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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.

CONTENTS

Vol. LVI, No. 1 **March 1998**

Information Theory and Molecular Biology. By Hubert P. Yockey, Cambridge University Press, 1992, xix+408 pp., $69.95

This monograph is intended to introduce molecular biologists to the application of information theory and coding theory in their field. It is divided into two parts. Part I: the basic mathematical ideas, and part II: application to problems in molecular biology. Part I (chapters 1–5) presents the mathematical ideas and background in sufficiently complete form to make it unnecessary to refer to other books. Chapter headings: 1. Basic ideas in probability theory; 2. The role of entropy: a quantitative measure of information, uncertainty and complexity; 3. The principle of maximum entropy; 4. Coding theory and codes with a Central Dogma; 5. The source, transmission and reception of information; 6. The information content or complexity of protein families; 7. Evolution of the genetic code and its modern characteristics; 8. The early earth and the primeval soup; 9. Did life emerge by chance from a primeval soup? 10. Self-organization origin of life scenarios; 11. Error theories of aging; 12. Information theory and molecular evolution.

Vertically Transmitted Diseases–Models and Dynamics. By Stavros Busenberg and Kenneth Cooke, Springer-Verlag, 1993, xi+248 pp., $109.00

This is volume 23 in the series Biomathematics. It is its purpose to describe a class of predictive tools and their application to diseases whose mode of transmission includes vertical transmission, that is, the passing of the infection from a parent to an unborn or newborn offspring. There are three basic objectives of this book. The first is to show the reader how to formulate a set of mathematical equations that capture the essentials of a given epidemiological situation. A second objective is to demonstrate the mathematical analysis by which the implications from a model may be derived. A third objective is to show how the mathematical analysis of models yields epidemiological inferences which cannot be easily detected from either the statistical analysis of data or from qualitative logical inferences. Chapter headings: 1. Introduction; 2. Differential equations models; 3. Difference equations models; 4. Delay differential equations models; 5. Age and internal structure.

Turbulence and Random Processes in Fluid Mechanics. By M. T. Landahl and E. Mollo-Christensen, Cambridge University Press, 1992, xii+168 pp., $59.95 (cloth), $19.95 (paperback)

This is the second edition of the monograph first published in 1986. In addition to correcting misprints and errors in the text, the equations, and the figures, the authors have also clarified points that have proved difficult for students. In chapter 8 a short description of a simplified model for the temporal and spatial evolution of three-dimensional disturbances in a strong mean shear has been added, and a short chapter (chapter 12) on numerical modeling of turbulence has been added. The chapter headings are: 1. Introduction with historical notes; 2. Characteristic scales and nondimensional parameters; 3. Statistical tools for description of turbulence; 4. Flows that are homogeneous in more than one spatial dimension; 5. Waves; 6. Instability and transition to turbulence; 7. Shera flow turbulence structure; 8. Turbulence modeling and closure schemes; 9. Aerodynamic noise; 10. Convective transport; 11. Numerical simulation of turbulence.

The Mathematics of Oil Recovery. Edited by P. R. King, Oxford University Press, 1992, xviii+817 pp., $195.00

This is volume 31 in The Institute of Mathematics and its Applications Conference Series, being the proceedings of a conference organized by the Institute in association with the Society of Petroleum Engineers and held at Robinson College, Cambridge, in July 1989. The conference concentrated on three main themes: the statistical description of the porous medium geological environment at various length scales; the derivation of the appropriate spatially averaged equations of motion for multiphase displacement processes; solution of the resulting partial differential equations by numerical methods. There are 47 papers in all.

Complex Analysis and Applications. By Alan Jeffrey, CRC Press, 1992, viii+642 pp., $48.00

This text, for students of engineering and applied mathematics, is intended to serve a dual purpose: to discuss in detail the solution of two-dimensional potential problems by means of conformal mapping, and to develop those methods of complex analysis which are needed when using transform techniques to obtain solutions to ordinary and partial differential equations. Chapter headings: 1. Analytic functions; 2. Conformal mapping; 3. Boundary value problems, potential theory and conformal mapping; 4. Complex integration; 5. Taylor and Laurent series, residue theorem and applications.

Differential Equations and Group Methods for Scientists and Engineers. By James M. Hill, CRC Press, 1992, xi+201 pp., $59.95

This text presents a concise and self-contained account of the use of one-parameter transformation groups that leave the differential equation invariant to solve differential equations. Only the essentials are included, sufficient to enable the reader to attempt the group approach when solving differential equations. Chapter 1 gives a general introduction with simple examples involving both ordinary and partial differential equations. The other chapters are headed: 2. One-parameter groups and Lie series; 3. Invariance of standard linear ordinary differential equations; 4. First order ordinary differential equations; 5. Second and higher order ordinary differential equations; 6. Linear partial differential equations; 7. Non-linear partial differential equations.

An Introduction to Mathematical Cosmology. By J. N. Islam, Cambridge University Press, 1992, xii+190 pp., $60.00 (cloth), $24.95 (paper)

This monograph discusses not only traditional cosmology, but also has a chapter each on inflationary models, quantum cosmology, the distant future of the universe, and on singularities. It is essentially an introductory book, although a knowledge of general relativity is helpful—a brief exposition is included in chapter 2. Chapter headings: 1. Some basic concepts and an overview of cosmology; 2. The Robertson-Walker metric and the Einstein equations; 3. The Friedmann models; 4. The Hubble constant and the deceleration parameter; 5. Models with a cosmological constant; 6. Singularities in cosmology; 7. The early universe; 8. The very early universe and inflation; 9. Quantum cosmology; 10. The distant future of the universe; 11. Some recent developments.

Principles of Continuum Mechanics. By Mysore N. L. Narasimhan, John Wiley and Sons, 1993, xiv+567 pp.

This text, addressed to graduate students and research workers, is devoted not only to the classical continuum theory of solids and fluids, but also to certain selected topics of modern continuum mechanics of viscoelasticity and microcontinua together with their applications to problems of practical interest. A feature of the book is the derivation of the constitutive equations for materials from thermodynamics. The author provides complete mathematical derivations of most of the fundamental equations introduced in the book. The book is divided into ten chapters: 1. Basic concepts of the theory of continuous media; 2. Tensor algebra; 3. Tensor calculus; 4. Kinematics of deformation; 5. The stress concept and the thermomechanical balance laws; 6. A thermodynamic approach to constitutive equations of simple materials; 7. Selected topics in linear elasticity theory; 8. Selected topics in fluid mechanics; 9. Special theories of generalized continua; 10. A continuum model for liquid crystals. The two topics discussed in chapter 7 are the problem of an elastic plate weakened by a central elliptic hole, and Rayleigh surface wave propagation in elastic solids. In chapter 8 expressions for viscous dissipation and heat transfer, as well as the Navier Stokes equations, are derived, the concept of similarity in fluid flow is introduced, and problems such as Couette flow in a rotating cylindrical annulus, flow due to a rotating disk, and Stokes flow past a fixed rigid sphere, are solved completely. Chapters 9 and 10 belong to the area of modern continuum mechanics: e.g., viscoelasticity, microcontinuum and micropolar theories, nonlocal continuum theory, a continuum theory of nematic-type liquid crystals.

Large Deviation Techniques and Applications. By Amir Dembo and Ofer Zeitouni, Jones and Bartlett Publishers, 1993, xiii+346 pp., $44.50

The authors take *Large deviations* to mean the evaluation of small probabilities on an exponential scale. Large deviation estimates have proved to be the crucial tool required to handle many questions in statistics, engineering, statistical mechanics, and applied probability. This book is an attempt to provide a rigorous exposition of the theory of large deviations geared to audiences with widely different backgrounds. The principles are first discussed in a relatively simple, finite dimensional setting, and the abstraction that follows is motivated and based on it and on real applications that make use of the simple estimates. The emphasis is on the projective limit approach, which is the natural tool to pass from simple finite dimensional statements to abstract ones. Chapter headings: 1. Introduction; 2. The large deviation principle (LDP) for finite dimensional spaces; 3. Applications—the finite dimensional case; 4. General principles; 5. Sample path large deviations; 6. The LDP for abstract empirical measures; 7. Applications of empirical measures LDP.

Nearrings–Geneses and Applications. By James R. Clay, Oxford University Press, 1992, x+469 pp., $95.00

This book was written with advanced graduate students—those about to start on a dissertation—in mind, so a good foundation in algebra is a prerequisite for reading this authoritative account of the theory of algebraic structures that are generalisations of rings. There are discussions of many examples of nearrings in and outside pure mathematics. The chapter headings are: 1. Introduction to nearrings; 2. Planar nearrings; 3. The great unifier; 4. Some first families of nearrings and some of their ideals; 5. Some structure of groups of units; 6. Avant-garde families of nearrings.

Graphs: Theory and Algorithms. By K. Thulasiraman and M. N. S. Swamy, John Wiley and Sons, 1992, xv+460 pp., $64.95

This book is addressed to students in engineering, computer science, and mathematics and attempts to provide a unified and in-depth treatment of those topics in graph theory and graph algorithms that are fundamental in nature and that occur in most applications. In the first ten chapters the authors discuss the theory of graphs. The topics discussed include trees, circuits, cutsets, Hamiltonian and Eulerian graphs, directed graphs, matrices of a graph, planarity, connectivity, matching, and coloring. Also included is an introduction to matroid theory. The last two chapters of the book deal with graph algorithms and flows in networks.

Synchronization and Linearity–An Algebra for Discrete Event Systems. By François Baccelli, Guy Cohen, Geert Jan Olsder, and Jean-Pierre Quadrat, John Wiley and Sons, 1992, xix+489 pp.

This is a volume in the Wiley Series in Probability and Mathematical Statistics. The mathematical theory developed in it found its initial motivation in the modeling and time behavior of a class of dynamic systems (discrete event dynamic systems), which essentially contains man-made systems that consist of a finite number of resources shared by several users, which all contribute to the achievement of some common goal. The coordination of the user access to these resources requires complex control mechanisms which usually make it impossible to describe the dynamic behavior of such systems in terms of differential equations. The dynamics of such systems can in fact be described using the two (Petri net like) paradigms of "synchronization" and "concurrency". Synchronization requires the availability of several resources or users at the same time, whereas concurrency appears for instance when, at a certain time, some user must choose among several resources. Synchronization is the main topic of this book. The following are the chapter headings. Part I: Discrete event systems and Petri nets. 1. Introduction and motivation; 2. Graph theory and Petri nets. Part II: Algebra. 3. Max-plus algebra; 4. Dioids. Part III: Deterministic system theory. 5. Two-dimensional domain description of event graphs; 6. Max-plus linear system theory. Part IV: Stochastic systems. 7. Ergodic theory of event graphs; 8. Computational issues in stochastic event graphs. Part V: Postface. 9. Related topics and open ends.

Quantum Chaos–a new paradigm of nonlinear dynamics. By Katsuhiro Nakamura, Cambridge University Press, 1993, xii+208 pp.

This is volume 3 in the Cambridge Nonlinear Science Series. Most recent studies of chaos have dealt with classical systems. In this book, the author deals with three major issues in quantum chaos. First, quantum mechanics is applied to both bounded and open systems exhibiting classical chaos. Here, quantum chaos sheds new light on subjects such as diamagnetism, antiferrimagnetism, spin waves, electrical conductance, etc. Second, adiabetic-ansatz eigenvalue problems are shown to yield a new paradigm of nonlinear dynamics, closing the gap between solitons and random matrices. Finally, the author attempts to show how quantum mechanics may be modified so as to accomodate temporal chaos. Chapter headings: 1. What are the problems?; 2. Quantum billiards: from closed to open systems; 3. Quantum chaos in spin systems; 4. Nonlinear dynamics in spin-wave instabilities: chaos of macroscopic quanta; 5. Universal dynamical system behind quantum chaos: a single-parameter case; 6. Nonadiabetic generalization, field-theoretical model and future prospects.

Inverse Methods in Physical Oceanography. By Andrew F. Bennett, Cambridge University Press, 1992, xvi+346 pp., $59.95

This is a volume in the series Cambridge Monographs on Mechanics and Applied Mathematics. Inverse methods combine oceanic observations with theoretical models of ocean circulation. The methods lead to estimates of oceanic fields from sparse data, guided by physical laws, of meteorological forcing fields, and of parameters in the physical laws. They also lead to designs for oceanic observation systems, to resolution of mathematically ill-posed modeling problems, and to tests of scientific hypotheses. The purpose of this book is to introduce advanced graduate students, research scientists, and ocean forecasters, to the possibilities for inverse theory. It attempts to provide for the requirements of oceanographers, that is, detailed analysis of the application of inverse methods to nonlinear, time-dependent, dynamical models of stratified ocean circulation; detailed discussion of data requirements, including initial and boundary conditions; a theory for the design of observing systems, and interpretations of simple data-assimilation techniques in terms of inverse methods. Close attention is given to many real inverse calculations drawn from the recent oceanographic literature. A basic knowledge of geophysical fluid dynamics and ocean modeling is assumed. There are ten chapters: 1. Finite-dimensional inverse theory; 2. Smoothing of observations; 3. Data assimilation; 4. The spatial structure of the Kalman filter; 5. Generalized inverses of dynamical models; 6. Antenna analysis; 7. Nonlinear quasi-geostrophic models; 8. Open-ocean modeling: quasi-geostrophy; 9. Primitive equation models; 10. Outstanding problems.

Stochastic Models in Queueing Theory. By J. Medhi, Academic Press, 1991, xiii+444 pp., $63.50

This text is divided into eight chapters. Chapter 1, stochastic processes, is a summary of basic results; chapter 2 is devoted to general concepts, such as the Poisson arrivals see time averages (PASTA) property, superposition of arrival processes, and customer and time averages; chapters 3 and 4 deal with birth-and-death queueing models and non-birth-and-death systems, respectively. Chapter 5 is devoted to networks of queues and chapter 6 to non-Markovian queueing systems. In chapter 7, systems with general arrival and service patterns are discussed. Chapter 8 covers miscellaneous topics such as asymptotic methods, such as the diffusion approximation, and queues with vacations, with a brief excursion into the design and control of queues.

Finite Elements for Solids, Fluids, and Optimization. By G. A. Mohr, Oxford University Press, 1992, xvi+604 pp., $120.00 (cloth), $53.00 (paperback)

This comprehensive text not only presents the bases and classical applications of the finite element method (FEM), but also introduces concisely the basic theories of solid and fluid mechanics, numerical methods, and optimization techniques, as well as dealing with new developments of the FEM such as the use of the penalty factor and Lagrange multiplier techniques in element formulation, applications to new problems such as thick plates and shells, compressible and transonic fluid flows, and optimization of finite element models. It also contributes new developments such as basis transformation, which allows existing element formulations to be transformed into new ones, transformation of Lagrange multiplier formulations into equivalent penalty formulations, and application of a perturbation technique to transform functionals into differential equations (or vice versa) or to attack the governing functional or differential equation directly. The 23 chapters are divided into five parts: 1. Introduction to finite elements; 2. Applications to the statics of solids; 3. Non-linear and time dependent problems, and FEM programming; 4. Finite elements in fluid flow and other field problems; 5. Further applications of the finite element method.

Cryptography and Coding II. Edited by Chris Mitchell, Oxford University Press, 1992, xi+301 pp., $87.00

This is volume 33 in The Institute of Mathematics and its Applications Conference Series. it is based on the proceedings of a conference organized by the Institute and held at the Royal Agricultural College, Cirencester, in December 1989. The logic behind the conference is that ever since Shannon's papers of the late 1940s, one major role of cryptography can be seen as part of the source and channel processes for the communication of information. Many significant theoretical developments in cryptography continue to have close relation to work in coding and information theory in general, as exemplified by several papers in this volume. There were five sessions containing a total of 24 papers. Full versions of 20 of these appear in this volume. Of the five sessions, two were on cryptography, two on coding and one on sequences.

Chaotic Dynamics–Theory and Applications to Economics. Edited by Alfredo Medio in collaboration with Giampaolo Gallo, Cambridge University Press, 1993, xv+344 pp., $54.95 (hardcover); $50.00 (IBM disk)

The objective of this book is to provide a tool for the theoretical and numerical investigation of nonlinear dynamical systems modelled by means of ordinary differential and difference equations, with special attention given to the analysis and understanding of chaotic dynamics. The work is divided into two parts: (i) a book, including a theoretical overview of the subject matter and a number of applications; (ii) an integrated software program called DMC (originally standing for Dynamic Model Cruncher) together with its manual. The authors hope that both the text and the program will be suitable in different fields of study, although the emphasis is laid on, and all applications derived from, dynamical systems arising from economic motivation. The fifteen chapters are grouped into three parts. Part I: Theory. 1. General introduction: chaos and economics; 2. Basic mathematical concepts; 3. A user's guide; 4. Surfaces of sections and Poincaré maps; 5. Spectral analysis; 6. Lyapunov characteristic exponents; 7. Dimensions; 8. Symbolic dynamics; 9. Transition to chaos. Theoretical predictive criteria; 10. Analysis of experimental signals—some theoretical problems; Part II: Applications to economics. 11. Discrete and continuous chaos; 12. Cycles and chaos in overlapping-generations models with production; 13. Chaos in a continuous-time model of inventory business cycles; 14. Analysis of experimental signals—applications; Part III: Software. 15. DMC Manual.

Numerical Methods for Conservation Laws. By Randall J. LeVeque, Birkhäuser Verlag, 1992, vii+214 pp.

This is the second edition of a monograph in the series Lectures in Mathematics, ETH Zürich. The first nine chapters are devoted to the mathematical theory of conservation laws, and the remaining 14 chapters to numerical methods. The latter cover linear and nonlinear problems, computing discontinuous solutions, Godunov's method, approximate Riemann solvers, nonlinear stability, high resolution methods, semi-discrete methods, and multidimensional problems.

Coding Theory, Design Theory, Group Theory. Edited by Dieter Jungnickel and Scott Vanstone, John Wiley and Sons, 1993, xxi+299 pp., $86.00

These are the proceedings of the Marshall Hall Conference, which was held at the University of Vermont, 13–18 September 1990. It contains the texts of eight invited and twenty submitted papers, in the multidisciplinary fields addressed by the conference, to which Marshall Hall contributed so generously.

The Visual Mind–Art and Mathematics. Edited by Michele Emmer, The MIT Press, 1993, xvii+274 pp., 50 illustrations, 12 in color, $39.95

This is a volume in the series Leonardo Book. This book deals with areas in which artists and mathematicians are exchanging ideas and working together, such as scientific visualization, higher-dimensional geometries, 3D computer modeling, computer animation, imaginary and virtual environments. There are 35 chapters, by mathematicians concerned with the visual aspects of their computations and by visual artists concerned with the mathematical origins of their creations. They are divided into sections covering Geometry and Visualization; Computer Graphics; Geometry and Art; Symmetry and Perspective; Mathematics and Art. The chapters are tied together by introductions to each of these sections, by Arthur L. Loeb, Frank J. Malina with Roger F. Malina, István Hargittai, and Kim H. Veltman, respectively, and there is an introductory essay to the book by the editor. The work is richly illustrated.

Symmetry in Chaos–The Search for Pattern in Mathematics, Art, and Nature. By Michael Field and Martin Golubitsky, Oxford University Press, 1992, xii+218 pp., $35.00

The authors, in their professional research as mathematicians, study how symmetry and dynamics coexist, and this study has led to the pictures of symmetric chaos presented in this beautiful, lavishly illustrated book. They had two purposes in writing the book: to present these pictures, and to present the mathematical ideas of symmetry and chaos needed to understand how these pictures are formed, that is, to explain their relationship with pattern formation and geometric design and art. The chapter headings are: 1. Introduction to symmetry and chaos; 2. Planar symmetries; 3. Patterns everywhere; 4. Chaos and symmetry creation; 5. Symmetric icons; 6. Quilts; 7. Symmetric fractals. In the appendices, the authors give the exact parameter values used to produce the pictures, the detailed computer programs, written in QuickBasic, and the derivation of the formulas for symmetric chaos presented in chapters 5–7.

Topics in Fluid Mechanics. By Rene Chevray and Jean Mathieu, Cambridge University Press, 1993, xv+320 pp., $125.00 (hardcover), $49.95 (paper)

The authors' aim in this graduate text is not to offer a classical view of an established subject, as for an undergraduate text, but to present several subjects chosen from currently important topics in fluid mechanics, stressing a unity of concepts, rather than of material. The Navier-Stokes equations, for instance, are here extended to include memory effects, leading to higher-order equations. The interplay between convective and diffusive effects in many flows is introduced. Fundamental ideas are reviewed in the first two chapters. Chapter headings: 1. Basic concepts; 2. Toward a constitutive law for fluid materials; 3. Vorticity laws; 4. Fundamental concepts of turbulence; 5. Dynamical systems and chaotic advection; 6. Chaos and the onset of turbulence; 7. Boundary layer theory; 8. Wave propagation; 9. Fundamentals of classical thermodynamics.

Computer Algebra in Industry–Problem Solving in Practice. Edited by Arjeh M. Cohen, John Wiley and Sons, 1993, ix+252 pp., $45.00

These are the proceedings of the SCAFI '91 Seminar, held in December 1992 at Amsterdam. The seminar's theme was to show how computer algebra in industry can be useful and cost effective. There is a general introduction by A. M. Cohen, J. H. Davenport and A. J. P. Heck, and the thirteen papers are divided into five groups: liquids, mechanics, electronics, miscellaneous, and numeric interfaces.