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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."

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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(199703)55:1;1-H

Models of Hysteresis. Edited by A. Visintin, Longman Scientific and Technical, 1993, 221 pp., $49.95

This is volume 286 in the Pitman Research Notes in Mathematics Series. It collects the proceedings of a workshop on the subject, held in Trento, Italy, in September 1991. There are 18 papers on the mathematical aspects of hysteresis, a property exhibited by phenomena such as plasticity, ferromagnetism, ferroelectricity, undercooling effects in liquid-solid (or vapour-liquid) transitions. Since all prominent mathematicians active in the field are represented, the volume offers a state-of-the-art summary of the subject. The models discussed employ mathematical topics such as partial differential equations, stochastic differential equations, control theory, stability, parabolic variational inequalities, singular perturbations, eigenvalue analysis, differential automata, semigroups, and others.

Technological Mechanics of Porous Bodies. By B. Druyanov, Oxford University Press, 1993, xii+184 pp., $57.00

This is a volume in the series Oxford Science Publications. It aims to describe and investigate the capability of some materials to acquire irreversible volumetric deformations. An example is the compacting of a porous (powder) material in a closed mould. Some theoretical questions specific to compressible bodies, such as the external friction of plastic compressible bodies, are given special consideration. A number of methods and theoretical questions are of interest not only for compressible but also for strain-hardened materials. Isothermal and non-isothermal deformation processes are considered. Chapter headings: 1. Foundation of porous body plasticity; 2. Initial and boundary-value problems, extremum theorems, and discontinuities; 3. Equations of two-dimensional flows; 4. Compacting; 5. Reduction, extrusion, and rolling; 6. Densification at evaluated temperatures; 7. Continuum theory of rigid-phase sintering.

Partial Differential Equations. By Fritz John, Springer-Verlag, 1992, x+249 pp., $32.00

This is volume 1 in the series Applied Mathematical Sciences. It is the fourth edition of the monograph first published in 1971. A considerable amount of new material has been added to this edition. There is an extensive discussion of real analytic functions of several variables in chapter 3. Chapter 6 now includes a more detailed discussion of Hilbert spaces with applications to the boundary behaviour of solutions of the Dirichlet problem in higher dimensions. To chapter 7 there has been added a proof of Widder's theorem on nonnegative solutions of the heat equation. A new chapter, chapter 8, contains H. Lewy's construction of a linear differential equation without solutions. There are also more problems, designed, in part, to extend the material discussed in the text. Chapter headings: 1. The single first-order equation; 2. Second-order equations: hyperbolic equations for functions of two independent variables; 3. Characteristic manifolds and the Cauchy problem; 4. The Laplace equation; 5. Higher-order elliptic equations with constant coefficients; 6. Parabolic equations; 7. H. Lewy's example of a linear equation without solution.

Probability. By Alan F. Karr, Springer-Verlag, 1993, xvii+282 pp., $39.00

This is a volume in the series Springer Texts in Statistics. It is a text at the introductory graduate level. On the question whether or not to include measure theory, the author concluded "that it is intellectually imperative and pedagogically sensible to introduce and use concepts and results from measure theory, but that it is not necessary (and perhaps not even desirable) to develop and prove them individually nor to treat measure theory as a subject in its own right." Hence, many proofs are downgraded or omitted, but the material is presented. Chapter headings: Prelude: Random walks; 1. Probability, 2. Random variables; 3. Independence; 4. Expectation; 5. Convergence of sequences of random variables; 6. Characteristic functions; 7. Classical limit theorems; 8. Prediction and conditional expectation; 9. Martingales.

An Introduction to Spectral Modeling. By Howard M. Taylor and Samuel Karlin, Academic Press, 1984, vii+566 pp.

This is a revised edition of the book first published in 1984. For this edition, the number of exercises has been doubled (with many answers and solutions provided) and errors have been corrected; Wald's equation has been added to the renewal theory chapter. The book is intended as a beginning text in stochastic processes, bridging the gap between a basic probability text and, for example, the authors' *A First Course in Stochastic Processes.* The objectives are to introduce students to the standard concepts and methods of the subject, to illustrate the rich diversity of applications of stochastic processes in the sciences, and to provide exercises in applications. Chapter headings: 1. Introduction; 2. Conditional probability and conditional expectation; 3. Markov chains: introduction; 4. The long run behaviour of Markov chains; 5. Poisson processes; 6. Continuous time Markov chains; 7. Renewal phenomena; 8. Branching processes and population growth; 9. Queueing systems.

Box Splines. By C. de Boor, K. Hölling, and S. Riemenschneider, Springer-Verlag, 1993, xvii+200 pp.

This is volume 98 in the series Applied Mathematical Sciences. The authors wrote it to remedy the situation that the basic facts about box splines – which give rise to a beautiful mathematical theory— have been available only in research papers. They have not only organized the available material in a cohesive way, but present a careful exposition of the theory with simple and complete (and often new) proofs. Chapter headings: 1. Box splines defined; 2. The linear algebra of box spline spaces; 3. Quasi-interpolants and approximation power; 4. Cardinal interpolation and difference equations; 5. Approximation by cardinal splines and wavelets; 6. Discrete box splines and linear Diophantine equations; 7. Subdivision algorithms. There is also a bibliography of about 260 items.

Associative Neural Memories—Theory and Implementation. By Mohamad H. Hassoun, Oxford University Press, 1993, xxi+350 pp., $85.00

This volume brings together significant papers on associative neural memory theory (architecture, learning, analysis, and design) and hardware implementation (VLSI and opto-electronic) by leading international researchers. Its purpose is to integrate recent fundamental and significant research results and present the material in a clear and organized format. The book is organized into an introductory chapter by the editor plus four parts: biological and psychological connections (3 papers), artificial associative neural memory models (3 papers), analysis of memory dynamics and capacity (7 papers), implementation (5 papers).

Eigenvalues of Matrices. By Françoise Chatelin, John Wiley and Sons, 1993, xiii+382 pp., $81.95

This is a translation, by Walter Ledermann, of the work originally published in French, in two volumes (1988 and 1989) by Masson, Paris. The exercises are by the author and Mario Ahués. The presentation is organized around several salient ideas: treatment of the eigenvalue problem in complete generality (nonsymmetric matrices, multiple defective eigenvalues), influence on spectral conditioning of the departure from normality, use of the Schur form in preference to the Jordan form, simultaneous treatment of several distinct eigenvalues, presentation of the most efficient algorithms (for sequential or vectorial computers) for computing e.v.'s of medium size dense matrices and large size sparse matrices, analysis of the convergence of subspaces by means of the convergence of their bases, analysis of the quality of approximation, improvement of numerical efficiency by spectral preconditioning.

Hilbert's Tenth Problem. By Yuri V. Matiyasevich, The MIT Press, 1993, xii+264 pp., $45.00

Hilbert's Tenth problem (presented in 1900) reads: given a Diophantine equation with any number of unknown quantities and with rational integral numerical coefficients, to devise a process according to which it can be determined by a finite number of operations whether the equation is solvable in rational integers. This book is a volume in the Foundations of Computing Series. It is a translation from the Russian by the author himself, edited by David Jones and Martin Davis. There is a foreword by Martin Davis, sketching the history of the subject. He recalls that, in 1970, the author of this monograph presented a beautiful and elegant construction of a Diophantine equation that satisfies Julia Robinson's hypothesis. This showed not only "that Hilbert's Tenth Problem is unsolvable, but also that two fundamental concepts arising in different areas of mathematics are equivalent." There are ten chapters: 1. Principal definitions; 2. Exponentiation is Diophantine; 3. Diophantine coding; 4. Universal Diophantine equations; 5. Hilbert's tenth problem is unsolvable; 6. Bounded universal quantifiers; 7. Decision problems in number theory; 8. Diophantine complexity; 9. Decision problems in calculus; 10. Other applications of Diophantine representations.

Numerical Solutions of the Incompressible Navier-Stokes Equations. By L. Quartapelle, Birkhäuser-Verlag, 1993, xii+291 pp.

This is volume 113 in the International Series of Numerical Mathematics. The author's aim was to provide graduate students and researchers in computational fluid dynamics with a brief introduction to the numerical methods for the solution of the unsteady incompressible Navier-Stokes equations. Rather than presenting a great variety of numerical techniques, the author preferred to give a unitary view of the methods that reduce the equations for viscous incompressible flows to a system of second-order equations of parabolic and elliptic type. Chapter headings: 1. The incompressible Navier-Stokes equations; 2. Nonprimitive variable formulation in 2D; 3. Nonprimitive variable formulation in 3D; 4. Vorticity-velocity representation; 5. Primitive variable formulation; 6. Evolutionary pressure-velocity equations; 7. Fractional-step projective method; 8. Incompressible Euler equations.

Atmospheric Data Analysis. By Roger Daley, Cambridge University Press, 1993, xiv+454 pp., $29.95 (paper)

This is a volume in the Cambridge Atmospheric and Space Science Series. It is designed to be self-contained and thus includes some topics from atmospheric dynamics and statistics. The emphasis is on the theoretical foundations of the subject, and most of the developments are analytic. However, practical aspects and examples are introduced where appropriate. The book is intended for graduate or advanced undergraduate students with no prior knowledge of the subject. The emphasis in early chapters is on spatial analysis, and the treatment is largely mathematical or statistical. Gradually, more atmospheric physics, in the form of multivariate constraints, is introduced, and there is an increasing emphasis on temporal aspects. Chapter headings: 1. Introduction; 2. Function fitting; 3. The method of successive corrections; 4. Statistical interpolation: univariate; 5. Statistical interpolation: multivariate; 6. The initialization problem; 7. Quasi-geostrophic constraints; 8. Variational procedures; 9. Normal mode initialization: theory; 10. Normal mode initialization: applications; 11. Dynamic initialization; 12. Continuous data assimilation; 13. Future directions.

Asymptotic Behaviour of Solutions of Evolutionary Equations. By M. I. Vishik, Cambridge University Press, 1993, 155 pp., $39.95 (hard cover), $18.95 (paper)

This is a volume in the series Lezioni Lincee, which consists of books arising from lectures given under the auspices of the Accademia Nazionale dei Lincei through a grant from IBM Italia. The theme of this volume is the investigation of globally asymptotic solutions of evolutionary equations. Locally asymptotic solutions of the Navier-Stokes equations and reaction-diffusion equations are the starting point, and by considering perturbed evolutionary equations, global approximations are constructed.

Nonlinear Magnetohydrodynamics. By Dieter Biskamp, Cambridge University Press, 1993, xiv+378 pp., $79.95

This is a volume in the series Cambridge Monographs on Plasma Physics. It provides a self-contained introduction to the subject, with emphasis on nonlinear processes. Chapters 2 to 4 outline the conventional aspects of MHD theory, magnetostatic equilibrium and linear stability theory. Chapters 5 to 7 present nonlinear theory, starting with the evolution and saturation of individual ideal and resistive instabilities, continuing with a detailed analysis of magnetic reconnection, and concluding with the most complex nonlinear behaviour, that of MHD turbulence. The last three chapters describe three important applications of the theory. Chapter headings: 1. Introduction; 2. Basic properties of magnetohydrodynamics; 3. Magnetostatic equilibria; 4. Normal modes and instability; 5. Nonlinear evolution of MHD instabilities; 6. Magnetic reconnection; 7. MHD turbulence; 8. Disruptive processes in tokamak plasmas; 9. Dynamics of the reversed-field pinch; 10. Solar flares.

Handbook of Integration. By Daniel Zwillinger, Jones and Bartlett Publishers, 1992, vii+367 pp.

This book is a compilation of the most important and widely applicable methods for evaluating and approximating integrals. As a reference book, it provides convenient access to these methods and contains examples showing their use. The book is divided into five parts: Applications of Integration, which shows how integration is used in differential equations, geometry, probability and performing summations; Concepts and Definitions, which defines several different types of integrals and operations on them; Exact, approximate and numerical techniques, which indicate several ways in which integrals may be evaluated exactly, approximately, and numerically, respectively.

Wavelets and Their Applications. Edited by Mary Beth Ruskai, Gregory Beylkin, Ronald Coifman, Ingrid Daubechies, Stephane Mallat, Yves Meyer, and Louise Raphael, Jones and Bartlett Publishers, 1992, xiii+474 pp.

This book had its genesis in the NSF/CBMS conference held at the University of Lowell in June, 1990. It is a book of essays on wavelets, using the invited lectures from that conference as a core, but including other contributors as well. It comprises an introduction by M. B. Ruskai and 18 papers divided into four groups: signal analysis, numerical analysis, other applications, and theoretical developments.