50[7].—C. MOSIER & D. D. SHILLADY, *A Fast, Accurate Approximation for $F_0(z)$ Occurring in Gaussian Lobe Basis Electronic Calculations*, Chemistry Department, Virginia Commonwealth University, Richmond, Virginia. Ms. of 3 typewritten pp. and 2 computer sheets deposited in the UMT file.

The mathematical function referred to in the title is defined by the definite integral $F_0(z) = \int_0^1 \exp(-zu^2)\,du$, which is expressible in terms of the error function by the relation $F_0(z) = \frac{1}{2}(\pi/z)^{1/2}\,\mathrm{Erf}(z^{1/2})$, as the authors note.

Specifically, the function $F_0(z)$ is herein approximated for positive z not exceeding 22.5 by a quartic polynomial in $z - s_i$, where the interval i and the corresponding shift s_i are calculated from a given value of z by simple formulas presented in the explanatory text. An accompanying table consists of 16S decimal values (in floating-point form) of the coefficients of this approximating polynomial for $i = 1(1)119$.

The authors claim that the error in their approximation is everywhere less than $4 \cdot 10^{-12}$. Moreover, tests performed by the authors on an IBM 360/50 system have revealed their algorithm to be faster than those based on comparable approximations cited in the literature.

J. W. W.

51[7].—ROBERT PIESSENS & MARIA BRANDERS, *Chebyshev Polynomial Expansions of the Riemann Zeta Function*, 3 pages of tables and 2 pages of explanatory text, reproduced on the microfiche card attached to this issue.

Herein are six 23D tables of the coefficients of the respective expansions of $x\zeta(x+1)$ and $\zeta(x + k)$ for $k = 2(1)5, 8$ in terms of the shifted Chebyshev polynomials $T_n^*(x)$, for $0 \leqq x \leqq 1$.

These tables were calculated on an IBM 1620 at the Computing Centre of the University of Leuven, and each table was checked by calculating $\zeta(x)$ therefrom for several values of x and then comparing the results with corresponding entries in the tables of McLellan [1].

Coefficients of the Chebyshev expansion of $x(\zeta + 1)$ have been published to 20D by Luke [2]; however, several entries are incorrect beyond 16D, as noted by the present authors. As a further check on Table 1 in the set under review, this reviewer has successfully compared it with a similar, unpublished 40D table of Thacher [3].

J. W. W.

1. ALDEN MCLELLAN IV, *Tables of the Riemann Zeta Function and Related Functions*, Desert Research Institute, University of Nevada, Reno, Nevada, 1968. (See *Math. Comp.*, v. 22, 1968, pp. 687–688, RMT **69**.)
2. YUDELL L. LUKE, *The Special Functions and Their Approximations*, v. II, Academic Press, New York and London, 1969.
3. H. C. THACHER, JR., *On Expansions of the Riemann Zeta Function.*

52[7].—GORO SHIMURA, *Introduction to the Arithmetic Theory of Automorphic Functions*, Princeton Univ. Press, Princeton, N.J., 1971, xiv + 267 pp., 24 cm. Price $10.00.

The present book is an advanced work on some of the most fascinating chapters