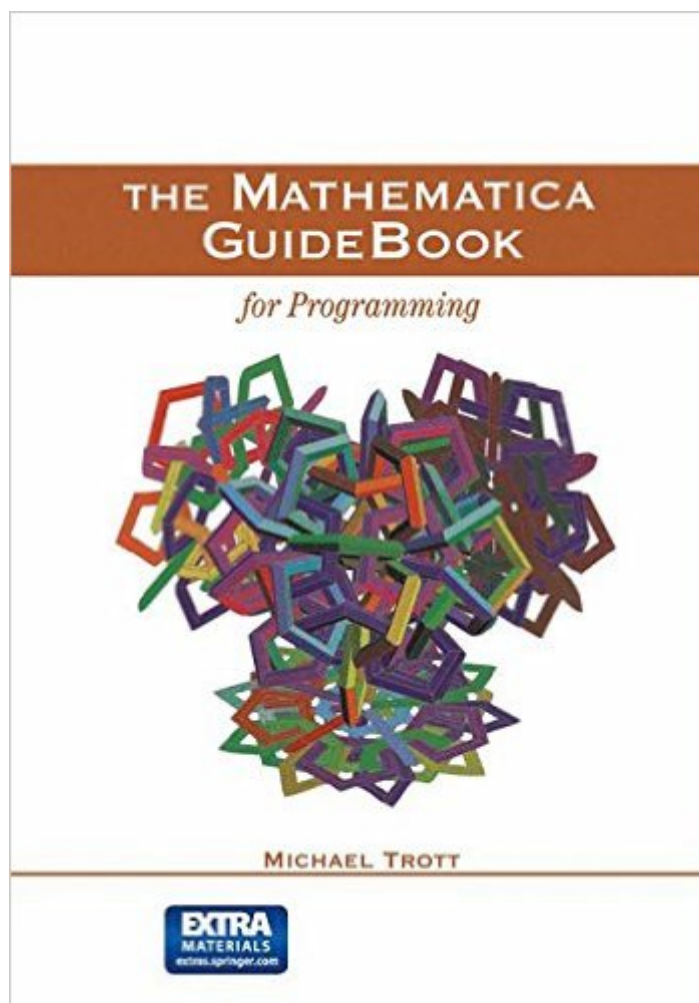


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# The Mathematica GuideBook For Programming



## Synopsis

This comprehensive, detailed reference provides readers with both a working knowledge of Mathematica in general and a detailed knowledge of the key aspects needed to create the fastest, shortest, and most elegant implementations possible. It gives users a deeper understanding of Mathematica by instructive implementations, explanations, and examples from a range of disciplines at varying levels of complexity. The three volumes -- Programming, Graphics, and Mathematics, total 3,000 pages and contain more than 15,000 Mathematica inputs, over 1,500 graphics, 4,000+ references, and more than 500 exercises. This first volume begins with the structure of Mathematica expressions, the syntax of Mathematica, its programming, graphic, numeric and symbolic capabilities. It then covers the hierarchical construction of objects out of symbolic expressions, the definition of functions, the recognition of patterns and their efficient application, program flows and program structuring, and the manipulation of lists. An indispensable resource for students, researchers and professionals in mathematics, the sciences, and engineering.

## Book Information

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## Customer Reviews

(...)Now then - one of the advantages of Mathematica is that it is supported by extensive documentation - both online and in print. Trott's Guidebooks (set of four books - Programming, Graphics, Symbolics and Numerics) is an impressive addition to this literature. These books stand out among the rest of the literature in several respects: 1. The whole set put together must be the biggest Mathematica book around. 2. The books teach Mathematica through examples. But unlike

most other books, the examples are not toy-examples; they are applications of Mathematica to non-trivial mathematical problems. Not only do they teach you Mathematica, they also teach you mathematics!!<sup>3</sup>. The above mentioned non-trivial mathematical problems and results are very well referenced. Each chapter ends with an extensive bibliography - usually several hundred references. This further enhances the value of the Guidebooks as books on mathematics, not just Mathematica.<sup>4</sup> Each book comes with a DVD containing the WHOLE SET (yup - you heard it - all four books) as Mathematica notebooks. You can open these notebooks in Mathematica, edit them and experiment with them.<sup>5</sup> There is a piece of Mathematica code on the web-page that incorporates the whole set on DVD into the Mathematica help browser. This feature is just brilliant!!

I purchased the Programming Guidebook with considerable hesitation; to all appearances the Guidebooks are intended for the discerning cognoscenti, whereas I am very much a Mathematica novice. The Programming Guidebook turned out to be a pleasant surprise: while there is a vast amount of material that would benefit the expert, it is also a careful and patient instruction book for the beginner. Mathematica is a complex system; at first acquaintance it appears to be a bewildering collection of expressions and ad hoc programming styles. This book is a pedagogical masterpiece: it brings order to this seeming chaos by revealing the underlying framework. Topics are organized into comprehensible groups and the author focuses on each in detail. Some parts that particularly appealed to this reader: The section in Chapter 1 on Solutions to "What you always wanted to compute". This is a wonderfully whimsical list of problems that the author has gathered over many years and each is backed up by several references. This section is an unexpected delight and following up on the references provides an education in itself. The very first paragraph in Chapter 2, where the author provides one of the keys to unraveling Mathematica. The section in Chapter 3 on lambda calculus, which clarifies the use of pure functions. The entire collection of topics in Chapter 4 on meta-Mathematica. Chapter 5 deals with the topic that is probably most foreign to those like myself used to traditional languages, (Fortran, C, C++); the treatment in this chapter is outstanding. Chapter 6 shows how Mathematica uses lists as a unified approach for vectors, matrices and tensors. Be aware however, that the book does require a fair background in mathematics or physics, (bachelor's or above). It is clear that this is a labor of love; the author is deeply excited by the capabilities of Mathematica, and does his best to share his enthusiasm with the reader. The result is an inspiring book that is richly deserving of high praise. To fellow novices aspiring to use Mathematica gainfully, I can recommend the Programming Guidebook without hesitation. With study and patience, this Guidebook will dramatically enhance your ability to use Mathematica

successfully. I still believe my path to skillful use of Mathematica is going to be a long one, but it does not matter - with a guide like this, I expect to enjoy the journey immensely.

Michael Trott's skill, knowledge and enthusiasm regarding the use of Mathematica in scientific research is extraordinarily impressive, as I have found to my considerable benefit from some extended professional contact. His infectious passion is manifested very strongly in this Guidebook (devoted to programming, with the subsequent three volumes --- already available --- being concerned with the topics of graphics, symbolics and numerics). Chapter 1 ("Introduction to Mathematica") alone contains close to twelve hundred references to the scientific literature (mostly physics, mathematics and engineering in nature), pertaining to one application or another --- many of an engaging/intriguing nature. Each chapter includes a set of exercises and a detailed solution proposal for each exercise. It certainly behooves each reader to peruse the Table of Contents and the Index to find the topics of most interest to him or her. Much valuable time for the computer practitioner can certainly be spent with simple browsing of this impressive work of devotion and erudition. Desirably, some of the virtuosity in the use of Mathematica, abundantly exhibited here by Trott, can be acquired by the reader.

Michael is a world authority on Mathematica. His deep insight, fresh perspectives and Herculean writing have produced a singular volume. It is impossible to turn the pages without a sense of amazement. If you want to appreciate the power and beauty of Mathematica, there is no better choice. Here we see Mathematica as used by a master. The instruction is top notch, the examples are superlative, the topics are fascinating. I think the customer rating system shows a blemish in allowing someone to rate this book as a poor introduction. It is a guidebook, a survey of capabilities, and as such is superlative example.

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