to the use of the quadrature routines in the NAG (Numerical Analysis Group Project) Library, which was developed collectively by five British universities.

The tables in Appendix B are tables of numbers which may be used to obtain global error bounds, as explained in the monograph, for Gauss-Legendre, Gauss-Chebyshev, Newton-Cotes, Lobatto, and Radau quadrature.

The text is mainly a reference text, even though it contains some good problems which weigh its purpose towards the direction of instruction.

F.S.

16[41A55, 65D30, 65D32].—H. BRASS & G. HÄMMERLIN (Editors), *Numerical Integration* IV, International Series of Numerical Mathematics, Vol. 112, Birkhäuser, Basel, 1993, xii + 382 pp., 24 cm. Price $100.50.

This is the fourth volume of Proceedings of Conferences on Numerical Integration in which Professor Hämmerlin has been either the Editor or Coeditor. The Proceedings of the previous three Conferences have also been published in this International Series of Numerical Mathematics (see Vols. 45, 47 and 85). Of these four volumes this latest one is by far and away the best produced and bound; the publishers, Birkhäuser, have done an excellent job. In this volume we find 27 refereed papers (see Contents, below) together with an addendum containing nine unsolved problems. This Conference, held at the Oberwolfach Mathematics Research Institute, was attended by 46 mathematicians from 16 different countries with at least one delegate from each of the 5 Continents.

To misquote slightly from the Preface to the Third Edition of Gabor Szegö's book on Orthogonal Polynomials, "The interest of the mathematical community for numerical integration is still not entirely exhausted". This is perhaps surprising in the light of the Editors' statement that "Algorithms for the numerical computation of definite integrals have been proposed for more than 300 years, ... ". However, the Editors go on to say that ... "practical considerations have led to problems of ever increasing complexity so that, even with current computing speeds, numerical integration may be a difficult task. High dimension and complicated structure of the region of integration and singularities of the integrand are the main sources of difficulties". Of the 27 papers, 17 were on one-dimensional, and 10 on multivariate approximate integration. Of the papers on one-dimensional quadrature nearly all of them (13) relate to either orthogonal polynomials or Gauss quadrature. It seems that orthogonal polynomials are in great demand in numerical integration; Gabor Szegö would, I am sure, be pleased.

To underline the continuing interest in numerical integration, this volume concludes with a report of one of the evenings of the Conference at which open problems were discussed. A total of nine problems is listed, eight of them concerning one-dimensional quadrature rules. In the tradition of Paul Erdös, it is stated that Frank Stenger is offering a 50 DM reward for a solution to the problem he proposed. (An e-mail to Frank on 26th April 1994 elicited the response that his problem remains unsolved and so keen is he to have it resolved one way or the other that he is now offering US$100 in place of the original DM50.)

Following the Oberwolfach tradition, all the papers, with one exception, are in English. This volume is an excellent addition to the ISNM series and any one who has the least interest in quadrature should make sure that they have ready access to it.

CONTENTS

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.