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Kapitel: Analyse numérique

a variety of modern-day topics and techniques. The book introduces a number of new research areas, including the Mantel-Haenszel method, Kappa statistics, ordinal risks, odds ratio estimates, goodness-of-fit, and various regression models for categorical data. The author presents his information in a user-friendly format and an accessible style while purposefully keeping the mathematics to a level appropriate for students in applied fields. The book is well supplemented with helpful graphs and tables.

Michel NOVI. — **Pourcentages et tableaux statistiques.** — Que sais-je?, vol. 3337. — Un vol. broché, 11,5×18, de 126 p. — ISBN 2-13-048880-3. — Prix: FF 42.00. — Presses universitaires de France, Paris, 1998.

Cet ouvrage traite des pourcentages en analyse statistique. Il se consacre aux méthodes descriptives et les présente par complexité croissante, le seul outil requis demeurant la règle de trois. L'étude et la mesure de l'association font l'essentiel de ce livre qui s'adresse à tous publics, mais en particulier aux étudiants des disciplines pour lesquelles l'usage des échelles nominales est intensif. En se limitant au niveau descriptif, ce livre ne requiert aucun bagage mathématique.

A.W. VAN DER VAART. — **Asymptotic statistics.** — Cambridge series in statistical and probabilistic mathematics. — Un vol. relié, 18,5×26, de XV, 443 p. — ISBN 0-521-49603-9. — Prix: £40.00. — Cambridge University Press, Cambridge, 1998.

This book is an introduction to the field of asymptotic statistics. In addition to most of the standard topics of an asymptotics course, including likelihood inference, M-estimation, asymptotic efficiency, U-statistics, and rank procedures, the book also presents recent research topics such as semiparametric models, the bootstrap, and empirical processes and their applications. One of the unifying themes is the approximation by limit experiments. This entails mainly the local approximation of the classical i.i.d. set-up with smooth parameters by location experiments involving a single, normally distributed observation. Thus, even the standard subjects of asymptotic statistics are presented in a novel way.

Analyse numérique

Zhongying CHEN, Charles A. MICCHELI, Yuesheng XU, (Editors). — **Advances in computational mathematics.** — Proceedings of the Guangzhou International Symposium. — Pure and applied mathematics, vol. 202. — Un vol. broché, 18×25,5, de XX, 604 p. — ISBN 0-8247-1946-8. — Prix: US$ 175.00. — Marcel Dekker, Inc., New York, 1998.

The Guangzhou International Symposium on Computational Mathematics was held at Zhongshan University, Guangzhou, People's Republic of China, in 1997. Reporting on topics ranging from numerical linear algebra to signal and image processing, this book addresses computational approximation, numerical solutions of differential and integral equations, inverse and ill-posed problems, and geometric modeling; presents a new class of Jacobi polynomials orthogonal with respect to certain varying weights; applies eigenstate preserving schemes to center manifolds and Hopf and torus bifurcations; constructs cubature formulas for the unit sphere in $\mathbf{R}^n$ that have almost equal weights.

P.G. CIARLET, J.L. LIONS. — **Handbook of numerical analysis, vol. 6: Numerical methods for solids (part 3), Numerical methods for fluids (part 1).** — Un vol. relié, 17,5×24,5, de X, 689 p. — ISBN 0-444-82569-X. — Prix: Dfl. 285.00. — Elsevier, Amsterdam, 1998.

This series of volumes covers all the major aspects of numerical analysis, serving as the basic reference work on the subject. Each volume concentrates on one to three particular topics.

Each article, written by an expert, is an in-depth survey, reflecting the most recent trends in the field, and is essentially self-contained. The handbook will cover the basic methods of numerical analysis, under the following general headings: Solution of equations in $\mathbf{R}^n$, finite difference methods, finite element methods, techniques of scientific computing, optimization theory and systems science. It also covers the numerical solution of actual problems of contemporary interest in applied mathematics, under the following headings: Numerical methods for fluids, numerical methods for solids, specific applications including meteorology, seismology, petroleum mechanics and celestial mechanics. *Contents of vol. 6: Numerical Methods for Solids (part 3):* R.M. Ferencz, T.J.R. Hughes: Iterative finite element solutions in nonlinear solid mechanics. — Obituary - Juan Carlos Simo. — J.C. Simo: Numerical analysis and simulation of plasticity. — *Numerical Methods for Fluids (part 1):* M. Marion, R. Temam: Navier-Stokes equations: theory and approximation.

Patrick DEWILDE and Alle-Jan VAN DER VEEN. — **Time-varying systems and computations.** — Un vol. relié, 16,5×24,5, de XIII, 459 p. — ISBN 0-7923-8189-0. — Prix: Dfl. 280.00. — Kluwer Academic Publishers, Dordrecht, 1998.

This book provides a detailed and consistent exposition of a powerful unifying framework for the study of time-variant systems and the computational aspects and problems that arise in this context. While complex function theory and linear algebra provide much of the fundamental mathematics needed by engineers engaged in numerical computations, signal processing and/or control, there has long been a large, abstruse gap between the two fields. This book shows the reader how the gap between analysis and linear algebra can be bridged. The authors explore, discover and exploit many interesting links that exist between classical linear algebraic concepts and complex analysis.

Neil GERSHENFELD. — **The nature of mathematical modeling.** — Un vol. relié, 18×25,5, de X, 344 p. — ISBN 0-521-57095-6. — Prix: £24.95. — Cambridge University Press, Cambridge, 1998.

This is a book about the nature of mathematical modeling, and about the kinds of techniques that are useful for modeling (both natural and otherwise). It is oriented towards simple efficient implementations on computers. The first part of the book covers exact and approximate analytical techniques (ordinary differential and difference equations, partial differential equations, variational principles, stochastic processes). The second part covers numerical methods (finite differences for ODEs and PDEs, finite elements, cellular automata). The third part covers model inference based on observations (function fitting, data transforms, network architectures, search techniques, density estimation, filtering and state estimation, linear and nonlinear time series). The text is completed by a Website and extensive worked problems that introduce extensions and applications.

Michel RAPPAZ, Michel BELLET, Michel DEVILLE. — **Modélisation numérique en science et génie des matériaux.** — Traité des matériaux, vol. 10. — Un vol. relié, 17×24,5, de XIII, 551 p. — ISBN 2-88074-365-6. — Prix: SFr. 108.00. — Presses polytechniques et universitaires romandes, Lausanne, 1998.

Cet ouvrage présente les notions nécessaires à la modélisation des phénomènes complexes ayant lieu lors de l'élaboration et de la mise en œuvre des matériaux. Après un bref rappel des équations de conservation et d'état à la base de ce domaine, les auteurs introduisent les principales méthodes numériques: différences finies, volumes finis et éléments finis. Ces techniques sont illustrées dans les chapitres du livre portant sur les problèmes de transformation de phase, de déformation des solides et d'écoulement des liquides. Les derniers chapitres traitent des

méthodes utiles dans la détermination des conditions aux limites ou des propriétés des matériaux, ainsi que des méthodes stochastiques utiles à la simulation de microstructures. Les diverses méthodes de modélisation sont présentées dans ce livre dans la perspective de l'ingénieur, limitant les développements mathématiques au strict nécessaire.

Informatique

Bernhard BAUER, Riitta HÖLLERER. — **Übersetzung objektorientierter Programmiersprachen: Konzepte, abstrakte Maschinen und Praktikum „Java-Compiler".** — Un vol. broché, 15,5×23,5, de XIV, 287 p. — ISBN 3-540-64256-0. — Prix: DM 49.90. — Springer, Berlin, 1998.

Dieses Buch vermittelt sowohl Studierenden der Informatik als auch Softwareentwicklern fundierte Grundlagen und Vorgehensweisen zur Entwicklung von Compilern für objektorientierte Programmiersprachen. Anhand mehrerer Sprachen (Smalltalk-80, Java, C++) werden die Konzepte objektorientierter Sprachen und ihrer Übersetzung dargestellt. Im Praxisteil des Buches wird die Spezifikation eines Übersetzers für Java entwickelt. Diese Spezifikation kann als Eingabe für einen Übersetzergenerator verwendet werden, der daraus ein ablauffähiges C-Programm erzeugt. Zahlreiche Illustrationen und Beispiele veranschaulichen die Lerninhalte. Durch das Praktikum im zweiten Teil mit Aufgaben und Lösungen (im WWW) kann der vermittelte Stoff am Beispiel eines Java-Compilers eingeübt werden.

Manfred BROY. — **Informatik: eine grundlegende Einführung, Bd. 2: Systemstrukturen und theoretische Informatik.** — 2. überarbeitete Auflage. — Springer-Lehrbuch. — Un vol. broché, 15,5×23,5, de XI, 404 p. — ISBN 3-540-64392-3. — Prix: DM 59.00. — Springer, Berlin, 1998.

Diese in der Neuauflage zweibändige Einführung behandelt die fundamentalen Modelle, Formalismen und sprachlichen Konstruktionen sowie die wichtigsten Anwendungsgebiete und technischen Konzeptionen der Informatik. *Inhaltsverzeichnis:* Prozesse, Kommunikation und Koordination in verteilten Systemen. — Betriebssysteme und Systemprogrammierung. — Interpretation und Übersetzung von Programmen. — Formale Sprachen. — Berechenbarkeit. — Komplexitätstheorie. — Effiziente Algorithmen und Datenstrukturen. — Beschreibungstechniken in der Programmierung. — Abschliessende Bemerkungen zur Informatik.

Henk J. A. M. HEIJMANS, Jos B. T. M. ROERDINK, (Editors). — **Mathematical morphology and its applications to image and signal processing.** — Computational imaging and vision, vol. 12. — Un vol. relié, 16,5×24,5, de IX, 442 p. — ISBN 0-7923-5133-9. — Prix: Dfl. 360.00. — Kluwer Academic Publishers, Dordrecht, 1998.

This book contains the proceedings of the International Symposium on Mathematical Morphology and its Applications to Image and Signal Processing IV, held June 3-5, 1998, in Amsterdam, The Netherlands. The purpose of the work is to provide the image analysis community with a sampling of recent developments in theoretical and practical aspects of mathematical morphology and its applications to image and signal processing. Among the areas covered are: digitization and connectivity, skeletonization, multivariate morphology, morphological segmentation, color image processing, filter design, gray-scale morphology, fuzzy morphology, decomposition of morphological operators, random sets and statistical inference, differential morphology and scale-space, morphological algorithms and applications.