

# Programmers

**Systems Programmers:** Evaluate performance of programming systems and develop technical specifications in the areas of compiler design, control programs and IOCS. This work also involves technical liaison to assure satisfactory performance and adherence to specifications of IBM programming systems. Three to six years' systems programming experience is required.

**Programming Systems Testing:** Develop new techniques for testing systems, evaluating performance and coordinating systems development. Work involves systems generation, editing and related test activity.

**Systems Analysts:** Develop systems and computer programs for manufacturing control, manufacturing support and financial functions. Systems include production control, materials management, industrial engineering, data collection and financial planning and analysis.

**Formula Manipulation Systems:** Develop systems to perform algebraic manipulations of mathematical expressions. Work involves use of PL/I in the development of advanced programming languages, compilers, mathematical techniques and algorithms.

**Advanced Conversational Programming Systems:** Design and implementation of systems which permit more effective interaction between men and machines. Concepts such as Time-Sharing, conversational techniques, input/output, graphics, formula manipulation, PL/I, and microprogramming will be explored in depth.

**Programming Engineering:** Work on problems in the boundary areas between programming and computer design, particularly microprogramming.

**Programming Applications of Linguistics:** Application of linguistics to the solution of problems in programming language development and the creation of practical systems which permit restricted English as input to a computer.

**Qualifications:** B.S. or advanced degree with appropriate experience.

Poughkeepsie is in New York's scenic mid-Hudson Valley, within easy range of the Catskill Mountains and year-round sports activities.

Please write, outlining your qualifications and interests, to: D. Neyer, Dept. 761K, IBM Corporation, Box 390, Poughkeepsie, New York. IBM is an Equal Opportunity Employer.

# IBM.

# THE UNDECIDABLE

Basic Papers on Undecidable Propositions,  
Unsolvable Problems and Computable  
Functions

**GÖDEL · TURING · CHURCH  
KLEENE · ROSSER · POST**

EDITED BY **Martin Davis**

**PARTIAL CONTENTS:** GÖDEL—1934 Princeton lectures (never before published); his 1931 paper, newly translated, *On Formally Undecidable Propositions of the Principia Mathematica . . .*; TURING—*On Computable Numbers, with an Application to the Entscheidungsproblem; Systems of Logic Based on Ordinals*; CHURCH—*An Unsolvable Problem of Elementary Number Theory*; ROSSER—*An Informal Exposition of Proofs of Gödel's Theorem and Church's Theorem*; KLEENE—*General Recursive Functions of Natural Numbers*; POST—*Recursively Enumerable Sets of Positive Integers and Their Decision Problems*.

440 pages, with Index . . . . . \$8.95

Order direct (postage free on prepaid orders), or from your bookseller

**RAVEN PRESS**  
1249 BROADWAY, HEWLETT, N.Y.

## MEMOIRS

Number 54

### Generalizations of a Theorem of Caratheodory

by **John R. Reay**

Caratheodory has shown that if a point is in the convex hull of a set  $X$  in an  $n$ -dimensional linear space, then  $p$  lies in the convex hull of some  $n + 1$  or fewer points of  $X$ . The present Memoir considers various extensions and generalizations of this theorem. The hypothesis may be modified in one or more of the following ways: the point  $p$  may be interior to  $\text{conv } X$  or "well-embedded" in the boundary of  $\text{conv } X$ ; the set  $X$  may have certain connectedness or symmetry conditions; the point  $p$  may be replaced by a finite set of distinct points. In each case the general minimal upper bound is found for the cardinality of a subset of  $X$  whose convex hull similarly contains the given point (or points). These results have been established by means of several theorems found by the author in the theory of positive bases.

52 pages

List Price \$1.50      Member Price \$1.13

Please order from

**AMERICAN MATHEMATICAL SOCIETY**  
P.O. Box 6248, Providence, Rhode Island 02904

## LECTURES IN APPLIED MATHEMATICS

### Perturbation of Spectra in Hilbert Space

by **K. O. Friedrichs**

The first two chapters of this volume deal with the existence and properties of suitable perturbations for operators with discrete spectra and with continuous (or partly discrete and partly continuous) spectra, respectively. The third and last chapter takes up the case of fundamental importance in the quantum theory of fields, namely when the disturbing operator is expressible in terms of "annihilation and creation operators." The treatment is mathematical throughout with frequent reference to the physical significance of the entities involved.

Volume 3 List Price \$7.40

Member Price \$5.55    193 pages

### The General Theory of Quantized Fields

by **R. Jost**

The classical theory of quantized fields is outlined in the introduction; the special mathematical tools of the new theory, consisting chiefly of topological linear spaces with functions for elements, are presented in the first chapter; and in the remaining six chapters the Wightman distributions and functions and the Haag-Ruelle asymptotic theory are used by the author to analyze, and thereby to axiomatize, those concepts which are fundamental to all relativistic quantum field theories.

Volume 4 List Price \$7.80

Member Price \$5.85    175 pages

Previously Published:

### Lectures in Statistical Mechanics

by **G. Uhlenbeck and G. W. Ford with E. W. Montroll**

Volume 1 List Price \$7.40

Member Price \$5.55    181 pages

### Mathematical Problems of Relativistic Physics

by **I. E. Segal with G. W. Mackey**

Volume 2 List Price \$6.00

Member Price \$4.50    131 pages

Please order from

**AMERICAN MATHEMATICAL SOCIETY**

P. O. Box 6248, Providence, Rhode Island 02904

---

## ANNOUNCING A NEW BOOK IN THE AUTOMATIC COMPUTATION SERIES

---

*Edited by Dr. George E. Forsythe, Professor of Mathematics and Computer Science at  
Stanford University and Director of the Stanford Computation Center*

### GAUSSIAN QUADRATURE FORMULAS

*By A. H. Stroud, Assistant Director, Computation Center, University of Kansas, and Don Secrest, University of Illinois. Offering a thorough coverage of the use of Gaussian Quadrature Formulas for different applications, this book includes a discussion of error bounds for the most commonly used formulas in various applications. All tables are given correct to thirty figures, allowing their use with double precision on the largest available computer. Feb. 1966, approx. 368 pp., \$14.95*

---

### OTHER TITLES IN THE SERIES

---

#### PROGRAMMING REAL-TIME COMPUTER SYSTEMS

*By James T. Matin, IBM (United Kingdom) Ltd., London, England. The design, programming, testing and implementation of real-time systems. Both the commercial and technical systems are presented, and the hazards that are to be faced in installing such systems. 1965, 384 pp., \$11.75*

#### FORTRAN IV: PROGRAMMING AND COMPUTING

*By James T. Golden, IBM Corporation, Scientific Marketing Manager. An introduction to computing for engineers and scientists and those already familiar with FORTRAN. Develops the ability to generate algorithms and to guide in creating strategies for problem solving on a digital computer. 1965, 288 pp., paper, \$4.50*

#### COMPUTERS AND THEIR USES

*By William H. Desmonde, IBM Corporation. Explains the essential characteristics of electronic data processing machines and their uses, providing a general introduction to programming, logical design, switching theory, theory of automata, artificial intelligence, commercial applications, operations research, and real-time data systems. 1964, 296 pp., \$7.95*

#### REAL-TIME DATA PROCESSING SYSTEMS: INTRODUCTORY CONCEPTS

*By William H. Desmonde, IBM Corporation. An elementary introduction to the design and programming of real-time data processing systems. These systems are applied where an immediate response must be made to a large, fast-changing, complex situation. 1964, 186 pp., \$7.95*

#### ITERATIVE METHODS FOR THE SOLUTION OF EQUATIONS

*By J. F. Traub, Bell Telephone Laboratories, Inc. The first systematic treatment of the calculation of roots of equations and systems of equations. Derives new families of computationally effective iteration functions and introduces natural classification schemes. (In the P-H International Series in Applied Mathematics) 1964, 310 pp. \$12.95*

#### ROUNDING ERRORS IN ALGEBRAIC PROCESSES

*By James H. Wilkinson, National Physical Laboratory, England. This is the only book available which gives a systematic treatment of error analysis and applies it to a wide range of problems. 1964, 161 pp., \$6.00*

#### AN INTRODUCTION TO ALGOL

*By R. Baumann, Munich Institute of Technology, Germany; M. Feliciano, Oak Ridge Nat'l. Lab.; F. L. Bauer, and K. L. Samelson, both of the Munich Institute of Technology, Germany. A primer for the non-specialist, emphasizing the practical uses of the algorithmic language. 1964, 142 pp., \$6.75*

#### DIGITAL PROCESSING: A SYSTEM ORIENTATION

*By Louise Schultz, System Development Corp. A general introductory book on digital computers and their operation, that describes the elements of devices and computation techniques in a system framework. 1963, 403 pp., \$10.50*

#### MATRIX ITERATIVE ANALYSIS

*By Richard S. Varga, Case Institute of Technology. Demonstrates the solution of elliptic partial differential equations by iterative techniques on large computers, closely aligned with cyclic iterative techniques. 1962, 322 pp., \$12.50*

For approval copies, write Box 903

**PRENTICE-HALL, ENGLEWOOD CLIFFS, N.J.**

## CLASSIFICATION OF REVIEWS

- A. Arithmetical Tables, Mathematical Constants
- B. Powers
- C. Logarithms
- D. Circular Functions
- E. Hyperbolic and Exponential Functions
- F. Theory of Numbers
- G. Higher Algebra
- H. Numerical Solution of Equations
- I. Finite Differences Interpolation
- J. Summation of Series
- K. Statistics
- L. Higher Mathematical Functions
- M. Integrals
- N. Interest and Investment
- O. Actuarial Science
- P. Engineering
- Q. Astronomy
- R. Geodesy
- S. Physics, Geophysics, Crystallography
- T. Chemistry
- U. Navigation
- V. Aerodynamics, Hydrodynamics, Ballistics
- W. Economics and Social Sciences
- X. Numerical Analysis and Applied Mathematics
- Z. Calculating Machines and Mechanical Computation