Risk Theory: The Stochastic Basis Of Insurance (Ettore Majorana International Science Series)

Twenty-five years ago, Hans Blihlmann published his famous monograph Mathe matical Methods in Risk Theory in the series Grundlehren der Mathematischen Wis8enschaften and thus established nonlife actuarial mathematics as a recognized subject of probability theory and statistics with a glance towards economics. This book was my guide to the subject when I gave my first course on nonlife actuarial mathematics in Summer 1988, but at the same time I tried to incorporate into my lectures parts of the rapidly growing literature in this area which to a large extent was inspired by Blihlmann's book. The present book is entirely devoted to a single topic of risk theory: Its subject is the development in time of a fixed portfolio of risks. The book thus concentrates on the claim number process and its relatives, the claim arrival process, the aggregate claims process, the risk process, and the reserve process. Particular emphasis is laid on characterizations of various classes of claim number processes, which provide alternative criteria for model selection, and on their relation to the trinity of the binomial, Poisson, and negativebinomial distributions. Special attention is also paid to the mixed Poisson process, which is a useful model in many applications, to the problems of thinning, decomposition, and superposition of risk processe8, which are important with regard to reinsurance, and to the role of martingales, which occur in a natural way in canonical situations.

Known and used throughout the world, the Purdue Industrial Waste Conference Proceedings books are the most highly regarded in the waste treatment field. New research, case histories, and operating data cover every conceivable facet of today's big problems in environmental control, treatment, regulation, and compliance. This volume representing the proceedings from the 48th conference provides unparalled information and data for your current waste problems.

This book is a tribute to Professor Ian Hugh Sloan on the occasion of his 80th birthday. It consists of nearly 60 articles written by international leaders in a diverse range of areas in contemporary computational mathematics. These papers highlight the impact and many achievements of Professor Sloan in his distinguished academic career. The book also presents state of the art knowledge in many computational fields such as quasi-Monte Carlo and Monte Carlo methods for multivariate integration, multi-level methods, finite element methods, uncertainty quantification, spherical designs and integration on the sphere, approximation and interpolation of multivariate functions, oscillatory integrals, and in general in information-based complexity and tractability, as well as in a range of other topics. The book also tells the life story of the renowned mathematician, family man, colleague and friend, who has been an inspiration to many of us. The reader may especially enjoy the story from the perspective of his family, his wife, his daughter and son, as well as grandchildren, who share their views of Ian. The clear message of the book is that Ian H. Sloan has been a role model in science and life.

The Current Index to Statistics (CIS) is a bibliographic index of publications in statistics, probability, and related fields.

Insurance and Risk Theory

Risk Theory

A Guide to Statistical Methods and to the Pertinent Literature / Literatur zur Angewandten Statistik

Asymptotic Statistics in Insurance Risk Theory

Contemporary Computational Mathematics - A Celebration of the 80th Birthday of Ian Sloan

th This book is devoted to the 19 Meeting of the EURO Working Group on Financial Modelling, held in Chania, Crete, Greece,November28-30, 1996. The EURO Working Group on Financial Modelling was founded in September 1986 in Lisbon. The primary field of interest for the Working Group can be described as "the development of financial models that help to solve problems facedby financial managers in the firm". From this point of view, the following objectivesof the Working Group are distinguished: • providing an international forum for exchange of information and experience on financial modelling; • encouraging research in financial modelling (i. e. new techniques, methodologies, software,empirical studies,etc.); • stimulating and strengthening the interaction between financial economic theory and the practice of financial decision making; • cooperating and exchanging information with universities and financial institutions throughout Europe. According to the aboveobjectives,the basic aim of this book is to present some new operational approaches (i. e. neural nets, multicriteria analysis, new optimization algorithms, decision software, etc.) for financial modelling, both in a theoretical and practical levels. Thus, the present volume is divided in nine chapters. The first chapter refers to the new trends in financial modelling and includes two invited papers by Gil-Aluja and Pardalos. The second chapter involves papers on the topic of high performance computing and finance which is a European union project in which participate some members of the EURO Working Group on Financial Modelling (Spronk, Zenios, Dempster, etc.).

"Winner of the 2014 Kulp-Wright Book Award Presented by the American Risk and Insurance Association". More information can be found here: http://www.aria.org/awards/bookawards.htm Insurance Economics brings together the economic analysis of decision making under risk, risk management and demand for insurance by individuals and corporations, objectives pursued and management tools used by insurance companies, the regulation of insurance, and the division of labor between private and social insurance. Appropriete both for advanced undergraduate and graduate students of economics, management, and finance, this text provides the background required to understand current research. Predictions derived from theoretical argument are not only stated but confronted with empirical evidence. Throughout the book, conclusions summarize results, helping readers to check their knowledge and understanding. Issues discussed include paradoxa in decision making under risk, selection of favorable risks by insurers, the possibility of a "death spiral" in insurance markets, and future challenges such as re-regulation in the wake of the 2007-09 financial crisis and the increasing availability of generic information.

Focusing on shocks modeling, burn-in and heterogeneous populations, Stochastic Modeling for Reliability naturally combines these three topics in the unified stochastic framework and presents numerous practical examples that illustrate recent theoretical findings of the authors. The populations of manufactured items in industry are usually heterogeneous. However, the conventional reliability analysis is performed under the implicit assumption of homogeneity, which can result in distortion of the corresponding reliability indices and various misconceptions. Stochastic Modeling for Reliability fills this gap and presents the basics and further developments of reliability theory for heterogeneous populations. Specifically, the authors consider burn-in as a method of elimination of 'weak' items from heterogeneous populations. The real life objects are operating in a changing environment. One of the ways to model an impact of this environment is via the external shocks occurring in accordance with some stochastic point processes. The basic theory for Poisson shock processes is developed and also shocks as a method of burn-in and of the environmental stress screening for manufactured items are considered. Stochastic Modeling for Reliability introduces and explores the concept of burn-in in heterogeneous populations and its recent development, providing a sound reference for reliability engineers, applied mathematicians, product managers and manufacturers alike.

Until now there were no published analyses of the recent solvency work conducted in Europe, specifically the risk categories proposed by the International Actuarial Association (IAA). Answering the insurance industry's demand in the wake of the EU Solvency II project, Solvency: Models, Assessment and Regulation provides a concrete summary and review of solvency and inspires additional work in the field. Following an introduction to the concept, the first section of the book provides a historical review of solvency, detailing solvency regulation and accounting within the EU. A review of the steps leading to Solvency II looks at accounting, supervision, the actuarial field, the first phase of Solvency II, international approaches to banking, and the solvency systems of 12 major nations. The second section explores the current basis for solvency modeling, focusing on the valuation of assets and liabilities, dependency and various conservative approaches, as well as a baseline and benchmark approach. This section also provides examples of risk structure and the effects of diversification. The final section discusses groups and internal modeling as it relates to EU Solvency II. It addresses insurance groups, financial conglomerates, reinsurance, the importance of internal modeling and stress testing, and the current state of the second phase of EU Solvency II.

Models, Assessment and Regulation

Selected Contributions In Honor of Valentin Konakov

A History of British Actuarial Thought

Ambit Stochastics

Proceedings of the 48th Industrial Waste Conference Purdue University, May 1993

Leading the way in this field, the Encyclopedia of Quantitative Risk Analysis and Assessment is the first publication to offer a modern, comprehensive and in-depth resource to the huge variety of disciplines involved. A truly international work, its coverage ranges across risk issues pertinent to life scientists, engineers, policy makers, healthcare professionals, the finance industry, the military and practising statisticians. Drawing on the expertise of world-renowned authors and editors in this field this title provides up-to-date material on drug safety, investment theory, public policy applications, transportation safety, public perception of risk, epidemiological risk, national defence and security, critical infrastructure, and program management. This major publication is easily accessible for all those involved in the field of risk assessment and analysis. For ease-of-use it is available in print and online.

whioh the developments are appropriate in an elementary text book is open to doubt. Fortunately the proceedings of the conference arranged by the Society of Actuaries Research Committee in September 1974 provide an effective review of the ourrent position (Credibility, Theory and Applications, Ed. P. M. Kahn, Academic Press, 1975). It is doubtful if any practical use is now made of the Esscher approximation and the N-P method is much more convenient and of adequate accuracy in most practical work. Thus the first half of Chapter 6 is now largely of historical interest. Chapter 11 dealing with ruin probability during a finite time interval does not give an adequate view of the current importanoe of this topic but the position is fluid because of the considerable effort being expended in the search for practical methods of calcu lation. Formulae are, in general, complicated and involve extensive computer based quadratures or simulation techniques. The paper by Seal in the Scandinavian Actuarial Journal (The Numerical Calculation of U(w,t) the Probability of Non-ruin in an Interval (O,t) 1974) gives a recent treatment and a fairly complete list of relevant references. In many countries studies are currently in progress in the develop ment of models for business planning where the basic operations involve a stochastic process. Not only are insurance companies interested but in many commercial and industrial firms the needs are significant so that a very large field exists for applications.

Providing the necessary materials within a theoretical framework, this volume presents stochastic principles and processes, and related areas. Over 1000 exercises illustrate the concepts discussed, including modern approaches to sample paths and optimal stopping.

The author considers the risks that the failure of Third World economies pose for highly exposed banks, whose collapse would threaten domestic as well as international financial systems.

Lectures on Risk Theory

The Role Of Bargaining And Information

14th National Computer Security Conference

Financial Mathematics

Foundations of Utility and Risk Theory with Applications

This book brings together the latest findings in the area of stochastic analysis and statistics. The individual chapters cover a wide range of topics from limit theorems, Markov processes, nonparametric methods, acturial science, population dynamics, and many others. The volume is dedicated to Valentin Konakov, head of the International Laboratory of Stochastic Analysis and its Applications on the occasion of his 70th birthday. Contributions were prepared by the participants of the international conference of the international conference "Modern problems of stochastic analysis and statistics", held at the Higher School of Economics in Moscow from May 29 - June 2, 2016. It offers a valuable reference resource for researchers and graduate students interested in modern stochastics.

Canadian financial institutions have been in rapid change in the past five years. In response to these changes, the Department of Finance issued a discussion paper: The Regulation of Canadian Financial Institutions, in April 1985, and the government intends to introduce legislation in the fall. This paper studi.es the combination of financial institutions from the viewpoint of ruin probability. In risk theory developed to descriße insurance companies [1,2,3,4,5J, the ruin probability of a company with initial reserve (capital) u is 6 1 -:;-7;;f3 u 1jJ(u) = H6 e H6 (1) Here,we assume that claims arrive as a Poisson process, and the claim amount is distributed as exponential distribution with expectation liS. 6 is the loading, i.e., premium charged is (1+6) times expected claims. Financial institutions are treated as "insurance companies": the difference between interest charged and interest paid is regarded as premiums, loan defaults are treated as claims.

The topics treated fall into three main groups, all of which deal with classical problems which originated in the work of Kolmogorov. The first section looks at probability limit theorems, the second deals with stochastic analysis, and the final part presents some papers on non-parametric and semi-parametric models of mathematical statistics and asymptotic problems. The contributions come from some of the foremost mathematicians in the world today, making for a truly international collection of papers, permeated with the influence of Kolmogorov's works.

Insurance has become a necessary aspect of modern society. The mathematical basis of insurance modeling is best expressed in terms of continuous time stochastic processes. This introductory text on actuarial risk theory deals with the Cramer-Lundberg model and the renewal risk model. Their basic structure and properties, including the renewal theorems as well as the corresponding ruin problems, are studied. There is a detailed discussion of heavy tailed distributions, which have become increasingly relevant. The Lundberg risk process with investment in risky asset is also considered. This book will be useful to practitioners in the field and to graduate students interested in this important branch of applied probability.

Fixed-Probability Levels in Renewal Risk Models

Fundamentals of Actuarial Mathematics

Handbook of Solvency for Actuaries and Risk Managers

Shocks, Burn-in and Heterogeneous populations

Martingale Methods in Financial Modelling

Reflecting the author's wealth of experience in this field, Handbook of Solvency for Actuaries and Risk Managers: Theory and Practice focuses on the valuation of assets and liabilities, the calculation of capital requirement, and the calculation of the standard formula for the European Solvency II project. The first three sections of the book examine the solvency concept, historical development, and the role of solvency in an enterprise risk management approach. The text provides a general discussion on valuation, investment, and capital, along with modeling and measuring. It also covers dependence, risk measures, capital requirements, subrisks, aggregation, the main risks market, and credit, operational, liquidity, and underwriting risks. The last three sections focus on the European Solvency II project. Basing the material on CEIOPS final advice, the author presents the general ideas, valuation, investments, and funds of this project as well as the standard formula framework. He also includes all calibrations from previous quantitative impact studies and discusses the political progress of the project. A one-stop shop for actuaries and risk managers, this handbook offers a complete overview of solvency and the European Solvency II standard formula. It gives a clear definition and broad historical review of solvency and incorporates a comprehensive discussion of the theory behind the calculation of the capital requirement. Updates on solvency projects and issues are available at www.SolvencyII.nu

A new edition of a successful, well-established book that provides the reader with a text focused on practical rather than theoretical aspects of financial modelling Includes a new chapter devoted to volatility risk The theme of stochastic volatility reappears systematically and has been revised fundamentally, presenting a much more detailed analyses of interest-rate models

In this volume we present some o~ the papers that were delivered at FUR-82 - the First International Con~erence on Foundations o~ Utility and Risk Theory in Oslo, June 1982. The purpose o~ the con~erence was to provide a ~orum within which scientists could report on interesting applications o~ modern decision theory and exchange ideas about controversial issues in the ~oundations o~ the theory o~ choice under un certainty. With that purpose in mind we have selected a mixture of applied and theoretical papers that we hope will appeal to a wide spectrum o~ readers ~rom graduate students in social science departments and business schools to people involved H making hardheaded decisions in business and government. In an introductory article Ole Hagen gives an overview o~ various paradoxes in utility and risk theory and discusses these in the light o~ scientific methodology. He concludes the article by calling ~or joint efforts to provide decision makers with warkable theories. Kenneth Arrow takes up the same issue on a broad basis in his paper where he discusses the implications o~ behavior under uncertainty for policy. In the theoretical papers the reader will ~ind attempts at de~initive Statements of the meaning o~ old concepts and suggestions for the adoption o~ new concepts. For instance, Maurice Allais discusses four di~~erent interpretations o~ the axioms o~ probability and explains the need ~or an empirical characterization o~ the concept of chance.

This practical and accessible text enables students in engineering, business, operations research, public policy and computer science to analyze stochastic systems. Emphasizing the modeling of real-life situations with stochastic elements and analyzing the resulting stochastic model, it presents the major cases of useful stochastic processes-discrete and continuous time Markov chains, renewal processes, regenerative processes, and Markov regenerative processes. The author provides user-friendly, yet rigorous coverage. He demonstrates both numerical and analytical solution methods in detail and includes numerous worked examples and exercises.

Stochastic Modeling for Reliability

Dynamic Stochastic Optimization

Control Mechanisms for Ecological-Economic Systems

Regression Modeling with Actuarial and Financial Applications

Modern Problems of Stochastic Analysis and Statistics

Provides a comprehensive coverage of both the deterministic and stochastic models of life contingencies, risk theory, credibility theory, multi-state models, and an introduction to modern mathematical finance. New edition restructures the material to fit into modern computational methods and provides several spreadsheet examples throughout. Covers the syllabus for the Institute of Actuaries

subject CT5, Contingencies Includes new chapters covering stochastic investments returns, universal life insurance. Elements of option pricing and the Black-Scholes formula will be introduced.

Risk Measures and Insurance Solvency Benchmarks: Fixed-Probability Levels in Renewal Risk Models is written for academics and practitioners who are concerned about potential weaknesses of the Solvency II regulatory system. It is also intended for readers who are interested in pure and applied probability, have a taste for classical and asymptotic analysis, and are motivated to delve into rather intensive calculations. The formal prerequisite for this book is a good background in analysis. The desired prerequisite is some degree of probability training, but someone with knowledge of the classical real-variable theory, including asymptotic methods, will also find this book interesting. For those who find the proofs too complicated, it may be reassuring that most results in this book are formulated in rather elementary terms. This book can also be used as reading material for basic courses in risk measures, insurance mathematics, and applied probability. The material of this book was partly used by the author for his courses in several universities in Moscow, Copenhagen University, and in the University of Montreal. Features Requires only minimal mathematical prerequisites in analysis and probability Suitable for researchers and postgraduate students in related fields Could be used as a supplement to courses in risk measures, insurance mathematics and applied probability.

Finance Mathematics is devoted to financial markets both with discrete and continuous time, exploring how to make the transition from discrete to continuous time in option pricing. This book features a detailed dynamic model of financial markets with discrete time, for application in real-world environments, along with Martingale measures and martingale criterion and the proven absence of arbitrage. With a focus on portfolio optimization, fair pricing, investment risk, and self-finance, the authors provide numerical methods for solutions and practical financial models, enabling you to solve problems both from mathematical and from financial point of view. Calculations of Lower and upper prices, featuring practical examples The simplest functional limit theorem proved for transition from discrete to continuous time Learn how to optimize portfolio in the presence of risk factors

Drawing on advanced probability theory, Ambit Stochastics is used to model stochastic processes which depend on both time and space. This monograph, the first on the subject, provides a reference for this burgeoning field, complete with the applications that have driven its development. Unique to Ambit Stochastics are ambit sets, which allow the delimitation of space-time to a zone of interest, and ambit fields, which are particularly well-adapted to modelling stochastic volatility or intermittency. These attributes lend themselves notably to applications in the statistical theory of turbulence and financial econometrics. In addition to the theory and applications of Ambit Stochastics, the book also contains new theory on the simulation of ambit fields and a comprehensive stochastic integration theory for Volterra processes in a non-semimartingale context. Written by pioneers in the subject, this book will appeal to researchers and graduate students interested in empirical stochastic modelling.

Probability Theory and Mathematical Statistics

Theory of Stochastic Processes

Reinsurance

Stochastic Processes

Encyclopedia of Quantitative Risk Analysis and Assessment

This monograph presents and analyzes the optimization, game-theoretic and simulation models of control mechanisms for ecological-economic systems. It is devoted to integrated assessment mechanisms for total risks and losses, penalty mechanisms, risk payment mechanisms, financing and costs compensation mechanisms for risk level reduction, sales mechanisms for risk level quotas, audit mechanisms, mechanisms for expected losses reduction, economic motivation mechanisms, optimization mechanisms for regional environmental (risk level reduction) programs, and mechanisms for authorities' interests coordination. The book is aiming at undergraduate and postgraduate students, as well as at experts in mathematical modeling and control of ecological economic, socioeconomic and organizational systems.

This book begins with the fundamental large sample theory, estimating ruin probability, and ends by dealing with the latest issues of estimating the Gerber-Shiu function. This book is the first to introduce the recent development of statistical methodologies in risk theory (ruin theory) as well as their mathematical validities. Asymptotic theory of parametric and nonparametric inference for the ruin-related quantities is discussed under the setting of not only classical compound Poisson risk processes (Cramér-Lundberg model) but also more general Lévy insurance risk processes. The recent development of risk theory can deal with many kinds of ruin-related quantities: the probability of ruin as well as Gerber-Shiu's discounted penalty function, both of which are useful in insurance risk management and in financial credit risk analysis. In those areas, the common stochastic models are used in the context of the structural approach of companies' default. So far, the probabilistic point of view has been the main concern for academic researchers. However, this book emphasizes the statistical point of view because identifying the risk model is always necessary and is crucial in the final step of practical risk management.

This book teaches multiple regression and time series and how to use these to analyze real data in risk management and finance.

The theory of risk already has its traditions. A review of its classical results is contained in Bohlmann (1909). This classical theory was associated with life insurance mathematics, and dealt mainly with deviations which were expected to be produced by random fluctua tions in individual policies. According to this theory, these deviations are discounted to some initial instant; the square root of the sum of the squares of the capital values calculated in this way then gives a measure for the stability of the portfolio. A theory constituted in this manner is not, however, very appropriate for practical purposes. The fact is that it does not give an answer to such questions as, for example, within what limits a company's probable gain or loss will lie during different periods. Further, non-life insurance, to which risk theory has, in fact, its most rewarding applications, was mainly outside the field of interest of the risk theorists. Thus it is quite understandable that this theory did not receive very much attention and that its applications to practical problems of insurance activity remained rather unimportant. A new phase of development began following the studies of Filip Lundberg (1909, 1919), which, thanks to H. Cramer (1926), e.O.

Risk Measures and Insurance Solvency Benchmarks

Current Index to Statistics, Applications, Methods and Theory

Solvency

The Economics Of International Debt Renegotiation

Modern Actuarial Risk Theory

There may be some readers of this book who are expecting a sort of Mrs Beeton of reinsurance, whose indications if carefully followed will ensure the satisfactory outcome of any reinsurance operation undertaken. They will, I fear, be disappointed for reinsurance is first and foremost a commercial enterprise, whose successful conduct depends upon so much that cannot be written in books or committed to paper. Above all else, it depends upon people and on the personalities of people as much as on their technical skills. Most reinsurers are born and only some are made, but none the less for either sort this book will be of inestimable benefit as a guide to the principles that lie behind the transaction of a business at once as complex and widespread as reinsurance is by its very nature. One of the main characteristics of this highly specialized business is the infinite variety of situations to which the reinsurer is called upon to adapt his business methods making any standardization of practice possible only on a broad, as opposed to a detailed, basis. This renders any attempt to encompass in one book all the practical alternatives and differences in approach to technical reinsurance problems a virtual impossibility.

Unlike traditional books presenting stochastic processes in an academic way, this book includes concrete applications that students will find interesting such as gambling, finance, physics, signal processing, statistics, fractals, and biology. Written with an important illustrated guide in the beginning, it contains many illustrations, photos and pictures, along with several website links. Computational tools such as simulation and Monte Carlo methods are included as well as complete toolboxes for both traditional and new computational techniques.

Motivated by the many and long-standing contributions of H. Gerber and E. Shiu, this book gives a modern perspective on the problem of ruin for the classical Cramér-Lundberg model and the surplus of an insurance company. The book studies martingales and path decompositions, which are the main tools used in analysing the distribution of the time of ruin, the wealth prior to ruin and the deficit at ruin. Recent developments in exotic ruin theory are also considered. In particular, by making dividend or tax payments out of the surplus process, the effect on ruin is explored. Gerber-Shiu Risk Theory can be used as lecture notes and is suitable for a graduate course. Each chapter corresponds to approximately two hours of lectures.

Modern Actuarial Risk Theory contains what every actuary needs to know about non-life insurance mathematics. It starts with the standard material like utility theory, individual and collective model and basic ruin theory. Other topics are risk measures and premium principles, bonus-malus systems, ordering of risks and credibility theory. It also contains some chapters about Generalized Linear Models, applied to rating and IBNR problems. As to the level of the mathematics, the book would fit in a bachelors or masters program in quantitative economics or mathematical statistics. This second and.

From Applications to Theory

Omni Shoreham Hotel, Washington, D.C., 1-4 October 1991 : Proceedings

Gerber-Shiu Risk Theory

Modeling and Analysis of Stochastic Systems

With Applications to Financial Mathematics and Risk Theory

In the first book of its kind, Turnbull traces the development and implementation of actuarial ideas, from the conception of Equitable Life in the mid-18th century to the start of the 21st century. This book analyses the historical development of British actuarial thought in each of its three main practice areas of life assurance, pensions and general insurance. It discusses how new actuarial approaches were developed within each practice area, and how these emerging ideas interacted with each other and were often driven by common external factors such as shocks in the economic environment, new intellectual ideas from academia and developments in technology. A broad range of historically important actuarial topics are discussed such as the development of the blueprint for the actuarial management of with-profit business; historical developments in mortality modelling methods; changes in actuarial thinking on investment strategy for life and pensions business; changing perspectives on the objectives and methods for funding Defined Benefit pensions; the application of risk theory in general insurance reserving; the adoption of risk-based reserving and the Guaranteed Annuity Option crisis at the end of the 20th century. This book also provides an historical overview of some of the most important external contributions to actuarial thinking: in particular, the first century or so of modern thinking on probability and statistics, starting in the 1650s with Pascal and Fermat; and the developments in the field of financial economics over the third quarter of the twentieth century. This book identifies where historical actuarial thought heuristically anticipated some of the fundamental ideas of modern finance, and the challenges that the profession wrestled with in reconciling these ideas with traditional actuarial methods. Actuaries have played a profoundly influential role in the management of the United Kingdom's most important long-term financial institutions over the last two hundred years. This book will be the first to chart the influence of the actuarial profession to modern day. It will prove a valuable resource for actuaries, actuarial trainees and students of actuarial science. It will also be of interest to academics and professionals in related financial fields such as accountants, statisticians, economists and investment managers.

Readers of my books, students and scientists, often ask for spe cial references not commonly found in introductory or interme diate books on statistics. From the titles and contents of 1449 key papers and books which are listed and numbered in Sec tion 5, I have selected keywords and subject headings and ar ranged them alphabetically together with the numbers of perti nent references in Section 3. Number 1153, for instance, denotes my book" Applied Statis tics". It contains a bibliographical section on pages 568 to 641. Supplementary material is displayed in this small bibliographi cal guide. It also complements well-known textbooks of Box, Hunter and Hunter (No.121), Dixon and Massey (No.286), Snedecor and Cochran (No. 1238), and many recent competitors. Since the methodology of statistics is expanding rapidly, many methods are not considered at all or only introduced in the basic textbooks of statistics. There is a need for intermediate statistical methods concerned with increasingly complicated ap plications of statistics to actual research situations. Here the specification of terms helps to find some sources. Since the ref erences vary considerably in length and content, the number of culled or extracted terms per referenced page varies even more, as does also their degree of specialization; however in most cases an intermediate statistical level is maintained.

Uncertainties and changes are pervasive characteristics of modern systems involving interactions between humans, economics, nature and technology. These systems are often too complex to allow for precise evaluations and, as a result, the lack of proper management (control) may create significant risks. In order to develop robust strategies we need approaches which explic itly deal with uncertainties, risks and changing conditions. One rather general approach is to characterize (explicitly or implicitly) uncertainties by objec tive or subjective probabilities (measures of confidence or belief). This leads us to stochastic optimization problems which can rarely be solved by using the standard deterministic optimization and optimal control methods. In the stochastic optimization the accent is on problems with a large number of deci sion and random variables, and consequently the focus ofattention is directed to efficient solution procedures rather than to (analytical) closed-form solu tions. Objective and constraint functions of dynamic stochastic optimization problems have the form of multidimensional integrals of rather involved in that may have a nonsmooth and even discontinuous character - the tegrands typical situation for "hit-or-miss" type of decision making problems involving irreversibility ofdecisions or/and abrupt changes ofthe system. In general, the exact evaluation of such functions (as is assumed in the standard optimization and control theory) is practically impossible. Also, the problem does not often possess the separability properties that allow to derive the standard in control theory recursive (Bellman) equations.

Lectures on Insurance Models

Stochastic Financial Mathematics

New Operational Approaches for Financial Modelling

The Stochastic Basis of Insurance

Risk Theory : the Stochastic Basis of Insurance