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1. K. P. Spies & J. R. Wait, *Mode Calculations for VLF Propagation in the Earth-Ionosphere Waveguide*, NBS Technical Note No. 114, U. S. Government Printing Office, Washington, D. C., 1961.

2. J. C. P. Miller, *The Airy Integral, giving Tables of Solutions of the Differential Equation* $y'' = xy$, British Association Mathematical Tables, Pt.-Vol. B, Cambridge University Press, Cambridge, 1946.

123[L].—M. I. Žhurina & L. N. Karmazina, *Tables of the Legendre Functions, Part* 2, Pergamon Press Mathematical Tables Series, Volume 38, The Macmillan Company, New York, 1965, xiii + 409 pp., 26 cm. Price $16.75.

This volume is an English translation by Prasenjit Basu of the Russian book entitled *Tablitsy funktsii Lezhandra* $P_{-1/2+i\tau}(x)$, Tom II published by Akad. Nauk SSSR, Moscow in 1962, and reviewed in this journal (v. 18, 1964, pp. 521–522, RMT 79).

The Russian edition of Part 1, which was reviewed herein (v. 16, 1962, pp. 253–254, RMT 22), has also been published in an English translation by Pergamon Press as Volume 22 of their Mathematical Tables Series.

J. W. W.

124[L].—M. Atoji & F. L. Clark, *Tables of the Generalized Riemann Zeta Functions*, ms. of 120 computer sheets deposited in UMT File.

These manuscript tables consist of 7D approximations to $\zeta_N(s, a)$ for $s = 1, 2$, $a = 0.01(0.01)1$, $N = 1(1)200$, and thus form an elaboration of the 4D published tables by the same authors, described in the following review.

J. W. W.

125[L, S].—M. Atoji & F. L. Clark, *The Generalized Riemann Zeta Functions and their Applications in the Calculations of Neutron Cross Sections*, Report ANL-6970, Argonne National Laboratory, Argonne, Illinois, December 1964, 55 pp., 28 cm. Available from the Clearinghouse for Federal Scientific and Technical Information, National Bureau of Standards, U. S. Department of Commerce, Springfield, Virginia. Price $3.00.

The generalized incomplete Riemann zeta function is defined by the equation

$$\zeta_N(s, a) = \sum_{n=0}^{N} (a + n)^{-s}$$

for $s > 1$, where n and N are nonnegative integers.

This report contains two tables. Table 1 gives 4D values of $\zeta_N^1(1, a) = \zeta_N(1, a) - a^{-1}$ and $\zeta_N^1(2, a) = \zeta_N(2, a) - a^{-2}$ for $a = 0.01(0.01)0.5(0.02)1$, $N = 1(1)100$ and $N = 1(1)50$, respectively. Table 2 gives 4D values of

$$\zeta(2, a) = \sum_{n=0}^{\infty} (a + n)^{-2}$$

for $a = 0.01(0.0005)0.5(0.001)1$. The FORTRAN programs used in performing the underlying calculations on a CDC 3600 are given as prefaces to the tables.

The authors include a preliminary section describing the formulas used in the calculations. The body of the report concludes with a discussion of applications of the tables, particularly in the evaluation of the unmeasured resonance-level contribution in calculations of neutron cross sections and amplitudes.

The appended list of 16 references should be augmented by a citation of the pertinent paper of E. R. Hansen and M. L. Patrick [1].

J. W. W.

1. E. R. Hansen & M. L. Patrick, "Some relations and values for the generalized Riemann zeta function," *Math. Comp.*, v. 16, 1962, pp. 265–274.

126[L, M].—F. M. Arscott, *Periodic Differential Equations*, The Macmillan Company, New York, 1964, x + 283 pp., 22 cm. Price $9.50.

This volume deals with the group of special functions, namely, Mathieu functions, Lamé functions, spheroidal and ellipsoidal wave functions, which have the common property that they satisfy a second-order linear differential equation with periodic coefficients. The functions are of considerable importance in applied problems. The book is intended for both the pure mathematician who is interested in the theory of these functions and for the applied worker who desires to use them. The volume is suitable as a text on the graduate level, and each chapter gives examples, along with appropriate references.

The book assumes added stature because it is well written and because there are few books devoted entirely to the subject. The most recent books which deal to some extent with these topics are those by J. Meixner and F. W. Schäfke (*Mathieusche Funktionen und Sphäroidfunktionen*, Springer, 1954), by A. Erdélyi, W. Magnus, F. Oberhettinger, and F. G. Tricomi (*Higher Transcendental Functions*, Vol. III, Chapters XV and XVI, McGraw-Hill, New York, 1955), and by C. Flammer (*Spheroidal Wave Functions*, Stanford Univ. Press, Stanford, Calif., 1957).

In the last decade, new material has appeared in journals, and the present volume serves to codify much of this information.

Chapter 1 shows how the differential equations satisfied by the functions noted arise from the separation of the wave equation in various coordinate systems. Let us write Mathieu's equation as $w'' + (a - 2q \cos 2z)w = 0$. Chapter 2 studies properties of the solution of this equation which can be deduced from the differential equation itself without recourse to actual construction of the solutions. Chapters 3–5 deal with solutions of Mathieu's equation and their properties, when q is given and a is selected, so that the solution is periodic. Analysis of the solutions when both q and a are given is the subject of Chapter 6. Hill's generalization of Mathieu's equation is taken up in Chapter 7. Chapters 8, 9, and 10 are concerned with the spheroidal wave equation, Lamé's equation, and the ellipsoidal wave equation, respectively.

There are three appendices giving some properties of Bessel functions, Legendre functions, etc., which are needed for the development in the volume proper. Also included is a section summarizing results obtained or published while the book was in press.

Y. L. L.