BOOK REVIEWS


This is a revised version of the first edition of the same book. The author added a significant amount of new material, such that the book can become a reference book but it can still be used as a first course on differentiable manifolds. The author discusses the following topics: Topological manifolds, the local theory of smooth functions, the global theory of smooth functions, Flows and foliations, Lie groups and Lie algebras, Covectors and 1-forms, Multilinear algebra and tensors, Integration of forms and de Rham cohomology, Forms and foliations, Riemannian geometry, Principal bundles. There are too four appendices in which there are discussed problems related to construction of the universal covering, the inverse function theorem, ordinary differential equations, the de Rham cohomology theorem. The book is useful for undergraduate and graduate students as well as for several researchers. The presentation is smooth, the choice of topics is optimal and the book can be profitably used for self teaching.

V. Oproiu


In this book the authors develop a mathematical theory of gravitational lensing. Examples, illustrations bibliography and index make this a suitable text for an undergraduate / graduate course, seminar, or thesis project on gravitational lensing. In the first two parts the authors present some historical highlights and astrophysical aspects of the subject (predicting and detecting gravitational lens effects, the mathematical problems, physical
interpretation, ingredients of gravitational lens systems, gravitational lens optics, probing the universe with gravitational lensing, observations of gravitational lensing). Next the authors deal with some mathematical aspects: time delay and lensing maps, critical points and stability, classification and genericity of stable lens systems, local lensing geometry, Morse inequalities. These tools are used to study the stable lens systems, local and global geometry of caustics, caustic metamorphoses, counting lensed images (single plane case and multiple plane case), total magnification cross sections, lensing by singular and nonsingular deflectors.

V. Oproiu


In this book, the author intended to provide an accelerated introduction to the computer algebra system MAPLE and to demonstrate Maple’s usefulness in modelling and solving a wide range of operations research (OR) problems. The numerical and graphical aspects of MAPLE make this software package an ideal tool for treating certain OR problems and providing descriptive and optimization-based analyses of deterministic and stochastic models. In the first chapter it is presented a short introduction to operations research. Next, Chapter 2 is an accelerated introduction to Maple that covers the most important commands that are relevant to OR applications. Finally, in Chapter 3, the interested reader will find a treatment of some of the mathematical techniques useful in OR modelling: algebra and calculus, ordinary and partial differential equations, linear algebra, transform methods and probability theory.

In Chapter 4, one discusses linear programming. After describing the graphical method to solve linear programming problems, one presents simplex method. Maple’s own implementation of the symplex method is demonstrated and integer linear programming is mentioned briefly. Next, in Chapter 5, it is presented the nonlinear programming, next, many problems in unconstrained and constrained optimization are solved explicitly. In Chapter 6 the dynamic programming is considered. Here Maple can be used in order to find optimal policies for dynamic optimization problems in closed form. Stochastic processes are presented in Chapter 7, where exponential/Poisson duality, renewal theory and discrete- and continuous-time Markov chains are described in detail. Chapters 8, 9, and 10 are concerned with the application of OR methods to inventory management, queueing models and simulation. Here Maple’s symbolic manipulation capabilities are used extensively in order to obtain solutions in closed-form.
The book is intended for graduate students in operations research, management science departments of business schools, industrial and systems engineering, economics and mathematics.

V. Oproiu


This book contains the lectures given at the DMV Seminar "Infinite Dimensional Kähler Manifolds", November 19 - 25, 1995, Mathematisches Forschungsinstitut Obervölfach. The lecturers were the editors of the present volume, K.H. Neeb, V.Yu. Ovsienko, S. Paycha, as well as P. Heinzner, P. Iglesias, G. Valli.

In the first set of lectures with the title "Introduction to Group Actions in Symplectic and Complex Geometry", A. Huckleberry presents some problems from the theory of (finite - dimensional) differentiable manifolds, theory of Lie groups, manifolds with additional structure, symplectic manifolds with symmetry, Kählerian structures on coadjoint orbits of compact groups and associate representations. Next, K.K. Neeb has written two sets of lectures with the titles "Infinite Dimensional Groups and their Representations" and "Borel - Weil Theory for Loop Groups". There are presented some notions and results from the calculus in locally convex spaces, dual spaces of locally convex spaces, topologies on function spaces, representations of infinite dimensional groups, general coherent state representations, compact groups, loop groups and their central extensions, root decompositions, representations of loop groups, representations of involutive semigroups, Borel - Weil theory and consequences for general representations. In the fourth set of lectures of title "Coadjoint Representation of Virasoro Type Lie Algebras and Differential Operators on Tensor Densities", written by V.Yu. Ovsienko, there are presented: coadjoint representation of Virasoro group and Sturm Liouville operators, Schwarzian derivative as a 1 - coycle, projectively invariant version of the Ghelfand Fuchs cocycle and of the Schwarzian derivative, Kirillov's method of Lie superalgebras, invariants of coadjoint representation of the Virasoro group, extension of the Lie algebra of first order linear differential operators on $S^1$ and matrix analogue of the Sturm Liouville operator, geometrical definition of the Ghelfand Dickey bracket and the relation to the Moyal Weil star product. Next, in the fifth set of lectures, with the title "From Group Actions to Determinant Bundles Using (Heat Kernel) Renormalization Techniques", S. Paycha discusses about renormalization techniques, the first Chern form on a class of hermitian vector bundles, the geometry of gauge orbits, the geometry of determinant
bundles, the action of diffeomorphisms on complex structures. Finally, in
the last set of lectures with the title “Fermionic Second Quantization and
the geometry of the Restricted Grassmanian” T. Wurzbacher presents re-
results on fermionic second quantization, Bogoliubov transformation and
the Schwinger term, the restricted Grassmanian of a polarized Hilbert space,
the non- equivariant moment map of the restricted Grassmanian, the deter-
minant line bundle on the restricted Grassmanian.

V. Oproiu

CASACUBERTA, C., MIRÓ - ROIG, R.M., VERDERA, J, XAMBÓ -
DESCAMPS, S.(Eds.) – European Congress of Mathematics, Barcelona,
July 10 - 14, 2000, vol I, II, Progress in Mathematics vols. 201, 202,
3 - 7643 - 6418 - 1.

These are the two volumes of the proceedings of the third European
Congress of Mathematics. They contain several contributions of the nearly
1400 people from 87 countries. The interested reader can find nine plenary
lectures, twenty seven invited lectures in parallel sections, lectures given by
ES prize winners, and nine mini - symposia on special topics. During the
Congress there were too seven round tables, poster sessions, presentations
of mathematical software and video exhibitions.

After the presentation of the EMS Prize Winners, and the Felix Klein
Prize Winner, one can read the addresses given at the both opening and
closing ceremonies. The plenary speakers are: R. Dijkgraaf, H. Föllmer,
H.W. Lenstra, Jr., Yu.I. Manin, Y. Meyer, C. Sumó, M.F. Vignéras and
O. Viro. Next, there are 27 articles by parallel invited speakers, dealing
with the most important subjects in the actual scientific research in the
domains of combinatorics, dynamic, complex and harmonic analysis, number
theory, algebraic geometry, graphs and fractals quasi conformal mappings,
differential topology and geometry etc.

In the second volume there are 8 articles by prize winers: S. Alesker,
R. Cerf, D. Joyce, V. Lafforgue, M. McQuillan, S. Nemirovski, P. Seidel,
W. Werner, as well as 9 mini - symposia on: Computer Algebra, Curves
over Finite Fields and Codes, Free Boundary Problems, Mathematical Fi-
nance (Theory and Practice), Quantum Chaology, Quantum Computing,
String Theory and M - Theory, Symplectic Geometry, Contact Geometry
and Hamiltonian Dynamics, Wavelet Applications in Signal Processing.

V. Oproiu

This book contains a collection of papers dedicated to the recent developments in modern homotopy theory. The papers are written by several mathematicians who have participated in 1998 and 1999 in an emphasis semester at the Centre de Ricerca Matèmatica and the 1998 Barcelona Conference on Algebraic Topology. The interested reader can find 25 contributions related to the following topics treated in the book: abstract features of stable and unstable homotopy, model categories, homotopical localizations and cellular approximations, \( p \) - compact group, \( H \) - spaces, classifying spaces for proper actions of discrete groups, \( K \) - theory and other generalized cohomology theories for finite and profinite groups (Hochschild homology), configuration spaces, Lusternik - Schnirelmann category, stable and unstable splittings. There are too some contributions discussing aspects from quantum field theory, differential geometry, homotopical dynamics, tilings, and various aspects of group theory.

V. Oproiu


In this book the author presents an introduction to harmonic maps, minimal surfaces, constant mean curvature surfaces, from the point of view of the theory of completely integrable systems. The main aspects from differential geometry are used in order to show the interplay of the completely integrable systems with harmonic maps and the use of loop groups. It is considered a family of curvature free connections for harmonic maps, starting from the associated family of constant mean curvature surfaces. The author presents too some basic exposition of the twistor theory for harmonic maps, emphasizing its stimulation for the integrable system theory. The following topics are considered: Surfaces with prescribed mean curvature, From minimal surfaces and CMC surfaces to harmonic maps, Variational point of view and Noether’s theorem, Working with the Hopf differential, The Gauss - Codazzi condition, Elementary twistor theory for harmonic maps, Harmonic maps as an integrable system, Construction of finite type solutions, Constant mean curvature tori are of finite type, Wente tori, Weierstrass type representations. The presentation is accessible to undergraduate and graduate students in mathematics but will also be useful to researchers.

V. Oproiu
Acţiunile filantropice ale familiei Rockefeller (John Davison Rockefeller (1839 - 1937) şi J.D. Rockefeller, Jr.(1874 - 1964)) realizate prin intermediul fundaţiilor General Education Board (GEB, înfiinţată în 1902), Rockefeller Foundation (RF, 1911), Laura Spelman Rockefeller Memorial (1918) şi International Education Board (IEB, 1923) au avut implicaţii majore în dezvoltarea medicinii şi a ştiinţelor exacte în prima jumătate a secolului al XX-lea, atit în SUA cit şi în Europa.

Lucrarea de faţă analizează în profunzime şi din cele mai subtile puncte de vedere contribuţia decisivă a IEB, care a fiinţat în perioada 1923 - 1928, la ”înternaţionalizarea” matematicii in intervalul dintre cele două războie mondiale.

În capitolul introductiv autorul precizează sensul în care este folosit conceptul de ”înternaţionalizare” în cadrul unităţii dintre naţional şi internaţional în ştiinţă şi matematică, analizează aspectele politice şi ideologice ale internaţionalizării matematicii ca parte a procesului general de modernizare a ştiinţei şi matematicii în Franţa şi mai ales, în Germania în preajma anului 1920 care, alături de existenţa contactelor informale care existau între matematicienii europeni, au favorizat succesul acţiunilor filantropice Rockefeller. O scurtă prezentare a tradiţiei, istoriei şi scopurilor fundaţiilor filantropice în SUA, circumscrierea intereselor comune ale matematicienilor şi fundaţiilor Rockefeller şi prezentarea subiectelor ce vor fi abordate încheie capitolul introductiv.

Wickliffe Rose (1862 - 1931), iniţial, timp de 15 ani, profesor de filosofie şi istorie la Peabody College din Nashville, Tenn., înalt oficial Rockefeller încă din 1910, a acceptat preşedenţia GEB, având competenţe numai în interiorul SUA, cu condiţia înfiinţării IEB. Cu acordul lui Rockefeller, Rose devine simultan preşedinte al GEB şi IEB. Certificatul de naştere al IEB este ”Scheme for the promotion of Sciences on an International Scale” din aprilie 1923. Tentativa de program al IEB instituia sistemul internaţional de burse pentru preluarea şi promovarea contactului dintre matematicieni şi stimularea competiţiei pe plan internaţional în ştiinţă şi matematică. Vizitele în Europa ale lui W. Rose în perioada decembrie 1923 - aprilie 1924 şi G.D. Birkhoff (1884 - 1944) - matematician de mare prestigiu şi influenţă, preşedinte al Americal Mathematical Society în 1925 şi 1926 - în intervalul februarie - septembrie 1926 - au avut drept scop cunoaşterea necesară şi detaliată a condiţiilor economice şi politice din principalele centre ale matematicii din Europa de vest, evaluarea tendinţelor de dezvoltare şi a potenţialului matematicii europene şi fundamentarea acţiunilor viitoare ale IEB pe baza acestor informaţii. La momentul respectiv Birkhoff acordă un rol improtant la
îmbunătățirea, diversificarea și ridicarea cercetării matematice în SUA prin atragerea unor matematicieni tineri deja consacraţi prin obţinerea pentru aceştia a unor poziții permanente în marile universităţi americane. Înființarea IEB, rezultatele vizitelor în Europa ale lui Rose și Birkhoff și alte implicații ale programului de burse IEB asupra dezvoltării matematicii fac obiectul Cap. II al cărții.

În Cap. III sunt atent analizate valorile generale și principiile ideologice ale activității IEB, precum și preconcepțiile împărtășite de unii înalti funcționari Rockefeller privind starea socială - culturală, științifică și economică a Europei din perioada de mijloc a anilor '20. Această analiză are la bază conținutul scrisorii din 8 iunie 1926 (reprodusă parțial la pag. 62) trimisă de A. Trowbridge, şeful biroului din Paris al IEB în perioada 1925 - 1928, către W. Rose la biroul central al IEB din New York. Scrisoarea scoate în evidență anumite prejudecăți ale lui Trowbridge privind relațiile dintre științific și politic sau dintre politic și cultural care conduceau la o divizare artificială a Europei în țări "avansate" și "înapoiate" din punct de vedere cultural. Într-o asemenea clasificare, Rusia, Polonia și Ungaria treceau țări cultural înapoiate (!). Cu toate acestea, în această perioadă și cu aportul lui Trowbridge, cercetarea din științele fundamentale s-a bucurat de un suport hotărîtor din partea IEB. Acest suport a fost substanțial mai ales pentru centrele matematice deja puternice ale Europei.

Practica acordării de burse de către IEB, în anii 1923 - 1928, și RF după 1928, este atent analizată în Cap. IV, cel mai amplu al cărții. Informațiile privind condițiile politice și sociale ale cercetării matematice și tendințele de dezvoltare a acesteia sunt completate cu lista beneficiarilor de burse. Un spațiu larg este dedicat situației specifice a științei și matematicii în Franța și Germania și a situației tinerilor cercetători. Este evidențiat caracterul dominant la interselor americane în programele IEB și RF. General vorbind, suportul Rockefeller pentru matematică a consolidat tendințele de dezvoltare existente în interiorul disciplinei, a contribuit la creșterea rolului științei și matematicii americane și a dus la declinul matematicii germane care a fost influențat de izolarea Germaniei naziste și implicit, de creșterea valului de emigrări în SUA a savanților europeni de mare valoare. Fundațiile Rockefeller nu au promovat inițiative care să conducă la depășirea izolării matematice din Rusia sovietică cu toate că matematicienii ca P.S. Alexandrov, A.S. Besicovici și N. Luzin au beneficiat de burse IEB.

Istoria materializării celor două "donații capitale" ale IEB destinate construirii Institutului de Matematică și a extinderii Institutului de Fizică din Göttingen precum și construirea Institutului Henri Poincaré din Paris face obiectul Cap. V. Anunțul public oficial al celor două donații a fost făcut pe 19 noiembrie 1926. Extinderea Institutului de Fizică din Göttingen a fost materializată în 1926, Institutulul Henri Poincaré a fost inaugurat la 17 noiembrie 1928, iar Institutulul de Matematică din Göttingen în noiembrie 1929. Este interesant de urmărit discuțiile care au precedat finalizarea


O scurtă trecere în revistă a activității RF după război, până în 1945, este făcută în Epilog, ultimul capitol al cărții.

Această excelentă și bine documentată lucrare (conține documente provenînd din 41 arhive, o bibliografie de 238 titluri, 23 fotografii ale unor matematicieni și personalități implicate în programele Rockefeller, 691 note finale, 17 apendice conținînd documente de mare valoare și ocupînd 60 pagini, ”subsoluri” lămuritoare, index de nume și index de autori) este de mare interes pentru orice matematician. Menționăm că trei matematicieni români au beneficiat de burse Rockefeller: Isaac Schöenberg (1903 - 1990), Florin Vasilescu (1897 - 1958) și Gheorghe Vrâncianu (1900 - 1979).

Cartea este istoria vie a matematicii dintr-o perioadă foarte frămîntată în care au trăit și au creat unii din marii matematicieni ai lumii, unii dintre ei cu destin tragic; este istoria care a schimbat ”geografia matematică” a lumii și a devenirii SUA mare putere matematică.

Gh.Gr. Ciobanu

This book has two parts: Zero - Sum Differential Games and Numerical Methods (Part I) and Stochastic and Nonzero - Sum Games and Applications (Part II).

The first part which contains four chapters deals with the Hamilton - Jacobi - Isaacs equations which arise in differential games theory. The main tools are the dynamic programming methods and the notion of generalized solution for Hamilton - Jacobi - Isaacs equations (viscosity solutions and minimax solutions). Also some discrete approximation schemes are presented with numerical tests on several examples.

The second part presents several interesting problems from the stochastic game theory together with some methods which are specific to this domain.

T. Havârneanu


The topics are relevant both to Mathematics and to Computer Science. In the selected papers are presented new approaches and new results in the common areas such as algorithms analysis, binary search trees, combinatorics and probabilities. The content of the book is of high level, and it is useful for a large public interested in discrete mathematics and computer science, including researchers, graduate students, teachers and engineers.

C. Smadici

In the process of its impetuous development the mechanics of spaces flight brought to life a whole series of fascinating and novel problems. This book is the story of some interesting theoretical investigations in the theory of motion of spacecraft. It presents some of the most interesting and important questions and problems that arise in the modern mechanics of spaces flight and celestial mechanics. In some of the problems described in the book substantial progress toward a solution was achieved only very recently. In this aim, there are used results published by contemporary scientists, specialists in mechanics and mathematicians; a major place is occupied by author’s research. The book reveals connections between classical problems and new results of the mechanics of space flight and explores some new formulations and solutions that have arisen in the dynamic of space flight.

The style of the exposition is unusual in the scientific literature. V.I. Arnold and Ya. B. Zeldovich (the review of the first edition in *Priroda*, No. 10, 1973, 115 - 117) noted: “... For a solid scientific monograph, V.V. Beletsky’s book is out of ordinary in many respects. Without exaggeration one can say that it marks the affirmation of a new style in the scientific literature. The author explains in a frank and detailed manner the reasons behind each calculation, its difficulties, and the psychological side of the research. The book contains no attempts to inflate the importance of results or to give results while hiding the methods used to obtain them. The book is adorned by humorous illustrations by I.N. Novozhilov, Doctor in Physico-Mathematical Sciences. ... The general impression that the Essays make is not that this is a boring lesson, but rather a discussion with a brilliant, knowledgeable and wise interlocutor. Even people with little interests in space problems will go through the book with satisfactions, perhaps omitting the calculations.”

The book retains the plan and style of exposition of the first edition, but the reader will remark a number of additions: on the resonant motions of celestial bodies and the generalized Cassini laws; on the evolution of galaxies and Poincaré’s recurrence theorem; on a new point of view concerning the phenomenon of lunar-solar precession of the Earth’s axis and on the magnetic stabilization of the Earth’s axis and on the magnetic stabilization of satellites; on the development of the concept of gravity flier in the sciences, science-fiction, and fiction literature; finally, on the “miracle of closed orbits” in a Newtonian central gravity field.

Various references to supplementary material are given and discussed briefly throughout the book.

The book is primary addressed to students in the third and fourth years of college programs in mechanics-mathematics, physics-mathematics,
This book is dealing with the properties of causation. It is based on the idea that even if we do not have a perfect definition of cause, we can nonetheless describe some of its features, and that this will help us to understand its nature. The book consists in 37 sections and Index. The author start with an undefined notion of sufficient cause and then using properties that he believe causation ought to have, he extent the general notion of cause over a very considerable collection of cases of non-sufficient causation. The author realizes a constructive process. He require sufficient causation to have some natural properties and then from these properties he construct the parts that give the theory more structure and usefulness. After this, the remainder of the book is used to pursue a number of questions that come up fairly naturally, to see how the minimal sufficient cause approach deals with them. In section "Events and Probabilities" the author remind the reader about the classical set-up for computing probabilities. Then in "Unitary algebra" he introduce some novel algebra that fits in extremely well with probability arguments, and turns out to be indispensable for causal models. How unitary algebra is used to specify a causal probability model involving only one cause is shown in section "The One-Factor Model". To a great extent the most important section is on "Causation". The author shows how to extend that notion using the principles of minimal sufficient cause. A key fact about minimal sufficient cause is that one can define "Structural Equations" that supply explicit unitary expressions for effects in terms of a selected subset of their cause. This leads naturally to a consideration of the difficulties in parametrizing "The Two-Factor Model". Given a valid causal model, techniques widely used in biomedicine involve "Marginalization" and "Stratification". Every causal diagram implies a probability diagram, and while causation is seldom reversible, probabilities frequently are. "Double Reversal" provides the argument for transforming retrospective studies into prospective results. "Dual Causation" happens when a cause an effect and the absence of the cause the absence of the effect. Classical methodology has not discovered this distinction. In "Causal Covariance" the author introduces a measures that corresponds to the covariance in linear analysis, but which performs a similar function in the unitary algebra of causation. When some variables are functions of others it is natural to imagine that the relationship is causal, but in "Functional Causation" the author shows...
that such a definition is problematic, and in particular that the prevailing notion of causation in the artificial intelligence community relies on some very strong assumption.

The book has many sections devoted to important examples and applications in Biomedicine.

I. Burdujan


This book is dedicated to the memory of Professor Viren K. Srivastava and contains thirty - one chapters written by distinguished econometricians and statisticians from many country. It summarizes the latest developments and techniques in the field of applied econometrics and statistical inference and highlights areas such as sample surveys, nonparametric analysis, hypothesis testing, time series analysis, Bayesian inference, and distribution theory for current applications in statistics, economics, medicine, biology, engineering, sociology, psychology, and information technology. His aim is to disseminate significant research results in econometrics and statistics. This handbook is a consolidated and comprehensive reference source for researchers and students whose work takes them to the interface between these two disciplines.


Part one contains the first five chapters and is dealing with issues related to parametric inference procedures and sample design. Part two consists of four chapters that are concerned with nonparametric estimation and testing methodologies. The three chapters of part are concerned with the problem related to hypothesis testing. Part IV presents a collection of four papers relevant to pretest and biased estimation. Time series analysis forms the subject matter of Part V. Part IV comprises five chapters focusing on estimation and inference of econometric models. The last part includes four chapters focusing on applied econometrics.

The major recent developments in both the applied econometrics and statistical inference techniques that have been covered in this book are of direct interest to researches, practitioners, and graduate students, not only
in econometrics and statistics but in order applied fields such as medicine, engineering, sociology and psychology. The book incorporates reasonably comprehensive up-to-date reviews of recent developments in various key areas of applied econometrics and statistical inference, and it also contains chapters that set the scene of future research in these areas.

I. Burdujan


This book reviews that various roles of genetic toxicology in human cancer risk assessment. Genetic toxicology studies have been used to assess mutagenicity of environmental, pharmaceutical and agricultural chemicals for over 30 years. Quantitative cancer risk assessment is an intricate process that knowledge from many different scientific disciplines, including genetic toxicology, rodent cancer bioassays, epidemiology, metabolism, pharmacokinetics and biostatistics. This book has five parts - the introductory chapters (Chapters 1-3) followed by four distinct subdivisions. The four parts are organized according to the four components of risk assessment: hazard identification (Chapters 4-10), dose-response relationship (Chapter 11), exposure assessment (Chapter 12) and risk characterization (Chapter 13-15). The book is a collection of a large amount of practical information on the current practice of regulatory genetic toxicology and quantitative cancer risk assessment.

The introductory part provides the background information for the discussion of controversial issues in the subsequent chapters.

One of the main focus of the book is the use of biologically based models for cancer risk assessment. Mathematical models of carcinogenesis have a wider role. They provide a mathematical framework within the quantitative aspects of cancer in populations (whether populations of humans in epidemiology studies or inbred populations of animals in experimental studies) can be viewed and questions about them asked. On the other hand, from the statistical point of view cancer models provide a rich class of hazard functions for analyzes of time-to-tumor data. Analyzes of epidemiological data using conventional statistical methods often require artificial assumptions, such as multiplicativity of relative risks of additivity of excess risks.

The references consists in nearly 1200 quotations.

I. Burdujan


This book is a comprehensive text that describes the selection, design, theory, and application of tests for univariate and multivariate normality, offering plotting methods, outliers and general goodness-of-fit tests, and power comparisons for detecting of non-normality in specialized conditions. This next contains the broadest and the most comprehensive set of material published to date on the single subject of testing for normality. The intention of the author was to focus on methodology an utility of the tests rather than in-depth theoretical issues, so that the reader would able to make a judgment as to which test/tests be best for their particular circumstances, and could easily perform the test.

The thirteen chapters of this book are divided in three parts, namely:
1. Testing for univariate normality, 2. Testing for multivariate normality, 3. Additional topics. Data sets used in the examples throughout the book are included in Appendix A and tables of critical values for most of the tests presented here are given in Appendix B.

The first part (Chapter 1) is introductory. The second Part (Chapter 2-8) addresses the issue of testing for univariate normality in complete samples (Chapters 2-7) and censored samples (Chapter 8). The third Part (Chapter 9 and 10) covers the topic of testing for multivariate normality.
The remainder of the text covers additional miscellaneous topics, including normal mixture distributions (univariate and multivariate, Chapter 11), robust estimation (Chapter 12) and computational issues (Chapter 13).

The book presents goodness of fit tests that were designed or could be used for determining whether a sample of observations could have come from a normal distribution. It is aimed at working scientists in various branches of mathematics, economics, medicine, biology.

I. Burdujan


This book consists of the contributions based on the talks presented at the Workshops on Statistics and the Sciences, held at the Centro Stefano Franscini in Ascona, Switzerland, during the week of May 23 to 28, 1999. It is a testimony to the crucial role that statistics plays in scientific disciplines such as genetics and environmental sciences, among others. The twelve articles in this book range from human and agricultural genetic DNA research to carcinogens and chemical concentrations in the environment and to space debris and atmospheric chemistry. The former article, entitled "Statistical Interaction with Quantitative Geneticists to Enhance Impact from Plant Breeding Programs", is dealing with the possibilities created as a result of the long-term collaboration between statisticians and quantitative geneticists. This collaboration has resulted in a joint research program focused on procedures to accommodate genotype by environment interactions. Analysis of DNA microchip data that can be used for rapid characterization of the expression pattern of the viral genes in an infection is given in the second article (entitled "Outliers Resistance, Standardization, and Modeling Issues for DNA Microarray Data"). A method of variance components estimation with an uncertain link between an individual and its parents is introduced in the third article, in order to obtain variance components estimators from likelihood functions. In "Robust Estimation for Chemical Concentration Data Subject to Detection Limits", Leo R. Korn and David E. Tyler propose a family of M-estimators for censored data, which include the maximum likelihood estimates of location and scale for censored t-distributions. M. Fygenson had used, in "Risk assessment of Low Dose Exposure to Carcinogens", the first degree of conservativeness by assuming that the excess risk mechanisms on both absolute and relative scale are nondecreasing in small dose levels of carcinogenic substances. As a result, he obtained good lower and upper bound estimates for the VSD and a qualitative explanation for the default
model of low-dose linearity. In "A Stochastic Model of Carcinogenesis", the age dependent risk of a theoretical model of carcinogenesis incorporating the familiar notions of multiple stages (initiation, promotion and progression) is derived. The high potential of the application of statistical models in atmospheric chemistry is exhibited in "Statistical Modeling to Answer Key Questions in Atmospheric Chemistry: Three Case Studies". David R. Brillinger discusses in his article "Spaces Debris: Flux in a Two Dimensional Orbit" a method to bound the rate of passage of subjects through an arc segment in the plan of motion, given random initial conditions for the orbiting object. This analysis is important because the debris circling the Earth has become an important environmental problem. In the next article "A Robust Approach to Common Principal Components" two families of robust estimates for the common principal model for several groups of multivariate observations are introduced and discussed. A method for dimension reduction in nonparametric regression models, based on the idea of fusing the information contained in the inverse regression curve is the object of "A Robustified Version of Sliced Inverse Regression". In "Similarities Between Location Depth and Regression Depth" is explored the analogies between location depth and regression depth. In last article, entitled "Approximate $\tau$-Estimates for Linear Regression Based on Subsampling of Elemental Sets", the authors show that the approximate $\tau$ estimates for the linear model, computed by the algorithm based on subsampling of elemental subsets, are consistent and with high probability have the same breakdown point that the exact $\tau$-estimate.

This volume help the reader to focus on the central role of statistics in the specific areas presented before and to extrapolate the results applications.

I. Burdujan


This volume contains, selected papers presented at the International Workshop on "Fast Solution of Discretized Optimization Problems", which took place at the Weierstrass Institute for Applied Analysis and Stochastics in Berlin from May 08 until May 12, 2000. The aim of this workshop was to faster the exchange of ideas between the still comparatively separated disciplines of nonlinear optimization on the one side and numerical methods for differential equations on the other side. The various topics discussed at the workshop included: discretizations for optimization problems, large scale optimization, iterative linear and quadratic solvers, QP - preconditioning,
sparse QP - and linear solvers, suboptimal solution approaches, real time optimization, interior point methods, adaptivity. Particular emphasis has been laid on numerical methods which are motivated by specific application problems.

C. Moroșan


This book is an introduction to the study of dynamic equations on time scales. The theory of time scale was introduced by Stefan Hilger in this Ph. D. thesis in 1988. Motivating the subject is the notion that dynamic equations on measure chains can build bridges between continuous and discrete mathematics.

The material of book is organized in 8 chapters, an annex (Solutions to Selected Problems), a bibliography and an index. In Chapter 1 are introduced the basic notions connected to time scales and differentiability of functions on them, as well as the integrability. In Chapter 2 are introduced the Hilger complex plan. Next, are considered “second order linear dynamic equations”. The general Laplace transformation on a general time scale is also introduced and many of its properties are derived.

In Chapter 4 is studied self - adjoint dynamic equations on time scales, while Chapter 5 is concerned with linear systems of dynamic equations on a time scale. Analogues of Gronwall’s inequality Hölder’s inequality, and Jensen’s inequality on time scales are presented in Chapter 6.

In Chapter 7 is considered linear symplectic dynamic systems on time scales that contains: linear Hamiltonian dynamic systems which in turn contain Sturm - Liouville dynamic equations of higher order and self - adjoint vector dynamic equations. Chapter 8 contains several possible extensions of the time scales calculus (measure chains, alpha derivatives).

The audience for this book especially might be: graduate students who are interested in the subject for a thesis project at the masters or doctoral level, researchers with a knowledge of differential or difference equation, who want a rather complete introduction into the time scales calculus.

C. Moroșan

Automata and Their Applications is a uniform treatment of the theory of finite state machines on finite and infinite strings and trees. Many books deal with automata on finite strings, but there are very few expositions that prove the fundamental results of automata on infinite strings and trees. These results have important applications to modelling parallel computation and concurrency, the specification and verification of sequential and concurrent programs, databases, operating systems, computational complexity, and decision methods in logic and algebra. Thus, this textbook fills an important gap in the literature.

Beginning with coverage of all standard fundamental results regarding finite automata, the book deals Büchi and Rabin automata and their applications to operating systems, temporal logic communication systems, as well as to various logical theories.

The book is self-contained with numerous examples, illustrations, exercises, and is suitable for a two-semester undergraduate course or a one-semester graduate course/seminar. Since no advanced mathematical background is required, the text is also useful for self-study by computer sciences professionals who wish to understand the foundations of modern formal approaches to software development, validation, and verification.