse. Staying ahead requires the development of innovative and responsive security measures, and recent advances in optical technology have positioned it as a promising alternative to digital cryptography. Optical Cryptosystems introduces the subject of optical cryptography and provides up-to-date coverage of optical security schemes. Optical principles, approaches, and algorithms are discussed as well as applications, including image/data encryption-decryption, watermarking, image/data hiding, and authentication verification. This book also includes MATLAB(R) codes, enabling students and research professionals to carry out exercises and develop newer methods of image/data security and authentication.

2013-06-10 Amar Khennane There are some books that target the theory of the finite element, while others focus on

the programming side of things. Introduction to Finite Element Analysis Using MATLAB® and Abaqus accomplishes both. This book teaches the first principles of the finite element method. It presents the theory of the finite element method while maintaining a balance between its mathematical formulation, programming implementation, and application using commercial software. The computer implementation is carried out using MATLAB, while the practical applications are carried out in both MATLAB and Abaqus. MATLAB is a high-level language specially designed for dealing with matrices, making it particularly suited for programming the finite element method, while Abaqus is a suite of commercial finite element software. Includes more than 100 tables, photographs, and figures Provides MATLAB codes to generate contour plots for sample results Introduction to Finite Element Analysis Using MATLAB and Abaqus introduces and explains theory in each chapter, and provides corresponding examples. It offers introductory notes and provides matrix structural analysis for trusses, beams, and frames. The book examines the theories of stress and strain and the relationships between them. The author then covers weighted residual methods and finite element approximation and numerical integration. He presents the finite element formulation for plane stress/strain problems, introduces axisymmetric

problems, and highlights the theory of plates. The text supplies step-by-step procedures for solving problems with Abaqus interactive and keyword editions. The described procedures are implemented as MATLAB codes and Abaqus files can be found on the CRC Press website.

2007 Jaakko Astola "Digital signal transforms are of a fundamental value in digital signal and image processing. Their role is manifold. Transforms selected appropriately enable substantial compressing signals and images for storage and transmission. No signal recovery, image reconstruction and restoration task can be efficiently solved without using digital signal transforms. Transforms are successfully used for logic design and digital data encryption. Fast transforms are the main tools for acceleration of computations in digital signal and image processing. The volume collects in one book most recent developments in the theory and practice of the design and usage of transforms in digital signal and image processing. It emerged from the series of reports published by Tampere International Centre for Signal Processing, Tampere University of Technology. For the volume, all contributions are appropriately updated to represent the state of the art in the field and to cover the most recent developments in different aspects of the theory and applications of transforms. The book consists of two parts that

represent two major directions in the field: development of new transforms and development of transform based signal and image processing algorithms. The first part contains four chapters devoted to recent advances in transforms for image compression and switching and logic design and to new fast transforms for digital holography and tomography. In the second part, advanced transform based signal and image algorithms are considered: signal and image local adaptive restoration methods and two complementing families of signal and image re-sampling algorithms, fast transform based discrete sinc-interpolation and spline theory based ones."--Publisher. 2019-05-20 Trung Dung Ngo Open-source electronics are becoming very popular, and are integrated with our daily educational and developmental activities. At present, the use open-source electronics for teaching science, technology, engineering, and mathematics (STEM) has become a global trend. Off-the-shelf embedded electronics such as Arduino- and Raspberry-compatible modules have been widely used for various applications, from do-it-yourself (DIY) to industrial projects. In addition to the growth of open-source software platforms, open-source electronics play an important role in narrowing the gap between prototyping and product development. Indeed, the technological and social impacts of open-source electronics in teaching,

research, and innovation have been widely recognized.

2016-12-05 Tim Caro Why do zebras have stripes? Popular explanations range from camouflage to confusion of predators, social facilitation, and even temperature regulation. It is a challenge to test these proposals on large animals living in the wild, but using a combination of careful observations, simple field experiments, comparative information, and logic, Caro concludes that black-and-white stripes are an adaptation to thwart biting fly attack.

2012-02-12 Maria Teresa Restivo Book describes online experimentation, using fundamentally emergent technologies to build the resources and considering the context of IoT. Online Experimentation: Emerging Technologies and IoT is suitable for all who is involved in the development design

2014-12-03 Ali Kemal Yetisen This thesis presents a theoretical and experimental approach for the rapid fabrication, optimization and testing of holographic sensors for the quantification of pH, organic solvents, metal cations, and glucose in solutions. Developing non-invasive and reusable diagnostics sensors that can be easily manufactured will support the monitoring of high-risk individuals in any clinical or point-of-care setting. Sensor fabrication approaches outlined include silver-halide chemistry, laser ablation and photopolymerization. The sensors employ off-axis Bragg diffraction gratings of ordered

silver nanoparticles and localized refractive index changes in poly (2-hydroxyethyl methacrylate) and polyacrylamide films. The sensors exhibited reversible Bragg peak shifts, and diffracted the spectrum of narrow-band light over the wavelength range  $\lambda_{\text{peak}} \approx 495\text{-}1100$  nm. Clinical trials of glucose sensors in the urine samples of diabetic patients demonstrated that they offer superior performance compared to commercial high-throughput urinalysis devices. Lastly, a generic smartphone application to quantify colorimetric tests was developed and tested for both Android and iOS operating systems. The sensing platform and smartphone application may have implications for the development of low-cost, reusable and equipment-free point-of-care diagnostic devices.

2013-08-05 Thomas M. Carsey Taking the topics of a quantitative methodology course and illustrating them through Monte Carlo simulation, Monte Carlo Simulation and Resampling Methods for Social Science, by Thomas M. Carsey and Jeffrey J. Harden, examines abstract principles, such as bias, efficiency, and measures of uncertainty in an intuitive, visual way. Instead of thinking in the abstract about what would happen to a particular estimator "in repeated samples," the book uses simulation to actually create those repeated samples and summarize the results. The book includes basic examples

appropriate for readers learning the material for the first time, as well as more advanced examples that a researcher might use to evaluate an estimator he or she was using in an actual research project. The book also covers a wide range of topics related to Monte Carlo simulation, such as resampling methods, simulations of substantive theory, simulation of quantities of interest (QI) from model results, and cross-validation. Complete R code from all examples is provided so readers can replicate every analysis presented using R.

2015-11-23 Michael Paluszek Learn from state-of-the-art examples in robotics, motors, detection filters, chemical processes, aircraft, and spacecraft. This is a practical reference for industry engineers using MATLAB to solve everyday problems. With MATLAB Recipes: A Problem-Solution Approach you will review contemporary MATLAB coding including the latest language features and use MATLAB as a software development environment including code organization, GUI development, and algorithm design and testing. This book provides practical guidance for using MATLAB to build a body of code you can turn to time and again for solving technical problems in your line of work. Develop algorithms, test them, visualize the results, and pass the code along to others to create a functional code base for your firm.

2015 B. D. Guenther The most up-to-date treatment available



on modern optics. The text gives an overview of the topics and an introduction to design practices for a number of applications. It provides the student with the foundations to enter into advanced courses in nonlinear optics, lens design, laser system design, and optical communications.

2013-05-29 Emilia Mihaylova  
Holography - Basic Principles and Contemporary Applications is a collection of fifteen chapters, describing the basic principles of holography and some recent innovative developments in the field. The book is divided into three sections. The first, Understanding Holography, presents the principles of hologram recording illustrated with practical examples. A comprehensive review of diffraction in volume gratings and holograms is also presented. The second section, Contemporary Holographic Applications, is concerned with advanced applications of holography including sensors, holographic gratings, white-light viewable holographic stereograms. The third section of the book Digital Holography is devoted to digital hologram coding and digital holographic microscopy.

2019-11-22 K. Deergha Rao  
This book discusses the latest channel coding techniques, MIMO systems, and 5G channel coding evolution. It provides a comprehensive overview of channel coding, covering modern techniques such as turbo codes, low-density parity-check (LDPC) codes, space-time coding, polar codes, LT codes, and Raptor codes as

well as the traditional codes such as cyclic codes, BCH, RS codes, and convolutional codes. It also explores MIMO communications, which is an effective method for high-speed or high-reliability wireless communications. It also examines the evolution of 5G channel coding techniques. Each of the 13 chapters features numerous illustrative examples for easy understanding of the coding techniques, and MATLAB-based programs are integrated in the text to enhance readers' grasp of the underlying theories. Further, PC-based MATLAB m-files for illustrative examples are included for students and researchers involved in advanced and current concepts of coding theory.

2001-02-08 Haldun M. Ozaktas  
The discovery of the Fractional Fourier Transform and its role in optics and data management provides an elegant mathematical framework within which to discuss diffraction and other fundamental aspects of optical systems. This book explains how the fractional Fourier transform has allowed the generalization of the Fourier transform and the notion of the frequency transform. It will serve as the standard reference on Fourier transforms for many years to come.

2022-09-19 Richard Yuxiong Su  
2020-03-23 Kyoji Matsushima  
This book covers basic- to expert-level applications in computer holography, a strong candidate for the ultimate 3D display technology. The computer holography

developed in the course of the past decade represents the basis of wave optics. Accordingly, the book presents the basic theory of wave optics and practical techniques for handling wave fields by means of the fast Fourier transform. Numerical techniques based on polygons, as well as mask-based techniques, are also presented for calculating the optical fields of virtual 3D models with occlusion processing. The book subsequently describes simulation techniques for very large-scale optical fields, and addresses the basics and concrete applications of simulation, offering a valuable resource for readers who need to employ it in the context of developing optical devices. To aid in comprehension, the main content is complemented by numerous examples of optical fields and photographs of reconstructed 3D images.

2022-12-31 Yaping Zhang  
An easy-to-understand course book, based on the authentic lectures and detailed research, conducted by the authors themselves, on information optics, holography and MATLAB. This book is the first to highlight the incoherent optical system, provide up-to-date, novel digital holography techniques, and demonstrate MATLAB codes to accomplish tasks such as optical image processing and pattern recognition. This title is a comprehensive introduction to the basics of Fourier optics as well as optical image processing and digital holography. A step-by-step guide which details the vast

majority of the derivations, without omitting essential steps, to facilitate a clear mathematical understanding. This book also features

exercises at the end of each chapter, providing hands-on experience and consolidating understanding. An ideal companion for graduates and

researchers involved in engineering and applied physics, as well as interested in the growing field of information optics.