QUARTERLY

OF

APPLIED MATHEMATICS

SUGGESTIONS CONCERNING THE PREPARATION OF MANUSCRIPTS FOR THE QUARTERLY OF APPLIED MATHEMATICS

The editors will appreciate the authors' cooperation in taking note of the following directions for the preparation of manuscripts. These directions have been drawn up with a view toward eliminating unnecessary correspondence, avoiding the return of papers for changes, and reducing the charges made for "author's corrections."

Manuscripts: Manuscripts should be typewritten double-spaced on one side only. Marginal instructions to the typesetter should be written in pencil to distinguish them clearly from the body of the text. The author should keep a complete copy.

The papers should be submitted in final form. Only typographical errors should be corrected in proof; composition charges for any major deviations from the manuscript will be passed on to the author.

Titles: The title should be brief but express adequately the subject of the paper. The name and initials of the author should be written as he/she prefers; all titles and degrees or honors will be omitted. The name of the organization with which the author is associated should be given in a separate line following his/her name.

Mathematical Work: As far as possible, formulas should be typewritten; Greek letters and other symbols not available on the average typewriter should be inserted using either instant lettering or by careful insertion in ink. Manuscripts containing pencilled material other than marginal instructions to the typesetter will not be accepted.

The difference between capital and lower-case letters should be clearly shown; care should be taken to avoid confusion between zero (0) and the letter O, between the numeral one (1), the letter l and the prime ('), between alpha and a, kappa and k, mu and u, nu and v, eta and n.

The level of subscripts, exponents, subscripts to subscripts, and exponents to exponents should be clearly indicated.

Single embellishments over individual letters are allowed; the only embellishment allowed above groups of letters is the overbar.

Double embellishments are not allowed. These may be replaced by superscripts following the symbols.

Complicated exponents and subscripts should be avoided. Any complicated expression that recurs frequently should be represented by a special symbol.

For exponentials with lengthy or complicated exponents the symbol exp should be used, particularly if such exponentials appear in the body of the text. Thus,

$$\exp\left[\left(a^2 + b^2\right)^{1/2}\right] \text{ is preferable to } e^{[a^2+b^2]^{1/2}}$$

Fractions in the body of the text and fractions occurring in the numerators or denominators of fractions should be written with the solidus. Thus,

$$\frac{\cos(x/2b)}{\cos(a/2b)} \text{ is preferable to } \frac{\cos\dfrac{x}{2b}}{\cos\dfrac{a}{2b}}$$

In many instances the use of negative exponents permits saving of space. Thus,

$$\int u^{-1} \sin u \, du \text{ is preferable to } \int \frac{\sin u}{u} \, du.$$

Whereas the intended grouping of symbols in handwritten formulas can be made clear by slight variations in spacing, this procedure is not acceptable in typeset formulas. To avoid misunderstanding, the order of symbols should therefore be carefully considered. Thus,

$$(a + bx)\cos t \text{ is preferable to } \cos t(a + bx).$$

Figures: Figures should be drawn in black ink with clean, unbroken lines; do not use ball point pen. The paper should be of a nonabsorbant quality so that the ink does not spread and produce fuzzy lines. If the figures are intended for reduction, they should be drawn with heavy enough lines so that they do not become flimsy at the desired reduction. The notation should be of professional quality and in proportion for the expected reduction size. Figures which are unsuitable for reproduction will be returned to the author for redrawing. Legends accompanying figures should be written on a separate sheet.

Bibliography: References should be grouped together in a Bibliography at the end of the manuscript. References in text to the Bibliography should be made by numerals between square brackets.

The following examples show the desired arrangements: (*for books*—S. Timoshenko, *Strength of materials*, vol. 2, Macmillan and Co., London, 1931, p. 237; *for periodicals*—Lord Rayleigh, *On the flow of viscous liquids, especially in three dimensions*, Phil. Mag. (5) 36, 354–372 (1893)). Note that the number of the series is not separated by commas from the name of the periodical or the number of the volume.

Authors' initials should precede their names rather than follow them.

In quoted titles of books or papers, capital letters should be used only where the language requires this. Thus, *On the flow of viscous fluids* is preferable to *On the Flow of Viscous Fluids*, but the corresponding German title would have to be rendered as *Über die Strömung zäher Flüssigkeiten*.

Titles of books or papers should be quoted in the original language (with an English translation added in parentheses, if this seems desirable), but only English abbreviations should be used for bibliographical details such as ed., vol., no., chap., p.

Footnotes: As far as possible, footnotes should be avoided. Footnotes containing mathematical formulas are not acceptable.

Abbreviations: Much space can be saved by the use of standard abbreviations such as Eq., Eqs., Fig., Sec., Art., etc. These should be used, however, only if they are followed by a reference number. Thus, "Eq. (25)" is acceptable but not "the preceding Eq." Moreover, if any one of these terms occurs as the first word of a sentence, it should be spelled out.

Special abbreviations should be avoided. Thus "boundary conditions" should always be spelled out and not be abbreviated as "b.c." even if this special abbreviation is defined somewhere in the text.

CONTENTS

—— NEW BOOKS ——

Syntactic pattern recognition and applications. By K. S. Fu. Prentice-Hall, Inc., Englewood Cliffs, NJ, 1982. viii + 596 pp. $37.51.

This is a volume in the Prentice-Hall Advances in Computing Science and Technology Series. The many different techniques used to solve pattern recognition problems may be grouped into two general approaches: the decision-theoretic (or discriminant) approach and the syntactic (or structural) approach. This book treats the problems of pattern recognition and its applications by use of the syntactic approach. It describes theoretical methods as well as important applications. The book is intended to be of use both as a reference for system engineers and computer scientists and as a textbook for courses in pattern recognition. The presentation is kept concise, and background knowledge on formal languages and syntax analysis is included. With the emphasis on structural description of patterns, the syntactic approach attempts to draw an analogy between the structure and the syntax of a language. The analogy is attractive primarily because of the availability of mathematical linguistics as its theoretical foundation. However, the syntactic approach certainly contains other nonsyntactic methods. Often a mixed approach needs to be applied. Although the materials discussed in this volume are mainly syntactic, important decision-theoretic methods are briefly reviewed in Chapter 1. The subject matter may be divided into four major parts: (1) syntactic pattern recognition using string and high-dimensional languages (Chapters 1 through 5), (2) syntactic recognition of noisy and distorted patterns (Chapters 6 through 9), (3) learning in syntactic pattern recognition—grammatical inference (Chapter 10), and (4) applications of syntactic pattern recognition to signal and image analysis (Chapters 11 and 12). In Chapter 1 the syntactic approach is introduced and pattern preprocessing, segmentation, and decision-theoretic classification techniques are reviewed briefly. An introduction to formal languages and their relations to automata are summarized in Chapter 2. Syntactic methods for pattern description using one-dimensional string languages are presented in Chapter 3. High-dimensional languages for pattern description and recognition are described in Chapter 4. Syntax analysis and its applications as pattern recognition procedures are discussed Chapter 5. Chapter 6 provides a review of recent results in the use of stochastic languages for syntactic pattern recognition. Error-correcting syntax analysis of string languages for the recognition of noisy and distorted patterns is presented in Chapter 7. Error-correcting syntax analysis of tree languages for syntactic pattern recognition is described in Chapter 8. Chapter 9 discusses cluster analysis of syntactic patterns. Various grammatical inference algorithms are reviewed in Chapter 10. Shape analysis of waveforms and contours is described in Chapter 11. Chapter 12 describes a syntactic approach to texture analysis. Appendices A to G provide a number of examples and detailed grammars to demonstrate the applications of syntactic pattern recognition.

Annual review of fluid mechanics, Volume 14. Edited by Milton Van Dyke, J. V. Wehausen and John L. Lumley. Annual Reviews, Inc., Palo Alto, CA, 1982. v + 456 pp. $22.00.

This volume contains the following articles: "Vilhelm Bjerknes and his Students" by Arnt Eliassen; "Sediment Ripples and Dunes" by Frank Engelund and Jørgen Fredsøe; "Strongly Nonlinear Waves" by L. W. Schwartz and J. D. Fenton; "Dynamics of Glaciers and Large Ice Masses" by Kolumban Hutter; "The Mathematical Theory of Frontogenesis" by B. J. Hoskins; "Dynamics of Lakes, Reservoirs, and Cooling Ponds" by Jörg Imberger and Pul F. Hamblin; "Turbulent Jets and Plumes" by E. J. List; "Gravity Currents in the Laboratory, Atmosphere, and Ocean" by John E. Simpson; "The Fluid Dynamics of Heart Valves: Experimental, Theoretical, and Computational Methods" by Charles S. Peskin; "The Computation of Transonic Potential Flows" by David A. Caughey; "Unsteady Airfoils" by W. J. McCroskey; "Low-Gravity Fluid Flows" by Simon Ostrach; "The Strange Attractor Theory of Turbulence" by Oscar E. Landford III; "Dynamics of Oil Ganglia During Immiscible Displacement in Water-Wet Porous Media" by A. C. Payatakes; "Numerical Methods in Free-Surface Flows" by Ronald W. Yeung.

Distribution-free statistical methods. By J. S. Maritz. Chapman and Hall, London, 1981. x + 265 pp. $29.95.

This is a volume in the series Monographs on Applied Probability and Statistics. It is based on courses given to third- and fourth-year students at Australian universities. The author had three aims: to show that the subject had a clearly recognizable underlying commong thread and was not a collection of isolated techniques; that a discussion of efficiency be provided to illustrate the reason for the types of calculations performed; to emphasize point and interval estimation more strongly than is usual in elementary books. Also, the idea of randomization, or permutation, is the fundamental idea connecting all the methods in the book. Chapter headings: 1. Basic concepts in distribution-free methods. 2. One-sample location problems. 3. Miscellaneous one-sample problems. 4. Two-sample problems. 5. Straight-line regression. 6. Multiple regression and general linear models. 7. Bivariate problems.

Sequencing and scheduling—An introduction to the mathematics of the job-shop. By S. French, John Wiley & Sons, New York, 1982. x + 245 pp. $49.95.

This is a volume in the Ellis Horwood Series in Mathematics and its Applications. The chapter headings indicate the scope of this textbook: 1. Scheduling Problems. 2. Optimality of Schedules. 3. Single Machine Processing: Basic Results. 4. Single Machine Processing: Precedence Constraints and Efficiency. 5. Constructive Algorithms for Flow-Shops and Job-Shops. 6. Dynamic Programming Approaches. 7. Branch and Bound Methods. 8. Integer Programming Formulations. 9. Hard Problems and *NP*-Completeness. 10. Heuristic Methods: General Approaches. 11. Heuristic Methods: Worst Case Bounds. 12. A Brief Survey of Other Scheduling Problems.

Graph theory and applications. By H. N. V. Temperley. John Wiley & Sons, New York, 1981. 130 pp.

This is a volume in the Ellis Horwood Series in Mathematics and its Applications. It deals mainly with enumerative graph theory, starts from first principles and leads up to various important areas of application, including statistical mechanics. Chapter headings: 1. Introduction. 2. The notion of the connectivity of a graph and some attempts to quantify it. 3. Some problems involving weighted graphs. 4. Further applications of trees. 5. Enumerations of graphs. 6. Applications to statistical mechanics. 7. Transformations of generating functions. 8. Oriented graphs and series-parallel graphs. 9. Applications to the analysis of games. 10. Some graph-theoretical problems made into puzzles which may have interesting applications in real life.

Kronecker products and matrix calculus with applications. By Alexander Graham. John Wiley & Sons, New York, 1981. 130 pp. $39.95.

This is a volume in the Ellis Horwood Series in Mathematics and its Applications. The author's purpose in writing this book was to bring to the attention of the reader some recent developments in the field of matrix calculus. Matrix calculus applicable to square matrices was developed by Turnbull in 1927. The theory presented in this book is based on the works of Dwyer and McPhail published in 1948, and others. It is more general than Turnbull's development and is applicable to non-square matrices. Chapter headings: 1. Preliminaries. 2. The Kronecker Product. 3. Some Applications for the Kronecker Product. 4. Introduction to Matrix Calculus. 5. Further Development of Matrix Calculus including an Application of Kronecker Products. 6. The Derivative of a Matrix with respect to a Matrix. 7. Some Applications of Matrix Calculus.

Prior information in linear models. By Helge Toutenburg. John Wiley & Sons, New York, 1982. ix + 215 pp. $39.95.

This is a volume in the Wiley Series in Probability and Mathematical Statistics. It describes how prior information can be used in estimating coefficients of linear models. Prior information here does not imply a Bayesian approach but includes, for example, equations and inequalities as well as prior estimates on the unknown parameters. It concentrates on several aspects: these include the robustness of minimax estimators, restricted least-squares and two-stage least-squares estimators, and mixed estimators which allow for part of the prior information to be incorrect. The book is devoted to estimation and model choice, and references are also made to prediction. In order to make the book more readable, proofs have been omitted where they are obvious. It is based upon a lecture course given by the author at the Humboldt University in Berlin (German Democratic Republic). There are six chapters, on the general linear model, mixed estimation, problems in model choice, and prior information in econometric models.

Statistical models and methods for lifetime data. By Jerald F. Lawless. John Wiley & Sons, New York, 1982. xi + 580 pp. $36.95.

This is a volume in the Wiley Series in Probability and Mathematical Statistics. It draws together material on the analysis of lifetime data and gives a comprehensive presentation of important models and methods. Most of the examples come from engineering or the biomedical sciences. Chapter 1 contains introductory material on lifetime distributions and surveys the most important parametric models. Censoring is introduced, and its ramifications for statistical inference are considered. In Chapter 2 some methods of examining univariate lifetime data and obtaining nonparametric estimates of distribution characteristics are discussed; life tables and graphical procedures play key roles. Chapters 3, 4, and 5 deal with inference for important parametric models, including the exponential, Weibull, gamma, log-normal, and generalized gamma distributions. This is extended in Chapter 6 to problems with concomitant variables, through regression models based on these distributions. Chapters 7 and 8 present nonparametric and distribution-free procedures: Chapter 7 deals with methods based on the proportional hazards regression model, and Chapter 8 gives distribution-free procedures for single- and many-sample problems. Goodness-of-fit tests for lifetime distribution models are considered in Chapter 9. Chapter 10 contains brief discussions of two important topics for which it was not feasible to give extended treatments: multivariate and stochastic process models. Several appendices review statistical theory that may be unfamiliar to some readers.

Recursive functions in computer theory. By R. Peter. John Wiley & Sons, New York, 1981. 179 pp. $59.95.

This is a volume in the Ellis Horwood Series in Computers and their Applications. It relates the theoretical background to the actual uses of recursive constructions as found in modern programming languages, computational algorithms, etc. Recursive techniques in program translation, one-level and two-level grammars in programming language definitions, context-free grammars, recursive functions and procedures, as well as everyday programming tools such as flow charts and decision tables, are all covered in this text. The author assumes little previous knowledge by the reader of the theoretical foundations required.

Applicable mathematics of non-physical phenomena. By Oliveira-Pinto and B. W. Connoly. John Wiley & Sons, New York, 1981. 269 pp. $59.95.

This is a volume in the Ellis Horwood Series in Mathematics and its Applications. The book is organized into three parts: Part I is the largest and is dedicated to the biological application of mathematics in both deterministic and stochastic contexts. It centres around the work of Volterra and Feller in this field. It also includes work in genetics incorporating the spread of an effect in space as well as time. It includes papers by Kolmogorov, Petrovsky, Piskovnoff and G. H. Hardy. Part II, Medical Applications, deals specifically with the Kermack/McKendrick deterministic model of a simple epidemic with removal. Part III contains a paper by F. W. Lanchester on the N-square law, whose purpose was primarily military but which fits within the common thread of birth and death processes. Bibliographical references are listed throughout the individual chapters with a more comprehensive bibliography at the end of the book.

Applied functional analysis. By D. H. Griffel. John Wiley & Sons, New York, 1981. 386 pp.

This is a volume in the Ellis Horwood Series in Mathematics and its Applications. It treats in detail applications to mechanics, fluid mechanics, diffusive growth and approximation. The twelve chapters are divided into four parts: 1. Distribution Theory and Green's Functions. 2. Banach Spaces and Fixed Point Theorems. 3. Operators in Hilbert Space. 4. Further Developments, including outlines of Fréchet calculus, stability and bifurcation theory, and Sobolev spaces.

Applied life data analysis. By Wayne Nelson. John Wiley & Sons, New York, 1982. ix + 634 pp. $40.95.

This is a volume in the Wiley Series in Probability and Mathematical Statistics. It is directed to engineers and industrial statisticians working on product life data. It starts with basic models and single graphical analyses of data, and it progresses through advanced analytical methods. Chapter headings: 1. Overview and Background. 2. Basic Concepts and Distributions for Product Life. 3. Probability Plotting of Complete and Singly Censored Data. 4. Graphical Analysis of Multiply Censored Data. 5. Series Systems and Competing Risks. 6. Analysis of Complete Data. 7. Linear Methods for Singly Censored Data. 8. Maximum Likelihood Analysis of Multiply Censored Data. 9. Analyses of Inspection Data (Quantal-Response and Interval Data). 10. Comparisons (Hypothesis Tests) for Complete Data. 11. Comparisons with Linear Estimators (Singly Censored and Complete Data). 12. Maximum Likelihood Comparisons (Multiply Censored and Other Data). 13. Survey of Other Topics.

Bayesian reliability analysis. By Harry F. Martz and Ray A. Waller. John Wiley & Sons, New York, 1982. ix + 745 pp. $44.95.

This is a volume in the Wiley Series in Probability and Mathematical Statistics. This book discusses techniques useful in the reliability analysis of complex devices which utilize all available pertinent information—both objective test data and subjective information—in a cost-effective manner. Chapters 2, 3, and 4 provide basic materials in probability, statistics, and classical reliability. The basic notions for understanding, performing, and interpreting Bayesian reliability analyses are given in Chapter 5. Techniques for selecting and evaluating prior distributions are given in Chapter 6 in which the primary emphasis is on noninformative and natural conjugate prior distributions, although other classes of prior distributions are also often considered. Chapter 7 discusses Bayesian estimation methods based on attribute life test data for binomial, Pascal, and Poisson sampling models. Chapters 8 and 9 cover Bayesian estimation procedures for continuous lifetime models including exponential, Weibull, normal, log normal, inverse Gaussian and gamma distributions. Special topics in Bayesian reliability demonstration testing, system reliability assessment, and availability of maintained systems are covered in Chapters 10, 11, 12, respectively. Finally, Chapter 13 addresses empirical Bayes reliability estimation.

The foundations of multivariate analysis—A unified approach by means of projection onto linear subspaces. By K. Takeuchi, H. Yanai and B. N. Mukherjee. John Wiley & Sons, New York, 1982. xi + 458 pp. $24.95.

The purpose of this book is to present the up-to-date theory and techniques of multivariate analysis, and to provide a unified scope for understanding mutual relationships among various methods and techniques of multivariate analysis by extensive use of projection operators defined onto linear subspaces of Euclidean space. It mainly deals with the so-called "descriptive methods" such as factor analysis and canonical analysis, while the complicated theory of sampling distributions of various test statistics is mostly omitted because the basic assumption of multivariate normality of the observations cannot be satisfied in most cases of practical application. Chapter headings: 1. Essentials of Linear Algebra. 2. Fundamental Concepts of Multivariate Analysis. 3. Regression Analysis. 4. Analyses of Variance and Covariance. 5. Principal Component Analysis. 6. Canonical Correlation Analysis and Discriminant Analysis. 7. Factor Analysis. 8. Analysis of Categorical Data. 9. Theory of Distance and its Applications to Classification Problems. 10. Analysis of Covariance Structures.

History of programming languages. Edited by Richard L. Wexelblat. (Association for Computing Machinery Monograph Series, edited by Thomas A. Standish.) Academic Press, New York, 1981. xxiii + 758 pp. $45.00

This book constitutes the proceedings of an ACM SIGPLAN conference held June 1–3, 1978. It presents a record of the early history of thirteen languages that set the tone of most of today's programming. It also includes the keynote address delivered at the conference by Grace Hopper. Through formal papers and transcripts of talks and discussions, the book describes the factors that influenced the development of the major programming languages. It covers, primarily, their early development with emphasis on the technical aspects of the language design and creation. Each paper and talk was prepared by one or two of the key technical people directly involved in the early development of the language: John Backus (FORTRAN), Alan Perlis and Peter Naur (ALGOL), John McCarthy (LISP), Jean Sammet (COBOL), Douglas Ross (APT), Jules Schwartz (JOVIAL), Geoffrey Gordon (GPSS), Kristen Nygaard (SIMULA), Charles Baker (JOSS), Thomas Kurtz (BASIC), George Radin (PL/I), Ralph Griswold (SNOBOL), Kenneth Iverson (APL). There are also summaries of each of the languages discussed at the conference.

Norbert Wiener: collected works with commentaries, volume III. Edited By P. Masani. (Mathematicians of Our Time. Gian-Carlo Rota, series editor.) The MIT Press, Cambridge, MA, 1981. xi + 753 pp. $50.00.

This volume contains papers in the following areas: Hopf-Wiener integral equation, with commentaries by J. Pineus and A. E. Heins; Prediction and filtering, with commentaries by E. J. Akutowicz, P. Masani, H. Salehi, P. S. Muhly, M. Kanter and G. Kallianpur; Quantum mechanics and relativity, with commentaries by D. Bohm, D. Gabor, A. Siegel, E. Nelson, A. H. Taub and M. S. Vallarta; and Miscellaneous mathematical papers, with commentaries by E. Hille, G. Freud, T. Hido, L. F. McAuley and E. E. Robinson. There is also an introduction by P. Masani and a bibliography of Norbert Wiener. There will yet be a fourth and last volume of the Collected Works, devoted principally to cybernetics.

Advanced matrix theory for scientists and engineers. By A. S. Deif. Abacus Press, Tunbridge Wells & London, 1982. x + 241 pp.

Chapter headings: 1. Basic Definitions. 2. Scalar Functions of Matrices. 3. Theory of Linear Equations. 4. The Matrix Eigenvalue Problem. 5. Matrix Functions. 6. Perturbation Theory.

Encyclopedia of statistical sciences, volume I (A to circular probable error). Samuel Kotz and Norman L. Johnson, eidtors-in-chief. John Wiley & Sons, New York, 1982. x + 478 pp. $75.00.

This is the first volume of a planned eight-volume work. The encyclopedia aims to provide sound information and practical guidance for readers who may not be specialists in a particular topic. Its scope embraces agriculture, censuses, computers, demography, statistical mechanics, crystallography, zoology, etc.—in fact, all disciplines which utilize statistics as a matter of course.

Introduction to probability theory and statistical inference. 3rd edition. By Harold J. Larson. John Wiley & Sons, New York, 1982. xi + 637 pp. $27.95.

This is a volume in the Wiley Series in Probability and Mathematical Statistics. It is the fully revised and updated third edition of a text first published in 1969, featuring new discussions of descriptive statistics, Cramér-Rao bounds for variances of estimators, two-sample inference procedures, the philosophy of significance testing, analysis of variance, and nonparametric procedures. Many new examples, exercises and illustrations have been added.

Applied multivariate statistical analysis. By Richard A. Johnson and Dean W. Wichern. Prentice-Hall, Inc., Englewood Cliffs, NJ, 1982. xiii + 594 pp. $32.95.

This text is concerned with statistical methods for describing and analyzing the measurements on several variables frequently collected by researchers in the biological, physical and social sciences. The level of presentation is such as to be readily understandable by readers who have taken two or more statistics courses. The use of calculus is avoided; matrices are used throughout but no knowledge of matrix algebra is assumed. The text grew out of lecture notes developed for a course offered at the University of Wisonsin-Madison, and is divided into four parts: getting started, inferences about multivariate means and linear models, analysis of covariance structure, classification and grouping techniques.

Geometrical methods of mathematical physics. By Bernard Schutz. Cambridge University Press, 1980. xii + 250 pp. $39.95 ($16.95 paperback).

In recent years the methods of modern differential geometry have become of considerable importance in theoretical physics and have found application in relativity and cosmology, high-energy physics and field theory, thermodynamics, fluid dynamics and mechanics. This textbook provides an introduction to these methods—in particular Lie derivatives, Lie groups and differential forms—and covers their extensive applications to theoretical physics. The reader is assumed to have some familiarity with advanced calculus, linear algebra and a little elementary operator theory. Chapter headings: 1. Some basic mathematics. 2. Differential manifolds and tensors. 3. Lie derivatives and Lie groups. 4. Differential forms. 5. Applications in physics. 6. Connections for Riemannian manifolds and gauge theories.

Introductory engineering statistics. 3rd edition. By Irwin Guttman, S. S. Wilks, and J. Stuart Hunter. John Wiley & Sons, New York, 1982. xi + 580 pp. $31.95.

This is a volume in the Wiley Series in Probability and Mathematical Statistics, and the third edition of a text first published in 1965. In preparing this new edition, the (surviving) authors have been guided by two recent currents in applied statistics. The first is reliability and, to this end, they have added a chapter introducing the elements of reliability theory and practice. The second topic is the use of contrasts in statistical analyses, notably in the analysis of variance. Additionally, the material on control charts, goodness-of-fit tests, Bayesian methods, regression analysis and the design of experiments has been updated and revised.

Global differential geometry of surfaces. By A. Svec, D. Reidel Publishing Co., Dordrecht, Holland, 1981. 154 pp. $25.00.

This monograph concentrates on the global differential geometry of surfaces in Euclidean 3-space, which is based on two classical results: (i) the ovaloids (i.e. closed surfaces with positive Gauss curvature) with constant Gauss or mean curvature are the spheres; (ii) two isometric ovaloids are congruent. The results presented in this book show generalizations of these facts.

Cost and production fucntions. By Ronald W. Shephard. Springer-Verlag, Berlin, 1981. ix + 104 pp. $12.00.

This is volume 194 of the Springer Lecture Notes in Economics and Mathematical Systems, and is a reprint of the first (1953) edition, published by Princeton University Press. There is a new preface by the author, and a foreword by Professor Dale W. Jorgenson of Harvard University, putting the book into perspective ("it ranks as one of the most original contributions to economic theory of all time") and summarizing its main ideas.

Mathematical modeling of the hearing process. Edited by Mark H. Holmes and Lester A. Rubenfeld. Springer-Verlag, Berlin, 1981. ii + 104 pp. $9.80.

This is volume 43 in the Springer Lecture Notes in Biomathematics and presents the Proceedings of the NSF-CBMS Regional Conference, held in Troy, NY, July 21–25, 1980. There are six papers, by J. B. Allen, R. S. Chadwick, M. H. Holmes, S. M. Khanna and D. G. B. Leonard, W. C. Van Buskirk, and M. M. Sondhi.

Ordered sets. Edited by Ivan Rival. D. Reidel Publishing Co., Dodrecht, Holland, 1982. xviii + 966 pp. $94.00.

This is volume C83 of the NATO Advanced Study Institute Series: proceedings of the Institute held at Banff, Canada, August 28 to September 12, 1981. The papers are divided into eight parts: 1. Structure and Arithmetic of Ordered Sets. 2. Linear Extensions. 3. Set Theory and Recursion. 4. Lattice Theory. 5. Enumeration. 6. Applications of Ordered Sets to Computer Sciences. 7. Applications of Ordered Sets to Social Sciences. 8. Problem Sessions. There is also an exhaustive bibliography by the editor, occupying 100 pages.

Deterministic and stochastic scheduling. Edited by M. A. H. Dempster, J. K. Lenstra and A. H. G. Rinnooy Kan. D. Reidel Publishing Co., Dodrecht, Holland, 1982. xii + 419 pp. $42.00.

This is volume C84 of the NATO Advanced Study Institutes Series: proceedings of an Advanced Study and Research Institute on Theoretical Approaches to Scheduling Problems held in Durham, England, July 6–17, 1981. Scheduling involves the allocation of scarce resources over time. Situations in which such allocation has to be determined can be studied from a deterministic or stochastic point of view. Deterministic models have been studied in great detail in the theory of deterministic sequencing and scheduling. Stochastic systems have been investigated extensively in the theory of queuing. These proceedings have a twofold purpose: first, to review the fundamental results from both areas and, secondly, to present the true interface results that have recently been obtained. Hence, on one hand the volume emphasizes the achievements of two well-established disciplines that have been developed in mutual isolation, and on the other hand it provides a starting point for an interdisciplinary approach to scheduling problems as a combination of the two traditional ones. There are 24 papers in all.

Stochastic systems: The mathematics of filtering and identification and applications. Edited by Michiel Hazewinkel and Jan C. Willems. D. Reidel Publishing Co., Dordrecht, Holland, 1981. xi + 663 pp. $61.00.

This is volume C78 of the NATO Advanced Study Institutes Series: the proceedings of the Institute held at Les Arcs, Savoie, France, June 22–July 5, 1980. There ia an introduction by the editors, providing an informal outline of the main themes of the volume, identification and filtering and recursiveness, and indicating how the various contributions fit together. There is introductory tutorial material for identification and filtering problems by the editors and by R. F. Curtain, M. H. A. Davis and S. I. Marcus, and the other papers are divided into five groups: 1. Foundations of stochastic systems and modeling issues and applications, 2. Identification, 3. Linear filtering, 4. Adaptive control, 5. Nonlinear filtering.

Algebraic automata theory. By W. M. L. Holcombe. Cambridge University Press, London, 1982. xi + 228 pp. $29.50.

This is volume 1 of Cambridge Studies in Advanced Mathematics. It lays the foundations for the algebraic study of machines by looking at various types of machines, their properties, and ways in which complex machines can be simulated by simpler machines joined together in some way. This then provides a theoretical framework for the more detailed analysis of the application of machine theory in these subjects, with the ultimate aim of explaining many natural and artificial phenomena. It begins with some elementary material concerning the theory of semigroups. The second chapter examines many elementary properties of the state machine, the ways in which it can be connected together with others, and finishes with some applications. Chapter 3 develops the idea of a covering, by which state machines can be simulated by other, perhaps simpler, state machines in various configurations. Here, one does not attempt to describe the machine exactly but rather what it can do. There are some general results that enable one to start with an arbitrary state machine and simulate it with simpler machines constructed from finite simple groups and elementary 'two-state' machines connected up suitably. The best known method for doing this, the holonomy decomposition, is examined in chapter 4. The theory of recognizers is intimately connected with the theory of state machines and is of considerable importance in the theory of computers. This area is studied in chapter 5. Finally, the author ends with a more practical and realistic type of machine and applies the previous results to this situation in chapter 6.

Instabilities, bifurcations, and fluctuations in chemical systems. Edited by L. E. Reichl and W. C. Schieve. University of Texas Press, Austin, TX, 1982. xi + 427 pp.

This is a collection of 18 articles on self-organization in nonlinear chemical systems (the so-called "dissipative structures"), grouped under the following headings: theory of bifurcation phenomena in chemical systems, experimental properties of chemical systems, biochemistry, fluctuation phenomena and stochastic theory.

Formal Specification and Software Development. By Dines Bjøner and Cliff B. Jones, Prentice-Hall International, Inc., 1982. x + 501 pp. $32.00.

This book is divided into three parts. Part I (Formal Specification of Meta-Language) discusses general aspects of the systematic development method known as the "Vienna Development Method" (VDM). Such a systematic development method provides, at the minimum, a notation for writing specifications and a way of relating designs to specifications. Chapters 2 and 3 are concerned with the meta-language of VDM. Chapter 1 provides some historical background to the work on formal definition. Part II describes the use of VDM on programming languages. Chapters 4 to 7 cover writing a definition in VDM; chapters 8 and 9 discuss how such a definition can be used as the basis of compiler design. The initial examples given are of small, contrived languages. But Chapters 6 and 7 apply VDM to complete programming languages which are widely known. Part III (VDM and Other Systems) includes some applications of VDM outside the area of programming languages. Chapters 12 and 13 discuss the definition and design of database systems. Chapters 10 and 11 provide examples which lead to the specification of "generic office automation systems" by the Danish Datamatics Center, and a number of IBM products. There is an extensive bibliography of 26 pages.

Mathematical experiments on the computer. By Ulf Grenander. Academic Press, New
   York, 1982. xv + 525 pp.

This is volume 105 in the series Pure and Applied Mathematics. In it the author discusses the use of the
computer as the mathematician's laboratory, in which he can perform experiments in order to augment his
intuitive understanding of a problem, or to search for conjectures, or to produce counterexamples, or to suggest a
strategy for proving a conjecture. Hence the theme of the book is experimental mathematics on the computer. It
does not deal with production computing, nor does it deal with topics like proving theorems on the computer or
related questions belonging to the area of artificial intelligence. The main thrust of the book is how to carry out
mathematical experiments, how to do it quickly and easily, using the computer as a tool, and with the emphasis
on mathematics rather than on programming. For the purpose, interactive computing is indispensable, and the
author claims that the programming language APL has no existing rival that can seriously compete with it here.
In Part I the author examines a number of concrete cases where experiments helped to solve a research problem,
or in some cases, where they failed. He selected the cases from different areas to show that the experimental
technique is essentially area independent. The problems are therefore unrelated to each other. What they have in
common, and what they are intended to illustrate, is how experiments can be designed, executed, and
interpreted; also what are the scope and the limitations of computer-based mathematical experiments. The
programming language APL is presented in Part II. The presentation is written from the point of view of the
prospective mathematical experimenter. For this reason the author emphasizes how to deal with those mathe-
matical structures and operations that are likely to appear in experiments. After discussing APL from the point
of view of mathematical experiments in general, the author presents still another special experiment in Part
III—an experiment in heuristic asymptotics. This is of more ambitious scope and also requires a good deal more
computing effort than the earlier ones. It is preceded by a general discussion of the techniques of mathematical
experiments. Part IV contains descriptions and listing of software especially constructed for experiments. There
is a great deal of emphasis on good documentation.

Residuals and influence in regression. By R. Dennis Cook and Sanford Weisberg. Chapman
   & Hall, Inc., New York and London, 1982. x + 230 pp. $25.00.

This is a volume in Monographs on Statistics and Applied Probability. It contains a comprehensive account of
diagnostic methods for detecting inadequacies and unusual characteristics in data analyses based on linear
regression models, and a discussion of extension of the methods to more complicated problems. The use of
graphical procedures is emphasized, and most techniques discussed are illustrated in over 35 examples with more
than 50 figures. The book is written at an intermediate level, and is appropriate for those who are familiar with,
or currently learning, the methods of standard linear regression. The first part of the book contains an overview
of the use of diagnostic residual based methods for detecting curvature, heteroscedasticity, nonnormality and
outliers. Special attention is given to transformations and to residual analyses in two-way tables. The next part of
the book contains a unified and up-to-date treatment of methods for the detection of influential observations,
mostly based on the sample influence curve. However, several other approaches, including Bayesian methods, are
also considered. The final sections of the book include discussions of methods of construction of residuals and
influence measures in other problems, including nonlinear regression, logistic regression, robust regression and
generalized linear models.

Ternary quadratic forms and norms. Edited by Olga Taussky. Marcel Dekker, Inc., New
   York and Basel, 1982. v + 135 pp. $ 19.75.

This is volume 79 in the Lecture Notes in Pure and Applied Mathematics Series. It is a collection of seven
articles.

The mathematics of finite elements and applications IV. Edited by J. R. Whiteman.
   Academic Press, London and New York, 1982. xvi + 555 pp. $40.50.

These are the proceedings of the fourth conference on The Mathematics of Finite Elements and Applications,
held at Brunel University in April 1981. There are the texts of 44 lectures and 39 abstracts of poster sessions.

Applying mathematics: A course in mathematical modeling. By D. N. Burghes, I. Huntley, and J. McDonaldl. John Wiley & Sons, Inc., New York, 1982. 194 pp. $ 44.95.

This is a volume in the Ellis Horwood Series Mathematics and Its Applications. The concept behind this book is to provide applied mathematicians from many scientific disciplines with a better understanding of the construction of mathematical models, teaching them how to take a real-life problem and convert it into a mathematical one. The text concentrates on the practical nature of mathematics, rather than precise definitions, and can be used as the basis for an introductory course in mathematical modelling.

Encyclopedia of statistical science. Samuel Kotz and Norman L. Johnson (editors-in-chief), Campbell B. Read (associate editor), *Volume* 2: *Classification to Eye Estimate.* John Wiley & Sons, Inc., New York, 1982. viii + 613 pp. $ 75.00.

This volume covers entries from Classification to Eye Estimate. The work is planned as an eight volume set of some three million words, aiming to provide sound information and practical guidance for readers who may not be specialists in a particular topic. Its scope embraces, for instance, agriculture, censuses, computers, demography, statistical mechanics, crystallography, zoology, and scores of other disciplines that utilize statistics as a matter of course.

Dynamical systems II. Edited by A. R. Bednarek and L. Cesari. Academic Press, New York and London, 1982. xiii + 664 pp. $49.00.

These are the proceedings of the Second International Symposium on Dynamical Systems, held at the University of Florida in Gainesville, Florida, February 25–27, 1981. The first was held there in 1976. The central theme of the symposium was the relation of dynamical systems to current research on ordinary and functional differential equations, partial differential equations, stability theory, and optimal control. The volume contains the text of 27 lectures and 27 invited papers.

The jacknife, the bootstrap and other resampling plans. By Bradley Efron. Society for Industrial and Applied Mathematics, Philadelphia, PA, 1982. vii + 92 pp. $12.50.

This is volume 38 of the CBMS-NSF Regional Conference Series in Applied Mathematics; it records the ten lectures given at Bowling Green State University in June 1980. The goal of the author is to present a collection of ideas concerning the nonparametric estimation of bias, variance and more general measures of error, a subject which began with the Quenoille-Tukey jacknife, which is also here taken as the starting point. There are ten chapters: 1. Introduction. 2. The jacknife estimate of bias. 3. The jacknife estimate of variance. 4. Bias of the jackne variance estimate. 5. The bootstrap. 6. The infinitesimal jacknife, the delta method and the influence function. 7. Cross validation, jacknife and bootstrap. 8. Balanced repeated replications (half-sampling). 9. Random subsampling. 10. Nonparametric confidence intervals.

Designing and programming modern computers and systems, volume I: LSI modular computer systems. Edited by Svetlana P. Kartashev and Steven I. Kartashev, Prentice-Hall, Inc., Englewood Cliffs, NJ. xxvii + 643 pp. $37.50.

This text is written by a group of experts and is structured into six chapters: 1. Historic progress in architectures for computers and systems (which analyzes the Von Neumann architecture, the architecture of microprogrammed computers, and parallel systems); 2. Reconfigurable parallel array systems; 3. Designing and programming supersystems with dynamic architectures; 4. Verification of complex programs and microprograms; 5. Requirements engineering for modular computer systems; 6. Design and diagnosis of reconfigurable modular digital systems.

Optimization over time: *Dynamic programming and stochastic control, Volume I*. By Peter Whittle. John Wiley & Sons, New York, 1982. xi + 317 pp. $46.95.

This is a volume in the Wiley Series in Probability and Mathematical Statistics. It gives a unified account of the method of dynamic programming as an analytical tool for the solution of temporal optimization problems, with applications of this and related methods to major areas such as optimal control theory, operational research models and sequential inference. Also a number of interesting special cases are investigated in detail. The subject is treated systematically from basic principles presenting a wide range of theory and applications in an integrated and readable style. As well as covering such fundamental topics as the role of causality and minimax stochastic formulations as alternative ways of dealing with ignorance, the book introduces new material, for example on multi-armed bandits (project evaluation), growth optimization, risk-sensitive control and other relaxations of LQG structure. The book is divided into three parts: I. Deterministic problems (chapter headings: the optimality equation and state structure in the deterministic case, deterministic examples, deterministic dynamic models, linear/quadratic models, the discrete maximum principle, the continuous maximum principle; concepts and examples, the continuous maximum principle; derivation, the minimax criterion), II. The stochastic formulation (chapter headings: the general optimality equation, Markov decision processes (finite horizon), examples, inventory and storage problems, sequential scheduling and the multi-armed bandit, structure theorems, duality concepts), III. Linear/Quadratic/Gaussian models (chapter headings: LQG control with incomplete state observation, state estimation with linear structure, risk-sensitive LQG control, LQG homing, LQG control by spectral methods). Volume II will consist of three parts: infinite-horizon problems, continuous time, and incompletely observed process state.

Linear models: *An introduction*. By Irwin Guttman. John Wiley & Sons, New York, 1982. x + 358 pp. $36.95.

This is a volume in the Wiley Series in Probability and Mathematical Statistics. Its objective is to give students the essential concepts of regression, least squares, and linear models. The approach is essentially geometrical, but parallel algebraic discussion is quoted as the different topics arise. A unifying theme is the principle of orthogonalization, first introduced for the problem of nuisance parameters, but also used in discussing the analysis of covariance and orthogonal polynomials. The principle of orthogonalization rests on another unifying theme, namely, that of projection, and this is discussed first in Chapter 3 for the full-rank case, and continued, using the same essential ideas, in Chapters 4 and 5 for the non-full-rank case. Chapter headings: 1. The simple linear model. 2. Sampling from the multivariate normal. 3. The linear regression model: full-rank case. 4. Non-full-rank-case. 5. Some non-full-rank linear models and the general linear hypothesis.

Matrix algebra useful for statistics. By Shayle R. Searle. John Wiley & Sons, New York, 1982. xxii + 438 pp. $29.95.

This is a volume in the Wiley Series in Probability and Mathematical Statistics. It is an introduction to matrix algebra and its applications, the basic prerequisite being high school algebra. Chapter headings: 1. Introduction. 2. Basic operations. 3. Special matrices. 4. Determinants. 5. Inverse matrices. 6. Rank. 7. Canonical forms. 8. Generalized inverses. 9. Solving linear equations. 10. Partitioned matrices. 11. Eigenvalues and Eigenvectors. 11A. Appendix to Chapter 11. 12. Miscellanea. 13. Applications in statistics. 14. The matrix algebra of regression analysis. 15. An introduction to linear statistical models.

Lectures on lepton nucleon scattering and quantum chromodynamics. By W. B. Atwood, J. D. Bjorken, S. J. Brodsky, R. Stroynowski. Birkhauser, Boston, Inc., Cambridge, MA, 1982. 561 pp. $29.95.

This is volume 4 of the series Progress in Physics, edited by A. Jaffe and D. Ruelle. It contains the following five lectures: Lepton nucleon scattering, by W. B. Atwood (114 pages); massive lepton pair production (61 pages) and QCD phenomenology of the large P_T processes (76 pages), both by R. Stroynowski; perturbative quantum chromodynamics (233 pages) and elements of quantum chromodynamics (138 pages), both by J. D. Bjorken. The lectures were originally given at the seventh annual Stanford Linear Accelerator Center's Summer Institute in 1979.

Clustering of large data sets. By Jure Zupan. Research Studies Press, New York, 1982. xviii + 122 pp. $31.95.

This is volume 2 in the chemometrics Research Studies Series. The approach taken to the problem of clustering large data sets is via a balanced hierarchical tree, with the idea of letting the tree develop, to "bud", new branches between the already existing ones, instead of restricting its growth at the leaves. This idea was suggested by the growth of space filling curves in Mandelbrot's book on Fractals. Chapter headings: 1. Definition of terms. 2. Standard clustering methods. 3. Clustering of large data sets. 4. Computer program THREE for three-distance clustering. 5. Hierarchical clustering of infrared spectra. 6. Prospects of the three-distance method.

Discrete and dynamic decision analysis. By J. T. Buchanan. John Wiley & Sons, New York, 1982. xi + 260 pp. $36.95.

This book is concerned with decision-making under uncertainty. It covers both decision analysis (statistical decision theory and sequential decision-making) and dynamic programming. The amount of mathematics assumed is small (e.g. no knowledge of probability or statistics is assumed) and by keeping structures discrete the use of calculus is avoided. Chapter headings: 1. Initiation and motivation. 2. Uncertainty and its measurement. 3. Utility and its measurement. 4. Criteria for decision. 5. Decision problems with information. 6. Decision trees. 7. Sequential decision problems. 8. Markov chains. 9. Infinite stage Markovian decision processes. 10. Decisions in absorbing chains.

Mathematical structures for computer science. By Judith L. Gersting. W. H. Freeman and Co., San Francisco, CA, 1982. xi + 426 pp. $22.50.

This is a survey course in discrete structures, introducing the rigorous theoretical frameworks within which ideas about computer science can be expressed. It is appropriate for sophomores and juniors in calculus, and for an applied algebra course in the mathematical sciences curriculum. Chapter headings: 1. How to speak mathematics: basic vocabulary I. 2. How to speak mathematics: basic vocabulary II. 3. Structures and simulations. 4. Boolean algebra and computer logic. 5. Algebraic structures. 6. Coding theory. 7. Finite-state machines. 8. Machine design and construction. 9. Computability. 10. Formal languages.

Singularities of smooth functions and maps. By J. Martinet. Translated by Carl P. Simon. Cambridge University Press, London, 1982. xiii + 256 pp. $19.95.

This is volume 58 of the London Mathematical Society Lecture Note Series. The theory of singularities of smooth maps is a branch of modern mathematics which brings together ideas and techniques of algebra, topology and advanced calculus. The smooth function is a fundamental concept in pure and applied mathematics; the function's singularities usually are its most interesting and important features. Singularity theory examines questions like: what is the usual structure of these singularities, how do they change when the function is perturbed, which singular sets are stable under perturbation, can they be simplified by appropriate change of coordinates? Keeping this approach as geometric as possible, the author introduces and uses basic notions of algebra (rings, modules, ideals), topology (function spaces, transversality) and analysis (implicit function theorem and its generalizations). To keep the presentation simple and practical, he emphasizes the local theory and shows the critical role which the concepts of unfolding and deformation play. He compares and contrasts the theories for scalar-valued functions and for mappings into higher dimensional spaces and concludes with a proof of the Division Theorem for smooth functions.

Optimality in parametric systems. By Thomas L. Vincent and Walter J. Grantham. John Wiley & Sons, New York, 1982. xv + 243 pp. $29.00.

This book presents a unified theoretical approach to parameter optimization for both static and dynamic systems. The topics covered include scalar minimization (nonlinear programming), vector optimum, Nash optimality, minimax concepts, Pareto-optimality, and Stackelberg solution concepts. Examples and exercises include problems in engineering design, aircraft performance, population biology, econonics and geometry. Contents: 1. Fundamentals, 2. Minimization of a Scalar Cost, 3. Vector Minimization, 4. Control Notation, 5. Continuous Static Games, 6. Optimality in Parametric Dynamic Systems.

Applied mathematics: *Principles, techniques, and applications*. By James A. Cochran. Wadsworth International Group, Belmont, CA, 1982. x + 399 pp. $34.95.

This book is designed for a "second" course in applied mathematics where the emphasis is on depth rather than breadth. The topics have been selected for their relevance to nonroutine applications; for this reason, advanced topics such as stability theory, conformal mapping, generalized functions, integral equations, and asymptotics are included, in addition to more elementary topics such as linear algebra, differential equations, and special functions. Chapter headings: 1. Linear algebra and computation. 2. Eigenvalue problems for differential equations. 3. The special functions of applied mathematics. 4. Optimization and the calculus of variations. 5. Analytic function theory and system stability. 6. Conformal mapping. 7. Integral transforms. 8. Green's functions. 9. Generalized functions. 10. Linear integral equations. 11. Asymptotics. There are also six appendices: 1. Matrix fundamentals, 2. Legendre polynomials and Bessel functions: basic facts, 3. Series solutions of ordinary differential equations, 4. Functions of a complex variable, 5. The gamma and related functions, 6. Fourier and Laplace transforms.

System theory: *A Hilbert space approach*. By Avraham Feintuch and Richard Saeks. Academic Press, New York. 1982. xi + 310 pp. $39.50.

This is a volume in the series Pure and Applied Mathematics. It uses Hilbert space techniques to formulate a unified theory of linear systems. Unlike the classical applications to mathematical physics, however, the formulation of a viable theory of linear systems requires the development of a modified Hilbert space theory in which a "time structure" is adjoined to the classical Hilbert space axioms. The present book thus represents an exposition of the resultant "theory of operators defined on a Hilbert resolution space" together with the formulation of a unified theory of linear systems based thereon. The text assumes only a simple course in Hilbert space techniques and is otherwise self-contained. It is divided into four parts, dealing with I. operator theory in Hilbert resolution space, II. state space theory, III. feedback systems, and, IV. stochastic systems.

Biomathematics in 1980. Edited by L. M. Ricciardi and A. C. Scott. North-Holland Mathematics Studies, vol. 58, North-Holland Publishing Co., New York, 1980. xiv + 214 pp. $55.75.

This volume contains the papers presented at a workshop on Biomathematics: Current Status and Future Perspectives, held at Salerno in April 1980. There are 20 papers. Topics covered range from theoretical to experimental in neuroscience, pattern formation, population dynamics, self-organizing systems, senescence and cardiovascular modeling. The coupled nonlinear diffusion system emerges in several chapters as a useful model in neurodynamics, pattern formation, population diffusion and synergetics.

Progress in boundary element methods–Volume 1. Edited by C. A. Brebbia. John Wiley & Sons, New York, 1981. iv + 315 pp. $54.95.

The boundary element method offers important advantages over 'domain'-type solutions such as finite elements and finite differences. One of the most interesting features of the method is the much smaller system of equations and considerable reduction in the data required to run a problem. In addition, the numerical accuracy of the results is greater than that of finite elements. These advantages are more marked in three-dimensional problems. The method is also well suited to problem solving with inifinte domains such as those frequently occurring in stress analysis for which the classical domain methods are unsuitable. Chapter heading: 1. Basis of Boundary Elements, 2. Fundamental Solutions, 3. Potential Theory, 4. Elastostatics, 5. Plasticity, 6. Time Potential Problems, 7. Elastodynamics, 8. Combination of the Boundary Element and Finite Element Methods, 9. Asymptotic Accuracy and Convergence.

An introduction to linear algebra. By L. Mirsky. Dover Publications, Inc., New York, 1982. xi + 233 pp. $8.00.

This is an unabridged and unaltered republication of the work originally published in 1955 at the Clarendon Press, Oxford.