attack nonlinear differential equations problems of great complexity, and thus has led to a renewed interest in the design and analysis of relevant computational methods. The present volume provides a well-balanced, and well-documented, survey of current research in this area.

W. G.

83[4, 6].—Louis Brand, *Differential and Difference Equations*, John Wiley & Sons, Inc., New York, 1966, xvi + 698 pp., 24 cm. Price $11.95.

This is a skillfully written introductory book on the more classical parts of the subject. Its distinguishing features are the conscious effort made to bring out the formal analogies and interplays between differential and difference equations, the generous consideration given to applications in the physical sciences, and the inclusion of Mikusiński's operational calculus, both for functions of a continuous and a discrete variable. The chapter headings are: 1. Differential equations of the first order, 2. Important types of first-order equations, 3. Linear equations of the second order, 4. Linear equations with constant coefficients, 5. Systems of equations, 6. Applications, 7. Laplace transform, 8. Linear difference equations, 9. Linear difference equations with constant coefficients, 10. Solutions in series, 11. Mikusiński's operational calculus, 12. Existence and uniqueness theorems, 13. Interpolation and numerical integration, 14. Numerical methods.

W. G.

84[7].—Aldo Ascari, *A Table of the Repeated Integrals of the Error Function*, Internal Report S/6339, Società Richerche Impianti Nucleari (SORIN), Nuclear Research Center, Saluggia, Vercelli, Italy, 1968, v + 104 pp., 31 cm. Deposited in UMT file.

This table consists of 10S unrounded values (in floating-point form) of the normalized repeated integrals, $A_n i^n \operatorname{erfc} x$, of the complementary error function $2\pi^{-1/2} \int_x^\infty e^{-t^2}\, dt$, for the range $n = 1(1)24$, $x = 0(0.01)5.20$.

The corresponding values of $A_n = 2^n \Gamma((n/2) + 1)$ and its reciprocal are listed to 12S (also unrounded) in a preliminary table.

We are informed in the introduction that this table evolved as a by-product of the numerical solution of a specific diffusion problem, obtained on an Olivetti-Elea 6001/S computer at the Center.

The computation of the successive integrals was performed by means of the standard three-term recurrence formula, which was decomposed into a system of two first-order recurrences. The author states that several recurrent checks were applied to random entries, and were found invariably to be satisfied to at least 9S.

At the conclusion of the introductory remarks it is stated that the tabular entries were all obtained by chopping the 14S computer results to 10S. This, of course, means that terminal-digit errors can range up to nearly a unit.

Included in the appended list of six references are the tables of Berlyand et al. [1], which the present author has found unreliable, confirming the evaluation thereof made by this reviewer. He also refers to the comparatively brief, but useful, table of Gautschi [2].

In the opinion of this reviewer, the present table supersedes all previous tables of this type, and consequently represents a significant contribution to the related tabular literature.

J. W. W.

1. O. S. Berlyand, R. I. Gavrilova & A. P. Prudnikov, *Tables of Integral Error Functions and Hermite Polynomials*, Pergamon Press, Oxford, 1962. (See *Math. Camp.*, v. 17, 1963, pp. 470–471, RMT **80**.)

2. M. Abramowitz & I. A. Stegun, Editors, *Handbook of Mathematical Functions with Formulas, Graphs, and Mathematical Tables*, National Bureau of Standards, Applied Mathematics Series, No. 55, U. S. Government Printing Office, Washington, D. C., 1964, pp. 317–318, Table 7.4.

85[7].—M. Lal & W. Russell, *Table of Factorials 0! to 9999!*, Department of Mathematics, Memorial University of Newfoundland, St. John's, Newfoundland, September 1967. Ms. of 3 + 200 pp., 28 cm. Deposited in the UMT file. Price $10.00.

This attractively printed, bound table consists of 50S unrounded values of $n!$ for $n = 0(1)9999$, arranged in floating-point form. Exact values of the first 48 entries can be read from the table.

The introduction contains a statement that the underlying calculations were performed on an IBM 1620 and the tabular output was printed on an IBM 407, Model E8. Appended to the introduction is a one-page Fortran listing of the program used in the initial calculation, which extended to 23S. This program was subsequently modified to permit the handling of 100S products. The authors express the belief that their results were probably correct to at least 90S before reduction to 50S in the final printout.

Reference is made in the introduction to earlier, closely related tables by Reitwiesner [1], Salzer [2], and Reid & Montpetit [3]. To this list there should be added the tables of Giannesini & Rouits [4]. These tables are all of much lower precision than the one under review.

It seems appropriate to this reviewer to mention here the existence of extensive manuscript tables [5] of exact factorials by these same authors.

J. W. W.

1. G. W. Reitwiesner, *A Table of Factorial Numbers and their Reciprocals from 1! through 1000! to 20 Significant Digits*, Ballistic Research Laboratories, Technical Note No. 381, Aberdeen Proving Ground, Maryland, 1951. (*MTAC*, v. 6, 1952, p. 32, RMT **955**.)

2. H. E. Salzer, *Tables of n! and* $\Gamma(n + 1/2)$ *for the First Thousand Values of n*, National Bureau of Standards, AMS 16, Washington, D. C., 1951. (*MTAC*, v. 6, 1952, p. 33, RMT **957**.)

3. J. B. Reid & G. Montpetit, *Table of Factorials 0! to 9999!*, Publication 1039, National Academy of Sciences—National Research Council, Washington, D. C., 1962. (*Math. Comp.*, v. 17, 1963, p. 459, RMT **67**.)

4. F. Giannesini & J. P. Rouits, *Tables des coefficients du binôme et des factorielles*, Dunod, Paris, 1963. (*Math. Comp.*, v. 18, 1964, p. 326, RMT **40**.)

5. M. Lal, *Exact Values of Factorials 200! to 550!*; and M. Lal & W. Russell, *Exact Values of Factorials 500! to 1000!*, Department of Mathematics, Memorial University of Newfoundland, St. John's, Newfoundland; the first dated August 1967, the second undated. (*Math. Comp.*, v. 22, 1968, pp. 686–687, UMT **67, 68**.)

86[7, 9].—M. Lal & W. F. Lunnon, *Expansion of* $\sqrt{2}$ *to 100,000 Decimals*, University of Manchester, Manchester, England, December 10, 1967. Computer output deposited in the UMT file.

Continuing the computation in [1] and [2], the authors have now extended the $\sqrt{2}$ to 100,000D by the use of the Atlas Computer in Manchester. The Newton-