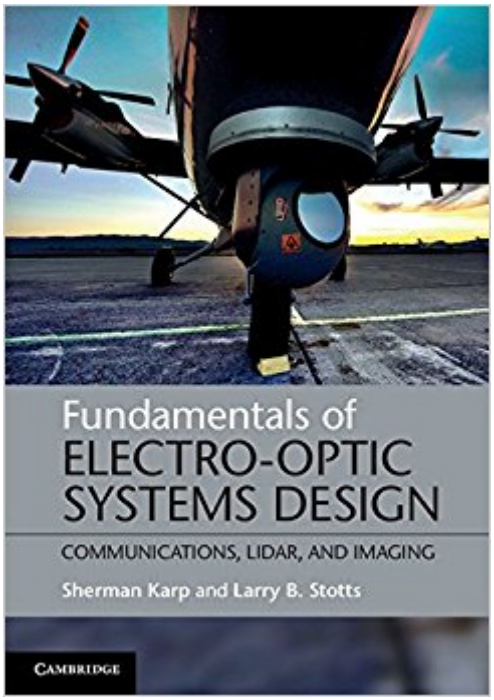
Fundamentals Of Electro-Optic Systems Design: Communications, Lidar, And Imaging



Synopsis

Using fundamentals of communication theory, thermodynamics, information theory and propagation theory, this book explains the universal principles underlying a diverse range of electro-optical systems. From fiber optics and infra-red imaging to free space communications and laser remote sensing, the authors relate key concepts in science and device engineering to practical systems issues. A broad spectrum of coherent and incoherent imaging and communications systems is considered, accompanied by many real-world examples. The authors also present new insights into LIDAR and free space communications and imaging, providing practical guidance on identifying the fundamental limitations of transmission and imaging through deleterious channels. Accompanied by online examples of processed images and videos, this uniquely tailored guide to the fundamental principles underlying modern electro-optical systems is an essential reference for all practising engineers and academic researchers in optical engineering.

Book Information

Hardcover: 318 pages

Publisher: Cambridge University Press; 1 edition (February 25, 2013)

Language: English

ISBN-10: 1107021391

ISBN-13: 978-1107025196

Product Dimensions: 6.8 x 0.8 x 9.7 inches

Shipping Weight: 1.7 pounds (View shipping rates and policies)

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Best Sellers Rank: #1,274,809 in Books (See Top 100 in Books) #83 inÃ Â Books > Engineering & Transportation > Engineering > Electrical & Electronics > Electronics > Optoelectronics #192 inÃ Â Books > Computers & Technology > Graphics & Design > Computer Modelling > Imaging Systems #256513 inÃ Â Books > Textbooks

Customer Reviews

"With the completion of Fundamentals of Electro-Optic Systems Design, Sherman Karp and Larry B. Stotts have created a single comprehensive book for anyone having anything to do with the vast field of electro-optics. The detailed systems design principles, examples, charts, graphs, and methods bring together under one cover the information to handle the applications given by the subtitle Communications, Lidar, and Imaging. The basic theories and their relationship to real-world hardware constraints such as noise and scattering are covered in full detail with necessary citations

to decades of electro-optics research. From a systems design point-of-view, Karp and Stotts blend Lidar, laser communications, and imaging into a logical path to analyze, design, and test complex electro-optics. The communication chapters covering modulation, coding, and propagation in various media are not found anywhere else unless one wades through thousands of research papers and reports. If you are a scientist or engineer who has to manipulate photons, Fundamentals of Electro-Optic Systems Design belongs on your bookshelf - near the front." Robert K. Tyson, The University of North Carolina at Charlotte"This book uniquely treats electro-optical system design from an engineering viewpoint emphasizing real world applications and where theory works and does not work. These perspectives make this book a must-have reference for the scientist or engineer involved with electro-optical system design." Tony Tether, Former DARPA Director 2001 to 2009"Fundamentals of Electro-Optic Systems Design is a comprehensive and authoritative treatment of free-space optical communications and Lidar. Topics range from diffraction, photoelectric detection, effects of scattering and optical turbulence, and even signal coding, modulation and error correction." Joseph W. Goodman, Stanford University"The book is written by very knowledgeable and very experienced individuals in the field of electro-optical systems. Their writing and explanations make the material very accessible. It is clear and well presented." Ronald Phillips, University of Central Florida"This book offers an exhaustive treatment of free-space electro-optical instrumentation for remote sensing, such as LIDAR, detection techniques and communications in turbulent and turbid media...The core chapters are easy to follow and describe in detail LIDAR, free-space optical communication(including atmosphere absorption and scattering) and the optical thick communication channel. There should be no problem in using this publication as a textbook, because it includes many examples. This comprehensive book will also be a very useful reference for researchers and engineers involved in optical remote sensing and instrumentation." Silvano Donati, Optics and Photonics News"The first feature of the book which astounds is its compactness. The authors have addressed an astonishing range of topics in a few hundred pages. ... The second feature of this book which causes amazement is the breadth of the coverage. Arguably the secret of this success is the fact that the authors are highly accomplished and greatly experienced. This strength enables the authors to make judicious choices of subject matter and have the confidence to convey the essence of each topic in a convincing manner. ... The depth and breadth of this volume together with the care that the authors have taken to present their material in a digestible form lead one to strongly recommend this book to as wide an audience as possible." K. Alan Shore, Contemporary Physics

Presents practical electro-optical applications in the context of the fundamental principles of communication theory, thermodynamics, information theory and propagation theory. Combining systems issues with fundamentals of communications, this is an essential reference for all practising engineers and academic researchers in optical engineering.

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