

BOOK REVIEWS

Nomograms of complex hyperbolic functions. By Jørgen Rybner. Jul. Gjellerups Forlag, Copenhagen, 1955. 39 pp. \$6.40.

This is a very carefully prepared group of alignment charts and formulas which should be extremely useful in any calculations involving complex hyperbolic functions. Included are formulas for circular and hyperbolic functions and for four terminal networks and transmission lines. Nomograms for reflection loss and phase shift and for insertion loss and phase shift are among the many alignment charts.

ROHN TRUETT

The theory of games and linear programming. By S. Vajda. Methuen & Co., Ltd., London, John Wiley & Sons, Inc., New York, 1956. 106 pp. \$1.75.

The contents of the little volume are roughly indicated by the following chapter headings: An outline of the theory of games—Graphical representation—Algebra of the theory of games—An outline of linear programming—Graphical representation of linear programming (1)—Algebra of the simplex method—Degeneracy and other complications—Duality—The solution of games—Graphical representation of linear programming (2)—The method of leading variables. The presentation is concise but easy to follow. In the field of linear programming, in particular, the book should be instrumental in dispersing the aura of mystery and complexity that this technique has acquired among many of its potential users because most expository material available so far either restricts itself to giving mere operating instructions or presupposes far too much mathematical background.

W. PRAGER

Frequency response. Edited by R. Oldenburger. The Macmillan Company, New York, 1956. xii + 372 pp. \$7.50.

In December 1953 a Frequency-Response Symposium was held in New York as part of the Annual Meeting of the ASME. The present volume contains primarily papers presented at this Symposium. To round out the material, reprints of several important papers on frequency-response have been added; some of these were originally published in Russian and had so far not been available in English. The space available for this review does not permit listing of the individual contributions, which are grouped as follows, the parentheses indicating the numbers of papers in each group: Fundamentals (6)—Frequency Response Aids (2)—Servo, Airplane and Power System Applications (4)—Process Control (4)—Transient Response (3)—Optimum Controls (2)—Nonlinear Techniques (4)—Sampling Controls (2)—Statistical Methods (1). The volume is dedicated to Dr. H. Nyquist, whose portrait appears on the frontispiece.

W. PRAGER

Foundations of quantum theory. By Alfred Landé. Yale University Press, New Haven, and Geoffrey Cumberledge, Oxford University Press, London, 1955. viii + 106 pp. \$4.00.

“As a whole the book is not an introduction for beginners but rather a postscript to more traditional books on quantum mechanics” (from the author’s preface). The author attempts to deduce the principles of quantum mechanics as a logical consequence of continuity of cause and effect; in particular, the Gibbs paradox of diffusion theory is removed by defining a “fractional degree of likeness” between states. This new approach is far removed from the traditional approach to the subject and in some places perhaps even is in conflict with accepted ideas. Although the book is certainly thought-provoking and novel, it is not likely to have much impact on the customary methods of teaching quantum mechanics until all possible aspects have been more thoroughly discussed.

GORDON NEWELL

(Continued on p. 154)

BOOK REVIEWS

(Continued from p. 148)

The structural interdependence of the economy. Proceedings of an international conference on input-output analysis, Varenna, 27 June–10 July, 1954. Edited by Tibor Barna. John Wiley & Sons, New York—A. Giuffrè, Milano, 1956. ix + 429 pp. \$7.50.

In addition to a prefatory note by W. Leontief, a foreword by R. Tremelloni, and a note on "The changed tasks of a faculty of economics" by G. Bruguier-Pacini, the volume contains twenty-one papers grouped under the following headings: Methods of analysis—Social accounting aspects—National experiences—Special applications. Since space limitations prevent a listing of all contributions, the following partial list contains only those likely to be of interest to applied mathematicians: Input-output computations, by W. Duane Evans—Dynamic programming, by G. Morton—Industry-wide, multi-industry and economy-wide process analysis, by H. Markowitz—Input-output and the social accounts, by R. Stone—Aggregation problems in input-output models, by E. Malinvaud—On changes in intersectoral terms of trade, by P. N. Rasmussen—Linear expenditure systems and demand analysis: an application to the pattern of British demand, by R. Stone.

W. PRAGER

Operations research for management. Volume II: Case histories, methods, information handling. Edited by J. F. McCloskey and J. M. Copping. With an Introduction by the Earl of Halsbury. The Johns Hopkins Press, Baltimore, 1956. xv + 563 pp. \$8.00.

The reception accorded "Operations research for management" (see review in this Quarterly 14 (1957) . . .) encouraged the editors to collect a number of papers presented at the Johns Hopkins Informal Seminar on Operations Research during 1953-54 and 1954-55 in the present volume. While a considerable number of these papers were also published in such journals as the Operational Research Quarterly or The Journal of the Operations Research Society of America, many readers will doubtless be glad to have them collected in a handy volume. In addition to an introduction ("From Plato to linear programming") by the Earl of Halsbury, there are twenty-eight papers, 13 on case histories, 9 on methods, and 6 on information handling. Papers not previously published deal with the following subjects: Operational research in the British coal industry, by H. P. Privet—Operational research in underground mining, by S. L. Cook—Utilization of training aircraft, by M. Astrachan—Design of experiments in operations research, by W. J. Youden—Operational organization, by D. B. Hertz and G. J. Feeney—Bounding the solutions of practical queueing problems by analytic methods, by G. D. Camp—Failure of complex equipment, by G. D. Shellard—Operational gaming in industry, by W. E. Cushen—A Monte Carlo model for military analysis, by R. E. Zimmerman—How is planning possible, by C. West Churchman, and some of the six papers on information handling which were integrated by L. S. Christie into a coherent account of work performed at M.I.T.

W. PRAGER

The principles of mechanics. By Heinrich Hertz. Translated from the German by D. E. Jones and J. T. Walley. XLVI + 274 pp. Dover Publications, New York, 1956. 271 pp. \$3.50.

Except for the addition of an introductory essay on Heinrich Hertz's philosophy of science (20 pp.) by Robert S. Cohen, this is a reprint of the 1899 edition of this translation.

(Continued on p. 168)

BOOK REVIEWS

(Continued from p. 154)

Surveys in mechanics. The G. I. Taylor 70th Anniversary Volume. Edited by G. K. Batchelor and R. M. Davies. Cambridge University Press, New York, 1956. vii + 475 pp. \$9.50.

This book has been written to commemorate the 70th birthday of Sir Geoffrey Taylor. It contains a biographical note by R. V. Southwell and ten articles in the form of surveys of the present position in some of the fields of mechanics in which Sir Geoffrey has been active and to which he has made important contributions. 1. "The Mechanics of Quasi-Static Plastic Deformation in Metals" by R. Hill; the author concentrates on the phase of the development of the subject from 1950 to the time of writing and emphasizes "The Principle of Maximum Plastic Work and its Applications". 2. "Dislocations in Crystalline Solids" by N. F. Mott; a general survey of the achievements of the study of dislocations. 3. "Stress Waves in Solids" by R. M. Davies; a review of experimental techniques and accounts of dispersion of elastic waves in a circular cylinder and of visco-elastic and plastic waves. 4. "Rotating Fluids" by H. B. Squire; a review of the major theoretical developments of the motion of an ideal fluid which is assumed to rotate as a solid body in its undisturbed state. 5. "The Mechanics of Drops and Bubbles" by W. R. Lane and H. L. Green; the production of liquid drops and their motion in a gaseous medium and the production of gas bubbles and their motion in a liquid medium. 6. "Wave Generation by Wind" by F. Ursell; a critical discussion of certain aspects of the subject: instability calculations, semi-empirical theories of wave generation and wave forecasting and sea roughness. 7. "Viscosity Effects in Sound Waves of Finite Amplitude" by M. J. Lighthill; an account of the influence of thermodynamically irreversible processes (viscosity, heat conduction, relaxation) and of nonlinearity effects on sound propagation with emphasis on the conflict of these two influences. 8. "Turbulent Diffusion" by G. K. Batchelor and A. A. Townsend; a review of the present state of basic knowledge of turbulent diffusion with emphasis on the essential ideas rather than the empirical working rules. 9. "Atmospheric Turbulence" by T. H. Ellison; a discussion of the empirical knowledge of turbulent air flow over the ground. 10. "The Mechanics of Sailing Ships and Yachts" by K. S. M. Davidson; an account of the development of the principal features of yachts and high speed sailing craft.

G. MORGAN

Journal of fluid mechanics. Editor: G. K. Batchelor. Assistant Editors: T. B. Benjamin, I. Proudman. Associate Editors: G. F. Carrier, W. C. Griffith, M. J. Lighthill. Taylor & Francis, Ltd., London, and Academic Press Inc., New York. Subscription price \$16.50 per volume of approximately 600 pp.

The new journal is to be devoted to theoretical and experimental investigations of all aspects of mechanics of fluids, and is to be issued in six parts per volume of approximately 600 pages. The first part (May 1956) contains papers by M. D. Van Dyke, P. G. Saffman and J. S. Turner, M. J. Lighthill, L. C. Woods, V. Blackman, J. Crease, M. B. Glanert, and N. Rott.

Integraltafeln zur Quantenchemie. By H. Preuss. Springer-Verlag, Berlin, Göttingen, Heidelberg, 1956. 162 pp. \$9.35.

This book is concerned with the calculation of wave functions and allied quantities arising in the quantum mechanics of chemical binding and molecular physics. The first part, of three parts, is concerned with the formulation of problems and the methods of solution. The second part of the book is concerned with methods of handling the integrals involved and the third part contains over 100 pages of tables of functions used in evaluating the integrals of parts I and II. This is a handbook for the person doing serious calculation in quantum chemistry.

R. TRUPELL

(Continued on p. 216)

BOOK REVIEWS

(Continued from p. 168)

Infinite sequences and series. By Konrad Knopp. Translated by Frederick Bagemihl. Dover Publications, Inc., New York, 1956. 186 pp. \$3.50.

In this little volume, about one fourth as long as the author's "Theory and Application of Infinite Series," Knopp presents an introduction to the theory of infinite series. With consummate skill he leads the reader through the elementary notions and then well into the more subtle developments. The chapter headings are as follows: Introduction and prerequisites, Sequences and series, The main tests for infinite series—operating with convergent series, Power series, Development of the theory of convergence, Expansion of the elementary functions, Numerical and closed evaluation of series. With a few exceptions, the results presented are included in the treatise mentioned above. In particular, the following are new: Jehle's extension (1950) of the Weierstrass convergence test (concerning the asymptotic form of a_{n+1}/a_n for a series $\sum a_n$); Landau's proof (1920) of Hardy's theorem on multiplication of series.

WILFRED KAPLAN

Selecta Hermann Weyl. Published on the occasion of his seventieth birthday by the Federal Institute of Technology in Zürich and the Institute for Advanced Study in Princeton. Birkhäuser Verlag, Basel and Stuttgart, 1956. 592 pp. \$11.45.

To celebrate the seventieth birthday of Hermann Weyl, on the ninth of November 1955, the Federal Institute of Technology in Zürich and the Institute for Advanced Study in Princeton together published this commemorative volume. These two institutions, to whom Hermann Weyl dedicated the greatest part of his scientific activity, wished to express their appreciation of his work in research and teaching and their admiration of his mathematical genius.

This collection of articles, written during the period from 1910 to 1952, is a cross-section of Weyl's mathematical work, and reflects the advances in almost all fields of mathematics during this interval of time. The text of the papers included in this collection has been essentially unaltered, save for minor changes in the style of the original bibliographical references and the correction of obvious misprints. Many of the papers reappear here with valuable annotations and cross references (dated 1955) by Hermann Weyl himself. The first paper is the well known 1910 *Mathematische Annalen* article dealing with "singular" ordinary differential equations $d/ds(p(s)du/ds) - q(s)u(s) = 0$, in which Weyl introduced his "limit point" and "limit circle" criteria. The second paper is the 1915 *Rendiconti di Palermo* article on the distribution of the eigenvalues of an arbitrary elastic body. This paper contains the author's only major alteration of the original text, in connection with the proof of the existence of a solution of a certain non-homogeneous integral equation whose corresponding homogeneous integral equation may possess non-trivial solutions. The last paper in the book, *Mathematische Zeitschrift* 1952, deals with boundary value problems of the same nature (but in a more general setting) as those considered in the second paper just mentioned. There are nineteen papers in all, arranged chronologically. Special mention will be made here only of the 1916 *Mathematische Annalen* paper containing Weyl's generalization of Kronecker's approximation theorem; the 1916 *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich* paper on the determination of a closed convex surface by its line element; the 1919 *Annalen der Physik* paper on the propagation of electromagnetic waves; the 1927 *Mathematische Annalen* paper on integral equations and almost periodic functions; the 1935 *American Journal of Mathematics* paper (with R. Brauer) on spinors in n dimensions; the 1940 *Duke Mathematical Journal* paper on the method of orthogonal projection in potential theory; and the 1942 *Annals of Mathematics* paper on the differential equations of the simplest boundary layer problems. This incomplete list of the contents is meant to convey an idea of the rich source of inspiration embodied in this single volume. The book concludes with a complete list of the publications of Hermann Weyl.

The appearance of a volume of this kind is always a welcome event in the scientific world. It is to be hoped that this beautifully appointed Birkhäuser Verlag volume is but a harbinger of the publication of the collected works of Hermann Weyl.

J. B. DIAZ