QUARTERLY

OF

APPLIED MATHEMATICS

VOLUME XLV — OCTOBER · 1987 — NUMBER 3

QUARTERLY OF APPLIED MATHEMATICS

The QUARTERLY prints original papers in applied mathematics which have an intimate connection with applications. 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.

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Second-class postage paid at Providence, Rhode Island.
Publication number 808680. (ISSN 0033-569X).

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,

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

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

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

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 Stromung zaher 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

Topics in Boundary Element Research— Volume 2: Time-dependent and Vibration Problems. By C. A. Breddia. Springer-Verlag, New York, 1985. pp. xiv + 260. $59.00.

This is the second volume in the continuing series, written by various authors actively involved in boundary elemental research. Contents: 1. Fundamentals of boundary integral equation methods in elastodynamics. 2. Elastic potentials in boundary integral equation formulations. 3. Time dependent nonlinear potential problems. 4. Further developments on the solution of the transient scalar wave equation. 5. Transient elastodynamics. 6. Propagation of surface waves. 7. Boundary integral formulation of mass matrices for dynamic analysis. 8. Boundary element method for laminar viscous flow and convective diffusion problems. 9. Asymptotic accuracy and convergence for point collocation methods.

Mechanics of Continua and Wave Dynamics. By L. Brekhovskikh, V. Goncharov, and V. Goncharov. Springer-Verlag, 1985. pp. xii + 342. $49.00.

This is volume 1 in the Springer Series on Wave Phenomena, edited by Leopold Felsen. The original Russian edition was published in 1982. The text is based on lectures given by the authors to students at the Physico-Technical Institute in Moskow. Chapter headings: 1. The main types of strain in elastic solids. 2. Waves in rods, vibrations of rods. 3. General theory of stress and strain. 4. Elastic waves in solids. 5. Waves in plates. 6. Basic laws of ideal fluid dynamics. 7. Potential flow. 8. Flows of viscous fluids. 9. Elements of the theory of turbulence. 10. Surface and internal waves in fluids. 11. Waves in rotating fields. 12. Sound waves. 13. Magnetohydrodynamics. 14. Nonlinear effects in wave propagation.

Harmonic Analysis on Symmetric Spaces and Applications. Volume 1. By Audrey Terras. Springer-Verlag, New York, 1985. pp. xii + 341. $39.00.

This volume contains the first three chapters (volume 2 contains the last two) of a set of notes for a course which describes harmonic analysis and its applications in such diverse areas as number theory, statistics, medicine, geophysics and quantum physics. Chapter I concerns Euclidean Fourier analysis and its applications to the solutions of the wave and heat equations, the study of potential functions of crystals, as well as zeta functions of algebraic number fields, for example. Chapter II deals with spherical Fourier analysis and its connections with Euclidean theory. There are applications to CAT scanners, the solar corona, and the Zeeman effect for the hydrogen atom in a magnetic field. Chapter III studies non-Euclidean Fourier analysis on the Poincaré or Lobatchevsky upper half-plane H, with an elementary discussion of the work of Harish-Chandra and Helgason in this special case.

The History of Statistics : The Measurement of Uncertainty before 1900. By Stephen M. Stigler. The Belknap Press of Harvard University Press, Cambridge, 1986. pp. xvi + 410. $25.00.

This outstanding work constitutes the first comprehensive history of statistics from its beginnings around 1700 to its emergence as a distinct discipline around 1900. The author shows how statistics arose from the interplay of mathematical concepts and the needs of several applied sciences including astronomy, geodesy, experimental psychology, genetics, and sociology. His emphasis is upon how, when, and where the methods of probability theory were developed for measuring uncertainty in experimental and observational science, for reducing uncertainty, and as a conceptual framework for quantitative studies in the social sciences. He describes the scientific context in which the different methods evolved and identifies the conceptual and mathematical problems that retarded the growth of mathematical statistics and the conceptual developments that permitted major breakthroughs. The ten chapters are arranged into three parts: I. The development of mathematical statistics in astronomy and geodesy before 1827 (chapters 1–4); II. The struggle to extend a calculus of probabilities to the social sciences (chapters 5–7); III. A breakthrough in the study of heredity (chapters 8–10). Chapter headings: 1. Least squares and the combination of observations. 2. Probabilists and the measurement of uncertainty. 3. Inverse probability. 4. The Gauss–Laplace synthesis. 5. Quetelet's two attempts. 6. Attempts to revive the binomial. 7. Psychophysics as a counterpoint. 8. The English breakthrough: Galton. 9. The next generation: Edgeworth. 10. Pearson and Yule.

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Measure and Integration for Use. By H. R. Pitt. Clarendon Press, Oxford, 1985. pp. xii + 143. $22.95.

This is volume one in Institute of Mathematics and its Applications Monograph Series. Its purpose is to provide as simply as possible an account of the Lebesgue theory of measure and integration, with illustrations of its use, which is adequate for practical use in many fields, both in other branches of mathematics and in the modelling of systems in the real world. It is divided into two parts: the theory (chapters 1–3) and applications (chapters 4–6). Chapter headings: 1. Sets and set-functions. 2. General theory of integration and measure. 3. Integrals of functions of real variables. 4. Measure and integration in geometry. 5. Harmonic analysis. 6. Random variables and probability.

Rotating Fields in General Relativity. By Jamal Nazrul Islam. Cambridge University Press, Cambridge, 1985. vi + 122. $34.50.

This book introduces the reader to research work on a particular aspect of rotating fields in general relativity. It should be accessible to someone with an elementary knowledge of relativity. A person with some maturity in mathematical physics may be able to follow it without knowing general relativity, as there is a brief introduction to the relevant aspects of general relativity in chapter 1. A significant part of the book is based on the author's own work. Chapter headings: 1. Introduction. 2. The Einstein equations for a rotating metric and some classes of solutions. 3. The Kerr and Tomimatsu–Sato solutions. 4. Rotating neutral dust. 5. Rotating Einstein-Maxwell fields. 6. Rotating charged dust.

Finite Element Systems: A Handbook. Edited by C. A. Brebbia. Springer-Verlag, New York, 1985. pp. 1 + 767. $85.00.

The first edition of this handbook appeared in 1981. This is the third and revised edition. It consists of a series of papers describing the different systems available in the market, and some tables to present in a schematic way the compatibility of each system.

Finite Algorithms in Optimization and Data Analysis. By M. R. Osborne. John Wiley & Sons, New York, 1985. pp. xv + 383. $51.95.

This is a volume in the Wiley Series in Probability and Mathematical Statistics. It presents a novel approach to those optimization problems in which an active set strategy leads to a finite algorithm, such as linear and quadratic programming or L_1 and L_∞ approximations. The author investigates the underlying structure of these problems, and describes the methods appropriate to their analysis. These methods involve the extensive use of convex analysis, in conjunction with homotopy methods and approximation theory. The main problem classes treated are those of minimizing polyhedral convex functions and solving convex robust estimation problems. The polyhedral convex function formulation includes not only linear programming and L_1 approximation but also a range of important statistical estimation problems based on ranks, while the robust estimation problem generalizes least square methods. In both cases, significant new algorithmic treatments are developed. The problems expounded are also applied to certain nonconvex, nonlinear problems. Chapter headings: 1. Some results from convex analysis. 2. Linear programming. 3. Application of linear programming in discrete approximation. 4. Polyhedral convex functions. 5. Least square and related methods. 6. Some applications to nonconvex problems. 7. Some questions of complexity and performance.

Generalized Linear Models. Edited by R. Gilchrist, B. Francis, and J. Whittaker. Springer-Verlag, New York, 1985. pp. vi + 178. $13.20.

This is volume 32 of Lecture Notes in Statistics and consists of the proceedings of the GLIM (Generalized Linear Models) 85 conference held at Lancaster University, U. K., 16–19 September 1985.

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Numerical Recipes: *The Art of Scientific Computing*. By William H. Press, Brian P. Flannery, Saul A. Teukolsky, and William T. Vetterling. Cambridge University Press, Cambridge, 1986. pp. xx + 818. $39.50.

The authors call this book Numerical Recipes since it resembles a cookbook rather than a restaurant menu; it reveals the individual ingredients of the methods of scientific computation and explains how they are prepared and combined. The title also connotes an eclectic mixture of presentational techniques. It offers, for each topic considered, a certain amount of general discussion, of analytical mathematics, and of discussion of algorithmics, and gives actual implementations of these ideas in the form of working computer routines. The level of presentation varies from that of an undergraduate course to that of a professional reference, depending on the appropriateness for the topic. The dominant theme is that practical methods of numerical computation can be efficient, clever, and clear at the same time. Chapter headings: 1. Preliminaries. 2. Solution of linear algebraic equations. 3. Interpolation and extrapolation. 4. Integration of functions. 5. Evaluation of functions. 6. Special functions. 7. Random numbers. 8. Sorting. 9. Root finding and nonlinear sets of equations. 10. Minimization or maximization of functions. 11. Eigensystems. 12. Fourier transform spectral methods. 13. Statistical description of data. 14. Modeling of data. 15. Integration of ordinary differential equations. 16. Two point boundary value problems. 17. Partial differential equations. A final section gives translations into Pascal of all the Fortran routines from the main body of the text.

Numerical Recipes Example Book (*Fortran*). By William T. Vetterling, Saul A. Teukolsky, William H. Press, and Brian P. Flannery. Cambridge University Press, Cambridge, 1985. pp. viii + 179. $18.95.

This book is designed to accompany the text and reference book *Numerical Recipes*: *The Art of Scientific Computing* (see above). The routines in that book are meant to be incorporated into user applications, since they are subroutines or functions, not stand-alone programs. This book contains Fortran source programs that exercise and demonstrate all of the Numerical Recipes subroutines and functions.

Numerical Recipes Example Book (*Pascal*). By William T. Vetterling, Saul A. Teukolsky, William H. Press, and Brian P. Flannery. Cambridge University Press, Cambridge, 1985. pp. viii + 236. $18.95.

This book is identical with the one noted above, except that the programs are Pascal rather than Fortran.

Freedom in Machinery, *Volume* 1: *Introducing Screw Theory*. By Jack Phillips. Cambridge University Press, Cambridge, 1984. pp. viii + 200. $59.50.

This book deals with mechanism, presented as the geometric essence of machinery. The study of mechanism is important because the geometry of mechanical motion is often the crux of a real machine's design. Mechanical motion is that which occurs between the rigid, contacting bodies or the material links of mechanism. This occurs in conjunction with two phenomena that occur together at the places of contact between the two bodies. Firstly, transmission and other forces operate between the bodies as the motion occurs; and secondly, the shapes of the surfaces there, guide the bodies as they move. A contact is a constraint upon a body motion. Each movable body in machinery suffers its constraints accordingly. Each of the chapters of the book is written such that it can stand alone; there are, however, extensive cross-references. Chapter headings: 0. General introduction. 1. Mechanism and the mobility of mechanism. 2. Overconstraint and the nature of mechanical motion. 3. Some of the various lines in a moving body. 4. Enumerative geometry and the powers of infinity. 5. Rigidity and the instantaneous screw axis. 6. Irregularity and the freedoms within a joint. 7. The possibilities in reality for practical joints. 8. Some elementary aspects of two degrees of freedom. 9. The linear complex of right lines in a moving body. 10. Line systems and the dual vectors in mechanics.

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Architecture of Systems Problem Solving. By George J. Klir. Plenum Press, New York, 1985. pp. xvi + 539. $75.00.

This is a text for a course covering fundamental systems concepts, major categories of system problems, and some selected methods for dealing with these problems at a rather general level. The concepts, problems, and methods are introduced in the context of an architectural formulation of an expert system—referred to as the general systems problem solver, or GSPS—whose aim is to provide users of all kinds with computer-based systems knowledge and methodology. Chapter headings: 1. Introduction. 2. Source and data systems. 3. Generative systems. 4. Structure systems. 5. Metasystems. 6. Complexity. 7. Goal-oriented systems. 8. Systems similarity. 9. GSPS: Architecture, use, evaluation.

Principal Component Analysis. By I. T. Jolliffe. Springer-Verlag, New York, 1986. pp. xiii + 271. $39.00.

This is a volume in the Springer Series in Statistics. Principal component analysis, the oldest and best known of the techniques of multivariate analysis, was introduced by K. Pearson and developed independently by Hotelling, and has been widely used since the advent of electronic computers. The central idea behind it is to reduce the dimensionality of the data set while retaining as much as possible of the variation presented in it, a reduction achieved by transforming to a set of uncorrelated variables, the principal components, such that the first few retain most of the variation. The problem reduces to the solution of an eigenvalue-eigenvector problem for a positive-semidefinite symmetric matrix. The technique has a wide variety of different applications, many covered in this book, which makes it useful to readers with a wide variety of backgrounds. Chapter headings: 1. Introduction. 2. Mathematical and statistical properties of population principal components. 3. Mathematical and statistical properties of sample principal components. 4. Principal components as a small number of interpretable variables: some examples. 5. Graphical representation of data using principal components. 6. Choosing a subset of principal components or variables. 7. Principal component analysis and factor analysis. 8. Principal components in regression analysis. 9. Principal components used with other multivariate techniques. 10. Outlier detection, influential observations and robust estimation of principal components. 11. Principal component analysis for special types of data. 12. Generalizations and adaptations of principal component analysis.

The Variational Theory of Geodesics. By M. M. Postnikov. Dover Publications, Inc., New York, 1983. pp. vii + 200.

This is a translation by Scripta Technica, Inc., edited by Bernard R. Gelbaum, of the Russian 1965 original, and first published by W. B. Saunders Company in 1967. The author presents the most fundamental aspects of modern differential geometry as well as the basic tools required for the study of Morse theory. The first half of the book contains an exposition of Riemannian geometry based on Koszul's axiom for an affine connection. The presentation is modeled after the treatment in S. Helgason's book, *Differential Geometry and Symmetric Spaces*. Academic Press, 1962. The second half deals with Morse's variational theory of geodesics with significant amplification given by Bott in his paper on the stable homotopy of the classical groups (Annals of Mathematics, 1959). The presentation is self-contained and requires no prerequisite beyond a good course in calculus and some familiarity with point-set topology.

Extremal Methods of Operations Research. By Paul R. Gribik and Kenneth O. Kortanek. Marcel Dekker, New York, 1985. pp. viii + 312. $37.50.

This is volume 97 in the series "Pure and Applied Mathematics". It consists of three chapters: the distribution-transportation problem, introduction to network models, and linear programming. The material is organized into 13 sets of exercises. Each unit is associated with certain sections of a given chapter, and each unit is preceded by a statement of its objectives. There are a total of 92 exercises, all accompanied by detailed solutions.

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Classical and Modern Regression with Applications. By Raymond H. Myers. PWS Publishers. Boston, 1986. pp. viii + 359.

This text contains a treatment of both traditional regression and modern techniques that have grown in popularity in the 1980's. It emphasizes applications with examples that illustrate nearly all the techniques discussed and that are selected from fields such as the physical sciences, engineering, biology, management science, and economics. A solutions manual accompanies the text. There is, for instance, a blend between classical and a contemporary methodology in chapter 4, where stepwise model-building methods to choose the optimal subset model are discussed. It includes Fallows' C_p-statistic, and discusses the connection between cross-validation criteria and model selection. Modern diagnostic methods for outlier detection are discussed in chapter 5, ridge regression in chapter 7, and influence diagnostic in chapter 8. Chapter 6 gives transformations and other methods appropriate when the standard assumptions are violated. Chapter headings: 1. Introduction: Regression Analysis. 2. The Simple Linear Regression Model. 3. The Multiple Linear Regression Model. 4. Criteria for Choice of Best Model. 5. Analysis of Residuals. 6. Nonstandard Conditions, Violations of Assumptions, and Transformations. 7. Detecting and Combating Multicollinearity. 8. Influence Diagnostics. 9. Nonlinear Regression.

Computational Methods for Parsimonious Data Fitting. By Marjan Ribaric. Physica-Verlag, Vienna-Würzburg, 1984. pp. 1 + 154.

This is volume 2 of Lecture Notes in Computational Statistics. The methods and algorithms presented in this monograph are concerned with exploratory data analysis with the intention of selecting from a specified set of admitted mathematical models the one with as few free parameters as practicable which can still fit the given data with the required precision.

Compstat Lectures 3. Physica-Verlag, Vienna-Würzburg, 1984. pp. 1 + 94.

This volume contains two papers: Correspondence analysis and Gaussian ordination, by Ihm, P. and H. van Groenewoud, and Estimating the degree of an Arma model, by A. Berlinet.

Multidimensional Clustering Algorithms. By Fionn Murtagh. Physica-Verlag, Vienna-Würzburg, 1984. pp. 1 + 131. $20.50.

This is volume 4 of Lecture Notes in Computational Statistics. It collects together important algorithmic results in the area of cluster analysis; indicates algorithms which may be of importance in parallel computing environments; includes discussion problems specific to the computing area such as pattern recognition and information storage and retrieval; and describes clustering algorithms which are of general, practical relevance.

Numerical Analysis of Parametrized Nonlinear Equations. By Werner C. Rheinboldt. John Wiley & Sons, New York, 1986. p. xi + 299. $34.95.

This is volume 7 in the University of Arkansas Lecture Notes in the Mathematical Sciences. In the author's opinion, the theory of parametrized equations has strong roots in modern differential geometry and should be considered in the setting of differential manifolds. Most of the numerical studies in the area, notably those on continuation methods, utilize this theoretical foundation very little. In these notes he has tried to show how a numerical analysis of parametrized equations may be developed on a differential geometric basis. Chapter headings: 1. Introduction. 2. Some sample problems. 3. Some background material. 4. Solution manifolds and their parametrizations. 5. Discretization errors. 6. One-distributions and augmented equations. 7. A continuation method. 8. Some numerical examples. 9. The computation of limit points. 10. Differential equations on manifolds. 11. Error estimates and related topics.

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The Theory of Analytic Functions: *A Brief Course*. By A. I. Markushevich. Mir Publishers, Moskow, 1983. Available from Imported Publications, Inc., Chicago, Ill. pp. 1 + 423. $10.95.

This is a revised translation of the fourth Russian edition of 1978. It is a text covering material taught at physical-mathematical faculties of Russian universities, up to, and including entire and meromorphic functions, Riemann surfaces, the Schwarz-Christoffel transformations, and applications.

Lectures on Three Dimensional Elasticity. By P. G. Ciarlet. Springer-Verlag, New York, 1983. pp. 1 + 149.

These lectures, delivered at the Indian Institute of Science, Bangalore, contain a nonlinear system of partial differential equations established as a mathematical model of elasticity. The nonlinearity appears in the highest order terms. An energy functional is established and the equations of equilibrium are obtained as the Euler equations starting from the energy functional. Existence results are studied in the second chapter. The two important tools are the use of the implicit function theorem and the theory of J. Ball.

Lectures on Stochastic Control and Nonlinear Filtering. By M. H. A. Davis. Springer-Verlag, 1984. pp. iii + 109. $7.10.

These lectures were delivered at the Indian Institute of Science, Bangalore. There are two separate series of lectures, on controlled stochastic jump processes and nonlinear filtering, respectively. They are united by the common philosophy of treating Markov processes by methods of stochastic calculus. The first part is aimed at developing optimal control theory for a class of Markov control processes called piecewise-deterministic processes. Part II concentrates on the pathwise theory of filtering for diffusion processes and on more sophisticated extensions of it due primarily to H. Kunita.

Variational Convergence for Functions and Operators. By H. Attouch. Pitman Advanced Publishing Program, Boston, 1984. pp. 1 + 423.

This is a volume in Pitman's Applicable Mathematics Series. It discusses the new concepts of convergence for sequences of functions and operators which have been appearing in mathematical analysis during the past twenty years. There are three chapters: 1. Model examples. 2. Epigraph-Convergence. Variational Approach. 3. Direct Approach by Epi-convergence.

Robust Statistics: *The Approach Based on Influence Functions*. By Frank R. Hampel, Elvenzio M. Ronchetti, Peter J. Rousseeuw, and Werner A. Stahel. John Wiley & Sons, New York, 1986. pp. xxi + 502. $39.95.

This is a volume in the Wiley Series in Probability and Mathematical Statistics. It is an introduction to the concepts, theory, and applications of the statistics of approximate parametric models. It gives a comprehensive account of the approach based on influence functions, which offers new insight into the robustness properties of existing procedures and provides a simple and flexible tool to derive new robust methods. The key concept, the influence function, describes the effect of an outlier on any locally linear statistical procedure. Related notions such as the breakdown point as a global measure of reliability and the change-of-variance function as a measure for the stability of the asymptotic variance are also covered in terms of general principles and applications. Chapter headings: 1. Introduction and motivation. 2. One-dimensional estimators. 3. One-dimensional tests. 4. Multidimensional estimators. 5. Estimation of covariance matrices and multivariate location. 6. Linear models: Robust estimation. 7. Linear models: Robust testing. 8. Compliments and outlook.

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Contrast Analysis: Focused Comparisons in the Analysis of Variance. By Robert Rosenthal and Ralph L. Rosnow. Cambridge University Press, Cambridge, 1985. pp. x + 107.

Contrasts are significance tests of focused questions in which specific predictions can be evaluated by comparing these predictions with the obtained data. Contrast analysis should be employed in the context of the analysis of variance whenever the numerator degrees of freedom are greater than one. The application areas are in the behavioral and social sciences, education and business.

Nondifferentiable Optimization. By Vladimir F. Dem'yanov and Leonid V. Vasil'ev. Optimization Software, Inc., and Springer-Verlag, New York, Inc. 1985. pp. xvii + 452. $72.00.

This is a volume in the Translations Series in Mathematics and Engineering, a translation by Tetsushi Sasagawa, Tokyo. It considers minimization problems for nonsmooth functions of a finite number of variables. Chapter headings: 1. Fundamentals of convex analysis and related problems. 2. Quasidifferentiable functions. 3. Minimization on the entire space. 4. Constrained minimization.

The Statistical Exorcist—Dispelling Statistics Anxiety. By Myles Hollander and Frank Proschan. Marcel-Dekker, New York, 1984. pp. xi + 247. $21.50.

This book provides approaches to intelligent decision-making, sampling, and estimating probabilities, with no algebra. It narrates in plain English words how statistics is used in everyday life and presents 26 vignettes which illustrate real-life applications of statistics.

Equations in Mathematical Physics. By V. S. Vladimirov. Mir Publishers, Moskow, 1984; available from Imported Publications, Inc., Chicago, Illinois. pp. 1 + 464. $10.95.

This text covers the well-posed boundary value problems for the differential equations of classical mathematical physics, by using the concept of a generalized solution. Chapter headings: 1. Statement of boundary value problems in mathematical physics. 2. Generalized functions. 3. Fundamental solutions and the Cauchy problem. 4. Integral equations. 5. Boundary value problems for equations of elliptic type. 6. Mixed problems.

Algorithm Graph Theory. By Alan Gibbons. Cambridge University Press, Cambridge, 1985. pp. xii + 259. $47.50 hardcover, $17.95 paperback.

This book is aimed primarily at computer scientists. For them graph theory provides a useful analytical tool and algorithmic interests are bound to be uppermost. The text does, however, contain an element of traditional material. Chapter headings: 1. Introducing graphs and algorithmic complexity. 2. Spanning-trees, branching and connectivity. 3. Planar graphs. 4. Network and flaws. 5. Matchings. 6. Eulerian and Hamiltonian tours. 7. Colouring graphs. 8. Graph problems and intractability.

Introduction to Probability Theory, By Kiyosi Itô. Cambridge University Press, New York, 1984. pp. ix + 213. $32.50 Hardcover, $12.95 Paperback.

This is a translation of the original Japanese edition, first published in 1978, of a text by the originator of the stochastic integral named after him. It is a modern, concise introduction, rigorous yet intuitive. Chapter headings: 1. Finite trials. 2. Probability measures. 3. Fundamental concepts in probability theory. 4. Sums of independent random variables.