REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

34[D, E, L, S, X].—Nelson A. Logan, *General Research in Diffraction Theory*, Volumes I and II, Missiles and Space Division, Lockheed Aircraft Corp., Sunnyvale, California. Reports LMSD-288087 and LMSD-288088, December 1959, xxiii + 345 p. and xviii + 268 p., 28 cm. Deposited in UMT File.

Volume I consists of a study of the theory and applications of a class of integrals defined by

$$A_m{}^n(\xi) = \sum_{s=1}^{\infty} \alpha_s{}^n [Ai'(-\alpha_s)]^{-m} e^{-(\sqrt{3}-i)\alpha_s \xi/2},$$

$$B_m{}^n(\xi) = \sum_{s=1}^{\infty} \beta_s{}^{n-1} [Ai(-\beta_s)]^{-m} e^{-(\sqrt{3}-i)\beta_s \xi/2}$$

where α_s, β_s denote the roots defined by $Ai(-\alpha_s) = 0$, $Ai'(-\beta_s) = 0$, and $Ai'(-\alpha_s)$, $Ai(-\beta_s)$ are the turning values of the Airy integral. This representation is useful only for $\xi > 0$. Alternative representations useful for $\xi \to 0$ are developed for the case $A_0{}^n$ and $B_0{}^n$. For $m = 1$ the functions are entire functions of ξ, and tables are given for the coefficients of the Taylor series of $A_1{}^n$ and $B_1{}^n$. These coefficients are evaluated by using the Euler summation scheme to sum the divergent series obtained by setting $\xi = 0$, $m = 1$ in the above representations. When $m = 2$ it is necessary to extract some terms which are singular at $\xi = 0$. The remaining parts of $A_2{}^n$ and $B_2{}^n$ are shown to be entire functions. Tables for the coefficients in the Taylor series for these non-singular parts are found by using the Euler-Maclaurin summation formula to sum the divergent series which are obtained by setting $\xi = 0$, $m = 2$ in the above representations. For $\xi \to -\infty$, asymptotic expansions are obtained for the cases $m = 1$ and $m = 2$. Tables are given for the coefficients in these expansions.

Volume II consists of a set of 26 tables and 17 figures that provide a supplement to the theoretical analysis contained in Volume I. Tables A, B, and C contain special tables of exponential and trigonometric functions which will facilitate computation with residue series and asymptotic expansions of the diffraction integrals. The functions tabulated in the remaining tables can be used to study diffraction effects when (a) source and receiver are on the surface, (b) source (or receiver) is on the surface and the receiver (or source) is at a great distance, and (c) both source and receiver are at a great distance.

Author's Summary

35[F].—R. Kortum & G. McNiel, *A Table of Quadratic Residues for all Primes less than 2350*, LMSD 703111, October 1960, Lockheed Missiles and Space Division, Sunnyvale, California, iii + 3 + 378 unnumbered pages, 28 cm.

This large report, bound with a plastic spiral, lists all 187,255 quadratic residues of the 347 primes from 3 to 2347. The tables were computed on an IBM 7090 in about ten minutes. Presumably most of this time was spent in binary-decimal conversion and in writing on tape. The original printing was done on a high-speed, wire