QUARTERLY
OF
APPLIED MATHEMATICS

This periodical is published quarterly under the sponsorship of Brown University, Providence, R.I. For its support, an operational fund is being set up to which industrial organizations may contribute. To date, contributions of the following industrial companies are gratefully acknowledged:

Bell Telephone Laboratories, Inc.; New York, N. Y.,
The Bristol Company; Waterbury, Conn.,
Curtiss Wright Corporation; Airplane Division; Buffalo, N. Y.,
Eastman Kodak Company; Rochester, N. Y.,
General Electric Company; Schenectady, N. Y.,
Gulf Research and Development Company; Pittsburgh, Pa.,
Leeds & Northrup Company; Philadelphia, Pa.,
Pratt & Whitney, Division Niles-Bement-Pond Company; West Hartford, Conn.,
Republic Aviation Corporation; Farmingdale, Long Island, N. Y.,
United Aircraft Corporation; East Hartford, Conn.,
Westinghouse Electric and Manufacturing Company; Pittsburgh, Pa.

The Quarterly prints original papers in applied mathematics which have an intimate connection with application in industry or practical science. It is expected that each paper will be of a high scientific standard; that the presentation will be of such character that the paper can be easily read by those to whom it would be of interest; and that the mathematical argument, judged by the standard of the field of application, will be of an advanced character.

Manuscripts submitted for publication in the Quarterly of Applied Mathematics should be sent to the Managing Editor, Professor W. Prager, Quarterly of Applied Mathematics, Brown University, Providence 12, R. I., either directly or through any one of the Editors or Collaborators. In accordance with their general policy, the Editors welcome particularly contributions which will be of interest both to mathematicians and to engineers. Authors will receive galley proofs only. Seventy-five reprints without covers will be furnished free; additional reprints and covers will be supplied at cost.

The subscription price for the Quarterly is $6.00 per volume (April-January), single copies $2.00. Subscriptions and orders for single copies may be addressed to: Quarterly of Applied Mathematics, Brown University, Providence 12, R.I., or to 450 Ahnaip St., Menasha, Wisconsin.
Van Nostrand Books

New Second Edition

MATHEMATICS OF STATISTICS
By JOHN F. KENNEY
Assistant Professor of Mathematics,
University of Wisconsin, Milwaukee, Wisc.

This elementary text furnishes the student with a sound basic course in the mathematical methods of statistics. The new second edition deals with such matters as frequency distributions, graphical representation, averages, moments, measures of dispersion, types of distributions, curve fitting and correlation theory. With this background, the student is prepared for the more specialized applications in economics, psychology, education and biology.

260 pages 6 x 9 Cloth Illustrated $3.75
Published January, 1947

ANALYTICAL GEOMETRY
By PAUL P. BOYD and HAROLD H. DOWNING
Department of Mathematics and Astronomy, University of Kentucky

This text is designed for a one-semester or one-quarter course in analytical geometry. The book is informal in style and easy to read, yet it provides the student with an adequate preparation for the calculus. The material includes important formulas from algebra and trigonometry; an introduction to rectangular and polar coordinates; a special consideration of the straight line, circle and conic sections; parametric equations; the plane and straight line in space; quadric surfaces; and the construction of surfaces from equations in rectangular, spherical, cylindrical and polar coordinates.

180 pages 5½ x 8¼ Cloth Illustrated $2.50
Published January, 1947

DIFFERENTIAL AND INTEGRAL CALCULUS
By PROFESSOR JAMES N. MICHIE
Texas Technological College

This text contains an abundance of well chosen and varied problems in addition to numerous illustrative examples. The drill problems are adequate in number to afford sufficient practice involving all the principles. Another feature is the inclusion of a summary of formulas in bold face type immediately preceding problems or exercises in which the forms are used. For the student there are reference formulas from more elementary courses, tables of the type used in testing for maxima and minima, a table of integrals and a short table of Naperian logarithms. It is well suited to the sophomore level, particularly for students of engineering.

To be published in May 6 x 9 Cloth Illustrated

Write for examination copies to:
D. VAN NOSTRAND COMPANY, INC. 250 Fourth Ave., New York 3, N.Y.
CONTENTS

J. J. STOKER: Surface waves in water of variable depth ........ 1
E. REISSNER: On bending of elastic plates .................. 55
S. BERGMAN: Punch-card machine methods applied to the solution of the torsion problem .......... 69
A. E. HEINS and J. F. CARLSON: The reflection of an electromagnetic plane wave by an infinite set of plates, II ........ 82

NOTES:

W. R. Sears: A second note on compressible flow about bodies of revolution ........ 89
S. Sherman: A note on stability calculations and time lag .......... 92
A. Weinstein: The center of shear and the center of twist .......... 97
O. L. Bowie: Elastic stress due to a semi-infinite band of hydrostatic pressure acting over a cylindrical hole in an infinite solid .......... 100
G. F. Carrier: On a conformal mapping technique ........ 101
W. D. Hayes: On hypersonic similitude .......... 105
S. A. Schaaf: On the superposition of a heat source and contact resistance .......... 107

BOOK REVIEWS .......... 112

Important McGraw-Hill Books

Elements of Nomography
By R. D. DOUGLASS and DOUGLAS P. ADAMS, Massachusetts Institute of Technology. 229 pages, $3.50
Deals with the study, understanding, design, creation, and practical uses of the alignment diagram, of which the book presents seven elementary types.

The Theory of Functions of Real Variables
By LAWRENCE M. GRAVES, The University of Chicago. 300 pages, $4.00
A compact and well-integrated presentation of the theorems and methods which are fundamental for research in analysis.

Johnson—Mathematical and Physical Principles of Engineering Analysis. 346 pages, $3.50
Pipes—Applied Mathematics for Engineers and Physicists. 621 pages, $5.50
Sokolnikoff—Mathematical Theory of Elasticity. 373 pages, $4.50
Franklin—Methods of Advanced Calculus. 486 pages, $5.00

Send for copies on approval

McGRAW-HILL BOOK COMPANY, Inc.
330 West 42nd Street New York 18, N. Y.
BOOK REVIEWS


The mathematical techniques which a beginning graduate student in Engineering should master are outlined and exemplified in this book. The material on such subjects as Laplace transforms, matrices, finite differences, and conformal mapping, is quite complete and occupies a large percentage of the portion of the book which deals with specific problems. An adequate section on special functions is given and the classical equations of mathematical physics are discussed. There appear to be, in fact, only two unfortunate omissions. The calculus of variations is almost entirely neglected and the absence of Sturm-Liouville theory (and hence a discussion of the special functions arising from the wave equation) makes the book definitely less interesting to physicists than to engineers. It should, however, provide an excellent text for a first graduate course in the techniques of applied mathematics.

G. F. Carrier


This book beautifully fulfills its announced purpose of discussing the fundamental theory of servomechanisms. The author succeeds simultaneously in presenting a clear discussion of servomechanisms and in giving the reader a vivid picture of the philosophy of the control problem.

The body of the book consists of eleven chapters, an appendix, and a bibliography. A foreword written by Dr. Warren Weaver sets the stage for the discussion. For the most part, the author discusses linear systems and accordingly makes efficient use of the concepts developed in studying feed-back amplifiers. This point of view combines operational methods with certain straightforward ideas from the theory of complex variables to describe the performance of control systems.

Starting with a very simple type of control mechanism, the author builds up the phenomenological and theoretical aspects of the problem, giving in the seventh chapter a detailed analysis of a particular system. The remaining four chapters discuss more specialized topics in linear systems. The appendix discusses some aspects of non-linearity and presents a study of a particular on-off servomechanism.

J. A. Krumhansl


The first part of this useful volume contains tables of the values of $A^x$ for $A = 2(1)9$, $x = [0.001(.001)0.01(.01)0.99; 15D]$; $A = 10$, $x = [0.001(.001)1.00; 15D]$; $A = \pi$, $x = (0.001(.001)1.000; 15D]$, and $A = 10^{-P}$ where $P$ is a prime number between 100 and 1000, $x = [0.001(.001)0.01(.01)0.99; 15D]$. The second part contains tables of the values of $x^a$ for $\pm a = 1/4, 1/3, 2/3, 3/4, x = [0(.01)9.99; 15D]$; $\pm a = 1/3, 2/3, x = [0(.01)10; 15D]$ and $a = [0.01(.01)0.99], x = [0(.01)0.99; 7D]$. In the Foreword, F. Bernstein discusses problems the solution of which is facilitated by the use of these tables.

W. Prager