The volume concludes with a section containing nine unsolved problems.

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17[60–02, 60G07, 60H10, 65C05, 65C20].—NICOLAS BOULEAU & DOMINIQUE LÉPINGLE, *Numerical Methods for Stochastic Processes*, Wiley Series in Probability and Mathematical Statistics, Wiley, New York, 1994, xx + 359 pp., 24 cm. Price $64.95.

This book offers a rigorous exposition of numerical treatments of stochastic models. A considerable mathematical sophistication is expected of the reader, but a brief review of the prerequisites is provided in the first chapter. The authors distinguish two types of simulation methods, the Monte Carlo method based on the strong law of large numbers, and the shift method based on the pointwise ergodic theorem. The shift method is particularly appropriate in infinite-dimensional settings.

Chapter 2 describes the mathematical framework for the Monte Carlo method. There is also some material on quasi-Monte Carlo methods, but here more extensive and up-to-date treatments are available in other sources, e.g., in the CBMS-NSF monograph of the reviewer [1]. Chapter 3 discusses the simulation of random processes and random fields in an infinite-dimensional setting. Markov processes, point processes, and processes with stationary independent increments are highlighted. Chapter 4 deals with the deterministic resolution of some Markovian problems through methods such as balayage algorithms and the reduced function algorithm. The carré du champ operator is applied to hedging strategies in financial markets. The last chapter is devoted to the numerical resolution of stochastic differential equations and the computation of expectations of random variables defined on Wiener spaces.

The book is on the whole very reliable and accurate. There are only some minor quibbles, for instance, the title of the paper of Warnock (1972) is given incorrectly. Readers seeking an introduction to the area will find the style of the book somewhat terse.

H. N.

1. H. Niederreiter, *Random number generation and quasi-Monte Carlo methods*, SIAM, Philadelphia, PA, 1992.

18[68Q40, 65Y25, 11-04, 12-04, 13-04, 14-04, 30-04, 33-04].—JOHN GRAY, *Mastering Mathematica: Programming Methods and Applications*, AP Professional, Boston, 1994, xx + 644 pp., $23\frac{1}{2}$ cm. Price: Softcover $44.95.

If you are a mathematician familiar with, or interested in, the *Mathematica* programming system and if you share even some of the author's eclectic set of interests, you may find this book useful.

Apparently intended for a course in mathematical software, this book's orientation—overwhelmingly one of endorsing Mathematica as the answer, regardless of the question—seems inappropriate as sole text for such a course. It may be viable as additional "symbolic methods" reading in combination with a numerical methods text.

Part I (Using Mathematica as a Symbolic Pocket Calculator), 140 pages, and Part II (Mastering Mathematica as a Programming Language), 260 pages, fits somewhere between Blachman's introductory book [2] and Maeder's book on advanced programming [3]. Gray's introduction to selected parts of the system is not entirely authoritative (there are even occasional typos in the computer-generated figures) but may be just right for an audience of upper-division applied mathematics students.

Part III in 110 pages illustrates computing in some areas of group theory and differentiable mappings of particular interest to the author. The last 110 pages are answers to problems.

If you wish to learn about ideas of programming languages partly covered in Part II: functional programming, object-oriented programming, the use of a few ideas from lambda calculus, etc., you may find (for example) the text by Abelson et al. [1] far more complete and authoritative than the coverage here.

Re-interpreting such ideas in a *Mathematica* framework has a number of failings, one of which is that it sometimes "reduces" simple ideas to complicated ones; another is that the "implementation" is extremely inefficient in execution time. However, a reader who would like to understand how something might be computed by relating it to an implementation in *Mathematica* may find the systematic development of such ideas as object-oriented programs of some interest.

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1. H. Abelson, G. J. Sussman, and J. Sussman, *Structure and interpretation of computer programs*, MIT Press, Cambridge, MA, 1985.

2. N. Blachman, *Mathematica, a practical approach*, Prentice-Hall, Englewood Cliffs, NJ, 1992.

3. R. E. Maeder, *Programming in mathematica*, 2nd ed., Addison-Wesley, Reading, MA, 1991.

19[14–06, 13–06, 13P10, 14Qxx].—DAVID EISENBUD & LORENZO ROBBIANO (Editors), *Computational Algebraic Geometry and Commutative Algebra*, Istituto Nazionale di Alta Matematica Francesco Severi, Symposia Mathematica, Vol. 34, Cambridge Univ. Press, Cambridge, MA, 1993, x + 298 pp., $23\frac{1}{2}$ cm. Price \$49.95.

This small, attractively bound volume consists of a collection of papers from a conference on the topics in its title held in 1991 in Cortona, Italy. Most of the papers deal with the theory of Gröbner bases, although there are some interesting exceptions. The papers are, as a group, of very high quality, and several of them are first-class contributions to the expository literature on this