REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

The numbers in brackets are assigned according to the American Mathematical Society classification scheme. The 1980 Mathematics Subject Classification (1985 Revision) can be found in the December index volumes of Mathematical Reviews.

1[34–00, 35–00].—DANIEL ZWILLINGER, *Handbook of Differential Equations*, Academic Press, Boston, 1989, xx + 673 pp., 23 $\frac{1}{2}$ cm. Price $49.95.

This book is a very valuable addition to the literature since it acts as a concise reference for many of the popular techniques for solving ordinary and partial differential equations. Since many equations do not admit analytic solutions, approximate and numerical methods have been added to the text. The 673-page volume is divided into four parts.

The first part is a collection of transformations (e.g., contact, Liouville's, Kirchoff's, Von Mises', Lie's, etc.) and general ideas about differential equations. Well-posedness and natural boundary conditions are also treated.

The second part is a collection of exact analytical solution techniques. These are (mostly) listed alphabetically. For almost every equation one finds: the type of equations to which the method is applicable; the idea behind the method; the procedure for carrying it out; an example or two; any necessary precautions; notes; references for further study. The third part deals with approximate analytical techniques such as collocation, equation splitting, Floquet theory, harmonic balance, perturbation, variational calculus, etc.

The fourth part is concerned with the most important methods for finding numerical solutions of common types of equations. For ordinary differential equations we find continuation, shooting, finite elements, predictor-corrector methods, stiff equation procedures and weighted residual methods. For partial differential equations the list includes finite differences, Monte Carlo, characteristics, lines, finite and boundary elements, spectral methods and Schwarz's procedure.

This reviewer found the book useful the first day it arrived. It stands in a readily available place beside Kamke's book [1], which it admirably complements. The book is highly recommended to scientists and engineers who must find the solution of a variety of equations. And it surely is a must for applied mathematicians working in differential equations. The author is to be congratulated for adding this very useful book to the literature of applied mathematics.

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