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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 that 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.

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0033-569X(200003)58:1;1-X

Elements of Multivariate Time Series Analysis, Second Edition. By Gregory C. Reinsel, Springer-Verlag, New York, 1997, xvii+357 pp., $59.95

This second edition of a text first published in 1993 is a volume in the Springer Series in Statistics. In this revised edition, some additional topics have been added and certain existing materials have been expanded, in an attempt to provide a more complete coverage of the topics of time-domain multivariate time series modeling and analysis. A new chapter gives an account of topics that arise when exogenous variables are involved in the model structures (ARMAX models). Amongst other new sections, there is one on the background and motivation for the AIC criterion for model selection from the viewpoint of the Kullback-Leibler information theory, with discussion of some recent proposals for finite sample corrected versions of AIC. The chapter headings are: 1. Vector time series and model representation; 2. Vector ARMA time series models and forecasting; 3. Canonical structure of vector ARMA models; 4. Initial model building and least squares estimation for vector AR models; 5. Maximum likelihood estimation and model checking for vector ARMA models; 6. Reduced-rank and nonstationary cointegrated models; 7. State-space models, Kalman filtering, and related topics; 8. Linear models with exogenous variables.

Intelligence, Genes, and Success: Scientists Respond to "The Bell Curve". Edited by Bernie Devlin, Stephen E. Fienberg, Daniel P. Resnick, and Kathryn Roeder, Springer-Verlag, New York, 1997, xi+376 pp., $59.95

This is a volume in the series Statistics for Social Science and Public Policy. It is designed to be an edited volume of responses that attempt to take stock, in depth and from a variety of disciplinary perspectives. of the claims of Richard Herrnstein and Charles Murray's *The Bell Curve: Intelligence and Class Structure in American Life* (The Free Press, New York, 1994). There are fifteen chapters, divided into five parts: I. Overview; II. The Genetics-Intelligence Link; III. Intelligence and the Measurement of IQ; IV. Intelligence and Success: Reanalyses of Data from the National Longitudinal Survey of Youth; V. The Bell Curve and Public Policy.

Modern Multidimensional Scaling: Theory and Applications. By Ingwer Borg and Patrick Groenen, Springer-Verlag, New York, 1997, xvii+471 pp., $54.95

This is a volume in the Springer Series in Statistics. Multidimensional scaling (MDS) is a technique for the analysis of similarity or dissimilarity data of a set of objects. Such data may be intercorrelations of test items, ratings of similarity on political candidates, or trade indices for a set of countries. MDS attempts to model such data as distances among points in a geometric space, yielding graphical displays of the structure of the data, which are more easily understood than an array of numbers and which display the essential information in the data, smoothing out noise. The six chapters of Part I (Fundamentals of MDS) explain the basic notions on how MDS can be helpful in answering substantive questions. Later parts deal with various special models in a more mathematical way and with issues that are important in particular applications of MDS. An appendix on major MDS computer programs is designed to help the reader to choose a program and run a job.

Introduction to Parallel Algorithms. By C. Xavier and S. S. Iyengar, John Wiley and Sons, New York, 1998, xvi+365 pp., $74.95

This is a volume in the Wiley Series on Parallel and Distributed Computing. It presents the concept of parallel algorithms in four stages: Part 1 presents the foundation concepts in the design of parallel algorithms, introducing the concepts of pipelining, multiprocessing, time sharing, and shared memory models. Part 2 deals with the parallel algorithms used in graph-theoretic problems and part 3 with array manipulation algorithms. Part 4 presents the parallel algorithms for numerical and computational methods. The book includes step-by-step methods for developing parallel algorithms, as well as their detailed analysis and implementation, a large number of examples and detailed bibliographies.

Fractals in Molecular Biophysics. By T. Gregory Dewey, Oxford University Press, 1998, xii+276 pp., $65.00

This is a volume in the series Topics in Physical Chemistry. It is its goal to pull together diverse applications and to present a unified exposition how fractals can be used in molecular biophysics. The book is intended for two audiences: the biophysical chemist who is unfamiliar with fractals, and the expert in fractals who is unfamiliar with biophysical problems. A theme that runs through the book is the close association of fractals and renormalization group theory, the latter being intimately associated with phase behavior of polymers and aggregates. Chapter headinds: 1. What are fractals? 2. Fractal aspects of protein structure: 3. Loops, polymer statistics, and helix-coil transitions; 4. The multifractality of biomacromolecules; 5. Fractal diffusion and chemical kinetics; 6. Are protein dynamics fractal? 7. Fractals and vibrational relaxation in proteins; 8. Encoded walks and correlations in sequence data; 9. Percolation; 10. Chaos in biochemical systems.

An Introduction to Semilinear Evolution Equations, Revised Edition. By Thierry Cazenave and Alain Haraux, Oxford University Press, 1999, xiv+186 pp., $75.00

This is a volume in the Oxford Lecture Series in Mathematics and its Applications. It is an expanded version of a post-graduate course taught for many years at the Université Pierre et Marie Curie in Paris. The purpose of the course was to give a self-contained presentation of some recent results concerning the fundamental properties of solutions of semilinear evolution partial differential equations, with special emphasis on the asymptotic behaviour of the solutions. Chapter headings: 1. Preliminary results; 2. m-dissipative operators; 3. The Hille-Yosida-Phillips theorem and applications; 4. Inhomogeneous equations and abstract semilinear problems; 5. The heat equation; 6. The Klein-Gordon equation; 7. The Schrödinger equation; 8. Bounds on global solutions; 9. The invariance principle and some applications; 10. Stability of stationary solutions.

Geometry Civilized—History, Culture, and Technique. By J. L. Heibron, Oxford University Press, 1998, viii+309 pp., $60.00

This book began life as part of a project supported by the National Science Foundation to introduce history into the teaching of science, and science into the teaching of history. It contains a full introduction to plane geometry and trigonometry within a fascinating historial framework that sets off the technical material. The book is beautifully and extensively illustrated and includes carefully explained solutions to the problems discussed.

Kendall's Advanced Theory of Statistics, Volume 2A: Classical Inference and the Linear Model, Sixth Edition. By Alan Stuart, Keith Ord, and Steven Arnold, Oxford University Press, 1999, xxii+885 pp., $145.00

This edition differs from its predecessors in several key areas. It was decided that *The Advanced Theory* should revert to its earlier two-volume format, and is now being published as: Volume 1—Distribution Theory (by Alan Stuart and Keith Ord, last edition 1994) and Volume 2—Classical Inference and Relationships. Volume 2 is now published in two parts: Volume 2A—Classical Inference and the Linear Model; Volume 2B—Bayesian Inference (by Anthony O'Hagan, first edition 1994). The third volume, Design and Analysis and Time Series, is now replaced by *Kendall's Library of Statistics*, of which five titles have already appeared and several more are in preparation.

In this volume, statistical inference is covered in Chapter 26 and the linear model in Chapters 27–32. This involved both the redesign of existing chapters and the creation of several new ones. Over 100 older papers were dropped from the references and about 300 new ones added. The scope of this incomparable reference work is best indicated by its chapter headings: 17. Estimation and consistency; 18. Estimation: maximum likelihood and other methods; 19. Interval estimation; 20. Tests of hypotheses: simple null hypotheses; 21. Tests of hypotheses: composite hypotheses; 22. Likelihood ratio tests and test efficiency; 23. Invariance and efficiency; 24. Sequential methods; 25. Tests of fit; 26. Comparative statistical inference; 27. Statistical relationship: linear regression and correlation; 28. Partial and multiple correlation; 29. The general linear model; 30. Fixed effects in analysis of variance; 31. Other analysis of variance models; 32. Analysis and diagnostics for the linear model.

Monte Carlo Methods in Statistical Physics. By M. E. J. Newman and G. T. Barkema, Oxford University Press, 1999, xiv+475 pp., $98.00 (cloth), $45.00 (paper)

This book is intended for those who are interested in the use of Monte Carlo simulations in classical statistical mechanics. Its primary goal is to explain how to perform such simulations efficiently. To this end, the authors discuss, in addition to the classical Metropolis algorithm, some of the many interesting new algorithms designed to accelerate the simulation of particular classes of problems in statistical physics, such as cluster algorithms, multigrid methods, non-local algorithms for conserved-order-parameter models, entropic sampling, simulated tempering and continuous time Monte Carlo. The book is divided into three parts covering equilibrium (Chapters 1–8) and non-equilibrium (9–12) Monte Carlo simulations, and implementations (13–16). Each algorithm is introduced in the context of a particular model. For example, the Metropolis algorithm is illustrated by its application to the Ising model. A brief outline of the physics behind each model is always given. Chapter headings; 1. Introduction; 2. The principles of equilibrium thermal Monte Carlo simulation; 3. The Ising model and the Metropolis algorithm; 4. Other algorithms for the Ising model; 5. The conserved-order parameter Ising model; 6. Disordered spin models; 7. Ice models; 8. Analysing Monte Carlo data; 9. Out-of-equilibrium Monte Carlo simulations; 10. Non-equilibrium simulations of the Ising model; 11. Monte Carlo simulations in surface science; 12. The lepton model; 13. Lattices and data structures; 14. Monte Carlo simulations on parallel computers; 15. Multispin coding; 16. Random numbers. There are appendices with answers to problems and sample programs written in C.

Two- and Three-Dimensional Patterns of the Face. By Peter W. Halliman, Gaile G. Gordon, A. L. Yuille, Peter Giblin, and David Mumford, A. K. Peters, 1999, viii+262 pp.

This book deals with the elucidation of the intricate and detailed patterns of the human face using the tools of "pattern theory", of statistical pattern recognition and of differential geometry. The term "pattern theory" was introduced by Ulf Grenander in the 1970s as a name for a field of applied mathematics that gave a theoretical setting for a large number of related ideas, techniques and results from fields such as computer vision, speech recognition, statistical pattern recognition, neural nets and parts of artificial intelligence and which involves the adaptation of Bayesian statistical inference to the analysis of patterns and the inference of hidden structure in these fields of application. The book is designed to appeal to the specialist in computer vision, in which two fully worked out examples are presented, to the statistician, who will hopefully find how powerful and distinctive a tool pattern theory is, and to the mathematician for whom the authors demonstrate the interesting new mathematics suggested by the face, in both its two- and three-dimensional aspects. The scope of the book is indicated by its table of contents: 1. Faces from a pattern-theoretic perspective; 2. Overview of approaches to face recognition; 3. Modeling variations in illumination; 4. Modeling variations in geometry; 5. Recognition from image data; 6. Parabolic curves and ridges on surfaces; 7. Sculpting a surface; 8. Finding facial features from range data; 9. Recognition from range data; 10. What's next?

Modulated Waves—Theory and Applications. By Lev A. Ostrovsky and Alexander I. Potapov, The Johns Hopkins University Press, 1999, xii+369 pp., $60.00

This is a volume in the Johns Hopkins Studies in the Mathematical Sciences. This monograph describes both the classical results and the state of the art in the field, in the context of one-dimensional waves in which all the variables depend on time and only one coordinate. Another restriction is that to modulated waves: it is a wide and very important class, and the authors expand the concept of modulation to include a rather wide class of wave processes. The book may be divided into three parts: the first one (Chapters 1–4) contains general information about waves, their kinematic and dynamic properties, energy and momentum, and variational methods in wave theory. The second part (Chapters 5–8) is devoted to linear modulated waves and asymptotic properties of the waves, time analogs of geometric optics and quasi optics, and waves in nonstationary media. The third part (Chapters 9–12) is concerned with nonlinear waves and different forms of their modulation.

Wavelet Analysis—The Scalable Structure of Information. By Howard L. Resnikoff and Raymond O. Wells, Jr., Springer-Verlag, 1998, xv+435 pp.

In this book, the authors introduce the reader to the ideas and methods that lie behind the theory of compactly supported wavelets. They relate these to previously known methods in mathematics and engineering, show how they can be used in a digital signal processing and computing environment and illustrate their potential for mathematical engineering by describing several successful applications in bandwidth management. The book splits naturally into four parts: I. The scalable structure of information; II. Wavelet theory; III. Wavelet approximation and algorithms; IV. Wavelet applications. Part I illustrates the multiscale nature of information in the mathematical and natural worlds. Part II presents the algebraic and analytic theories of wavelet matrices, scaling and wavelet functions, wavelet systems, and the corresponding multiresolution analysis of square-integrable functions on a given space. Part III shows how to make the transition from the continuous to the discrete, and indicates how approximate and very effective finite scale wavelet series can be used to represent a function or a signal. In Part IV, the tools developed in Parts II and III are used to illustrate a number of applications of wavelets to problems in data compression and communications.

p- and hp-Finite Element Methods, Theory and Applications in Solid and Fluid Mechanics. By Christoph Schwab, Oxford University Press, 1999, xii+374 pp., $85.00

This is a volume in the series Numerical Mathematics and Scientific Computation. Finite element methods (FEM) are discretizations of boundary value problems in variational form. In the h-version FEM convergence is achieved by mesh refinement; in the p-version, it is achieved by increasing polynomial degree. This book resulted from a graduate course on FEM taught at the ETH, Zurich, to mathematicians and engineers who were interested in learning the mathematical basis for the recent higher-order, hp and spectral element methods. The investigation of the relative merits of higher-order methods over the classical h-version approach requires a careful look at the regularity of solutions of elliptic boundary value problems. Chapter I introduces some model boundary value problems and discusses different variational formulations for them. Chapter 2 introduces FEM as a general approximation scheme for saddle point problems. Chapter 3 is devoted to a detailed convergence study of FEM in one dimension, in particular, the approximation properties of p- and hp-FEM. Chapter 4 is devoted to the analysis of h-FEM with mesh refinement and of hp-FEM for the Poisson equation in a polygon. Chapter 5 addresses the mixed FEM for saddle point problems, with application to the Stokes problem in incompressible fluid flow. Chapter 6 treats hp-FEM in the theory of elasticity, including membranes, plates and shells. There are appendices on Sobolev and interpolation spaces, and orthogonal polynomials. The bibliography contains 152 items.

Scan Statistics and Applications. By Joseph Glaz and N. Balakrishnan, Birkhäuser, 1999, xv+324 pp., $79.95

An example of a scan statistic is the following. Let $Y(t,w)$ denote the number of Poisson events that have occurred in the interval $(t, t+w)$. A scan statistic $S(w,T)$ is defined as the maximum of $Y(t,w)$ over $0 < t < T - w$, where $(0,T)$ is the total interval in which the Poisson process is observed. Scan statistics have found applications in numerous disciplines such as archaeology, astronomy, epidemiology, geography, material science, molecular biology, reconnaissance, reliability and quality control, sociology, and telecommunication. This volume presents 14 papers devoted to various aspects and applications of scan statistics. They are grouped into four parts: Introduction and preliminaries (including an introductory chapter by the editors), discrete scan statistics, continuous scan statistics, and applications.

Mathematics of Derivative Securities. Edited by Michael A. H. Dempster and Stanley R. Pliska, Cambridge University Press, 1997, xvi+582 pp., $79.95

This is a volume in the series Publications of the Newton Institute. It is one of several volumes of proceedings of the Mathematical Finance Programme held from January through June 1995 at the Isaac Newton Institute for Mathematical Sciences, Cambridge, England. Its chapters represent a wide ranging collection of contributions to theory and methods for financial derivative instrument valuation and hedging. They are based largely on papers presented to the Bank of England Conference entitled "Mathematics of Finance: Models, Theories and Computation" which was held at the Institute from 22 May to 2 June 1995. In addition to the papers themselves, there is a foreword by Robert C. Merton tracing the relation between mathematical research and finance theory and finance practice, as it has evolved and is in prospect, and an introduction by the editors summarizing and commenting upon each of the papers. The 27 papers are grouped into five parts: I. Introduction; II. Option pricing and hedging; III. Valuation and hedging with market imperfections; IV. Term structure and interest rate derivatives; V. Numerical methods.