There is a section on scaling, a section on debugging, a section on special routines, a section on a Monte Carlo device for determining the square root of r, and a section on a Monte Carlo device for the cosine of an equi-distributed angle. The random number routine is the familiar routine of selecting the middle digits of the square of a quasi-random number; it is frowned on by many random-number specialists. The logarithm routine presented depends on the power series expansion of the log, with restriction of the size of the arguments to assure fast convergence. An exponential routine is given as a quadratic approximation with scaling of the argument. A cosine routine is given through the use of a trigonometric identity and a truncated power series for the sine of a related angle. There is no detailed discussion of the accuracy of any of these routines.

The exposition in this book is far from perfect, and the editors have included the following statement: "It is realized that many workers in this fast moving field cannot devote the necessary time to producing a finished monograph. Because of their concern for speedy publication, the Editors will not expect the contributions to be of a polished literary standard if the originality of the ideas they contain warrant immediate and wide dissemination." The reviewer feels that the present book in its present form is more than justified on the basis of this philosophy, and he recommends the book as a most valuable contribution to numerical analysis.

The chapter headings follow:

Chapter I. Basic Principles
Chapter II. The Source Routine
Chapter III. The Main Free Path and Transmission
Chapter IV. The Collision or Escape Routine
Chapter V. The Collision Routine for Neutrons
Chapter VI. Photon Collisions
Chapter VII. Direction Parameters After Collision
Chapter VIII. Terminal Classification
Chapter IX. Remarks on Computation
Chapter X. Statistical Considerations
Appendix. Summary of Certain Problems Run on MANIAC I.

C. B. T.

63[L].—CENTRE NATIONAL D'ÉTUDES DES TÉLÉCOMMUNICATIONS, *Tables numériques des fonctions associées de Legendre. Fonctions associées de première espece*, P_n^m (cos θ), deuxième fascicule, Éditions de la Revue Optique, Paris, 1959, xii + 640 p., 31 cm. Price 5600 F.

The first volume of these Tables was reviewed in *MTAC*, v. 7, p. 178. The present second volume was designed to extend the range of tabulation from $\theta = 90°$ to $\theta = 180°$. In the process of constructing these tables, however, it was found desirable to increase the number of decimals and to add second and fourth central differences, thus facilitating interpolation. For this reason, the range up to $\theta = 90°$, already covered in the first volume, is included (in an improved form) in the volume under review. Perhaps because of the increase in size consequent upon increased numbers of decimals and added differences, tabulation has been restricted to $m =$

0, 1, 2 (whereas vol. 1 has $m = 0(1)5$). Otherwise, the range and intervals of this volume match those of the first.

Since $P_n^m(\cos\theta)$ has a singularity at $\theta = 180°$ (except when n is an integer), an auxiliary function $T_n^m(\cos\theta)$ is introduced by the relation

$$P_n^m(\cos\theta) = (\csc^m\theta)T_n^m(\cos\theta) + (-1)^m(A_n \log_{10}\left(\cot\frac{\theta}{2}\right) P_n^m(\cos(180° - \theta))$$

where $A_n = (2\sin n\pi)/(\pi \log_{10} e)$. The function $T_n^m(\cos\theta)$ is tabulated for $135° \leqq \theta \leqq 180°$. The use of these auxiliary functions is facilitated by the provision of tables of A_n, $\csc\theta$, $\csc^2\theta$, and $\log_{10}\cot(\theta/2)$.

The introductory material contains formulas, an account of the tables, hints for interpolation, and level curves of $P_n(\cos\theta)$, $P_n^1(\cos\theta)$, and $P_n^2(\cos\theta)$.

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64[L].—Louis Robin, *Fonctions sphérique de Legendre et fonctions sphéroidales*, tome 3, Gauthier-Villars, Paris, 1959, viii + 289 p., 24 cm. Price 5500 F.

The first two volumes of this work were reviewed in *MTAC*, v. 13, p. 325f. The present, final, volume contains chapters VII to X.

Chapter VII is devoted to the addition theorems of Legendre functions. Both Legendre functions of the first and second kind are included, and two cases are distinguished according as the composite argument lies in the complex plane cut from $-\infty$ to $+1$ or else on the cut between -1 and 1. Addition theorems are also developed for the associated Legendre functions of the first kind.

Chapter VIII is devoted to zeros of Legendre functions. First the zeros of $P_n^m(\mu)$ as functions of μ, for fixed real m and n are discussed, then the zeros of $P^m_{-\frac{1}{2}+ip}(\mu)$ when m is an integer and p a fixed real number, and then the zeros of $Q_n^m(\mu)$. This chapter contains also a discussion of zeros of Legendre functions considered as functions of n, m and μ being fixed. (These zeros are of importance in certain boundary-value problems.)

In Chapter IX, applications of Legendre functions are given to partial differential equation problems relating to surfaces of revolution other than spheres. Prolate and oblate spheroidal harmonics, toroidal harmonics, and conal harmonics are discussed.

Chapter X contains the discussion of some functions related to Bessel functions, namely, Gegenbauer polynomials and functions, and spheroidal wave functions.

Appendix I summarizes relevant information on "spherical Bessel functions", and Appendix II lists numerical tables of Legendre functions and tables connected with these functions.

The third volume maintains the high standards set by the first two volumes, and the author must be congratulated upon the completion of this valuable work.

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