

REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

The numbers in brackets are assigned according to the American Mathematical Society classification scheme. The 2000 Mathematics Subject Classification can be found in print starting with the 1999 annual index of *Mathematical Reviews*. The classifications are also accessible from www.ams.org/msc/.

1[41-02, 41A60, 33-00]—*Asymptotic approximations of integrals*, by R. Wong, Classics in Applied Mathematics, SIAM, Philadelphia, PA, 2001, vol. 34, xvii+543 pp., 23 cm, softcover, \$77.00

This is a reprint of the first edition (1989, Academic Press). In the Preface to this edition the author mentions new significant developments in the theory of asymptotic approximations of integrals, such as smoothing of the Stokes phenomenon, uniformly exponentially improved asymptotic expansions, and hyperasymptotics. The content of the book is the same as that of the first edition. For an extensive review in this journal by Jet Wimp, see vol. 56, no. 193 (1991, page 388).

NICO M. TEMME

2[65M12, 65L07]—*Collected lectures on the preservation of stability under discretization*, D. Estep and S. Tavener (Editors), SIAM, Philadelphia, PA, 2002, xiv+267 pp., 22 cm, softcover, \$55.00

The concept of *stability* occurs repeatedly in applied mathematics and refers to several related notions. In general a system is stable if small perturbations do not grow substantially. This may refer to the continuous dependence of solutions of differential equations, the numerical stability of discretizations, the conservation of momentum in physics, or other applications. The book under review is a collection of twelve papers from the Workshop on the Preservation of Stability under Discretization held May 30–June 2, 2001, at Colorado State University. Each of the papers discusses some aspect of stability as it relates to the computational solution of a discrete version of a continuous problem.

The papers are well organized into four general topics. These are the Preservation of Qualitative Stability Features, Preservation of Structural Stability, Investigation of Physical Stability, and Investigation of Model Stability.

In the section on preservation of qualitative stability there are two papers on stability of finite difference methods, a paper on analytic semigroups, and one on Hamilton-Jacobi equations. Two papers on the finite element method and one on Lie-group methods make up the section on preservation of structural stability.

The section on physical stability contains two papers on computations in the vicinity of bifurcation points and a paper on computing Lyapunov spectra. The two papers on model stability are concerned with dispersive models for fluids and with chaotic dynamics for the nonlinear Schrödinger equation.

As this list shows, the papers in this collection cover a broad set of topics, so that researchers from a wide range of applied mathematics should find at least one paper

in this collection that is of interest. The editors have included an introduction that provides a good introduction and overview of the material.

The level of the papers is about that of beginning graduate students, yet because of the diversity of topics, researchers of every level will find interesting material here.

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