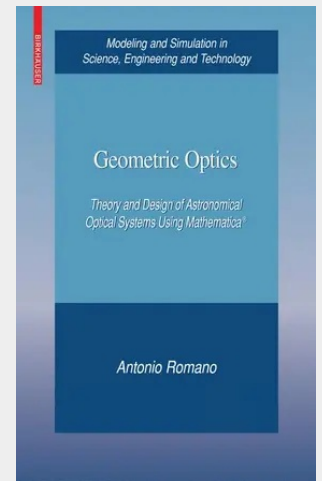


Geometric Optics

Theory and Design of Astronomical Optical Systems Using Mathematica®

This book—unique in the literature—provides readers with the mathematical background needed to design many of the optical combinations that are used in astronomical telescopes and cameras. The results presented in the work were obtained by using a different approach to third-order aberration theory as well as the extensive use of the software package Mathematica®. Replete with workout examples and exercises, Geometric Optics is an excellent reference for advanced graduate students, researchers, and practitioners in applied mathematics, engineering, astronomy, and astronomical optics. The work may be used as a supplementary textbook for graduate-level courses in astronomical optics, optical design, optical engineering, programming with Mathematica, or geometric optics.

A very wide selection of excellent books are available to the reader interested in geometric optics. Roughly speaking, these texts can be divided into three main classes. In the first class (see, for instance, [1]–[9]), we find books that present the theoretical aspects of the subject, usually starting from the Lagrangian and Hamiltonian formulations of geometric optics. These texts analyze the relations between geometric optics, mechanics, partial differential equations, and the wave theory of optics. The second class comprises books that focus on the applications of this theory to optical instruments. In these books, some essential formulae (which are reported without providing proofs) are used to propose exact or approximate solutions to real-world problems (an excellent example of this class is represented by [10]). The third class contains books that approach the subject in a manner that is intermediate between the first two classes (see, for instance, [11]–[16]). The aim of this book, which could be placed in the third class, is to provide the reader with the mathematical background needed to design many optical combinations that are used in astronomical telescopes and cameras. The results presented here were obtained by using a different approach to third-order aberration theory as well as the extensive use of the software package Mathematica.



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