Regression Modeling With Actuarial And Financial Applications

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Healthcare Risk Adjustment and Predictive Modeling - Ian G. Duncan 2011
This text is listed on the Course of Reading for SOA Fellowship study in the Group & Health specialty track. Healthcare Risk Adjustment and Predictive Modeling provides a comprehensive guide to healthcare actuaries and other professionals interested in healthcare data analytics, risk adjustment and predictive modeling. The book first introduces the topic with discussions of health risk, available data, clinical identification algorithms for diagnostic grouping and the use of grouper models. The second part of the book presents the concept of data mining and some of the common approaches used by modelers. The third and final section covers a number of predictive modeling and risk adjustment case-studies, with examples from Medicaid, Medicare, disability, depression diagnosis and provider reimbursement, as well as the use of predictive modeling and risk adjustment outside the U.S. For readers who wish to experiment with their own models, the book also provides access to a test dataset.

Claims Reserving in General Insurance - David Hindley 2017-10-26
This is a comprehensive and accessible reference source that documents the theoretical and practical aspects of all the key deterministic and stochastic reserving methods that have been developed for use in general insurance. Worked examples and mathematical details are included, along with many of the broader topics associated with reserving in practice. The key features of reserving in a range of different contexts in the UK and elsewhere are also covered. The book contains material that will appeal to anyone with an interest in claims reserving. It can be used as a learning resource for actuarial students who are studying the relevant parts of their professional bodies' examinations, as well as by others who are new to the subject. More experienced insurance and other professionals can use the book to refresh or expand their knowledge in any of the wide range of reserving topics covered in the book.

A/S/M SOA Exam SRM - Abraham Weishaus 2018

Generalized Linear Models for Insurance Rating - Mark Goldburd 2016-06-08

Computational Actuarial Science with R - Arthur Charpentier 2015-09-15
A Hands-On Approach to Understanding and Using Actuarial Models Computational Actuarial Science with R provides an introduction to the computational aspects of actuarial science. Using simple R code, the book helps you understand the algorithms involved in actuarial computations. It also covers more advanced topics, such as parallel computing and C/C++ embedded codes. After an introduction to the R language, the book is divided into four parts. The first one addresses methodology and statistical modeling issues. The second part discusses the computational facets of life

insurance, including life contingencies calculations and prospective life tables. Focusing on finance from an actuarial perspective, the next part presents techniques for modeling stock prices, nonlinear time series, yield curves, interest rates, and portfolio optimization. The last part explains how to use R to deal with computational issues of nonlife insurance. Taking a do-it-yourself approach to understanding algorithms, this book demystifies the computational aspects of actuarial science. It shows that even complex computations can usually be done without too much trouble. Datasets used in the text are available in an R package (CASdatasets).

Life Insurance Products and Finance - David B. Atkinson 2000

Understanding Actuarial Management - Clare Bellis 2010

Biostatistics with R - Jan Lepš 2020-07-30
A straightforward introduction to a wide range of statistical methods for field biologists, using thoroughly explained R code.

Financial Analytics with R - Mark J. Bennett 2016-10-06
Financial Analytics with R sharpens readers' skills in time-series, forecasting, portfolio selection, covariance clustering, prediction, and derivative securities.

Longitudinal and Panel Data - Edward W. Frees 2004-08-16
An introduction to foundations and applications for quantitatively oriented graduate social-science students and individual researchers.

Financial and Actuarial Statistics - Dale S. Borowiak 2013-11-12
Understand Up-to-Date Statistical Techniques for Financial and Actuarial ApplicationsSince the first edition was published, statistical techniques, such as reliability measurement, simulation, regression, and Markov chain modeling, have become more prominent in the financial and actuarial industries. Consequently, practitioners and students must ac

Loss Models - Stuart A. Klugman 2012-01-25
An update of one of the most trusted books on constructing and analyzing actuarial models Written by three renowned authorities in the actuarial field, Loss Models, Third Edition

upholds the reputation for excellence that has made this book required reading for the Society of Actuaries (SOA) and Casualty Actuarial Society (CAS) qualification examinations. This update serves as a complete presentation of statistical methods for measuring risk and building models to measure loss in real-world events. This book maintains an approach to modeling and forecasting that utilizes tools related to risk theory, loss distributions, and survival models. Random variables, basic distributional quantities, the recursive method, and techniques for classifying and creating distributions are also discussed. Both parametric and non-parametric estimation methods are thoroughly covered along with advice for choosing an appropriate model. Features of the Third Edition include: Extended discussion of risk management and risk measures, including Tail-Value-at-Risk (TVaR) New sections on extreme value distributions and their estimation Inclusion of homogeneous, nonhomogeneous, and mixed Poisson processes Expanded coverage of copula models and their estimation Additional treatment of methods for constructing confidence regions when there is more than one parameter The book continues to distinguish itself by providing over 400 exercises that have appeared on previous SOA and CAS examinations. Intriguing examples from the fields of insurance and business are discussed throughout, and all data sets are available on the book's FTP site, along with programs that assist with conducting loss model analysis. Loss Models, Third Edition is an essential resource for students and aspiring actuaries who are preparing to take the SOA and CAS preliminary examinations. It is also a must-have reference for professional actuaries, graduate students in the actuarial field, and anyone who works with loss and risk models in their everyday work. To explore our additional offerings in actuarial exam preparation visit www.wiley.com/go/actuarialexamprep.

Mathematical and Statistical Methods for Actuarial Sciences and Finance - Marco Corazza 2018-07-17
The interaction between mathematicians, statisticians and econometricians working in actuarial sciences and finance is producing numerous meaningful scientific results. This

volume introduces new ideas, in the form of four-page papers, presented at the international conference Mathematical and Statistical Methods for Actuarial Sciences and Finance (MAF), held at Universidad Carlos III de Madrid (Spain), 4th-6th April 2018. The book covers a wide variety of subjects in actuarial science and financial fields, all discussed in the context of the cooperation between the three quantitative approaches. The topics include: actuarial models; analysis of high frequency financial data; behavioural finance; carbon and green finance; credit risk methods and models; dynamic optimization in finance; financial econometrics; forecasting of dynamical actuarial and financial phenomena; fund performance evaluation; insurance portfolio risk analysis; interest rate models; longevity risk; machine learning and soft-computing in finance; management in insurance business; models and methods for financial time series analysis, models for financial derivatives; multivariate techniques for financial markets analysis; optimization in insurance; pricing; probability in actuarial sciences, insurance and finance; real world finance; risk management; solvency analysis; sovereign risk; static and dynamic portfolio selection and management; trading systems. This book is a valuable resource for academics, PhD students, practitioners, professionals and researchers, and is also of interest to other readers with quantitative background knowledge.

Predictive Modeling Applications in Actuarial Science: Volume 2, Case Studies in Insurance - Edward W. Frees 2016-07-27
Predictive modeling uses data to forecast future events. It exploits relationships between explanatory variables and the predicted variables from past occurrences to predict future outcomes. Forecasting financial events is a core skill that actuaries routinely apply in insurance and other risk-management applications. Predictive Modeling Applications in Actuarial Science emphasizes life-long learning by developing tools in an insurance context, providing the relevant actuarial applications, and introducing advanced statistical techniques that can be used to gain a competitive advantage in situations with complex data. Volume 2 examines applications of predictive modeling.

Where Volume 1 developed the foundations of predictive modeling, Volume 2 explores practical uses for techniques, focusing on property and casualty insurance. Readers are exposed to a variety of techniques in concrete, real-life contexts that demonstrate their value and the overall value of predictive modeling, for seasoned practicing analysts as well as those just starting out.
Solutions Manual for Actuarial Mathematics for Life Contingent Risks David C. M. Dickson 2013-08-12
This must-have manual provides detailed solutions to all of the 200+ exercises in Dickson, Hardy and Waters' Actuarial Mathematics for Life Contingent Risks, Second Edition. This groundbreaking text on the modern mathematics of life insurance is required reading for the Society of Actuaries' Exam MLC and also provides a solid preparation for the life contingencies material of the UK actuarial profession's exam CT5. Beyond the professional examinations, the textbook and solutions manual offer readers the opportunity to develop insight and understanding, and also offer practical advice for solving problems using straightforward, intuitive numerical methods. Companion spreadsheets illustrating these techniques are available for free download.
Actuarial Science - Hanji Shang 2006
This edition of the private and scientific correspondence of Sir Rudolf Peierls gives a unique insight into the life and work of one of the greatest theoretical physicists of the 20th century. Rudolf Peierls' scientific work contributed to the early developments in quantum mechanics, and he is well known and much appreciated for his contributions to various disciplines, including solid state physics, nuclear physics, and particle physics. As an enthusiastic and devoted teacher, he passed on his knowledge and understanding and inspired the work of collaborators and students alike. As an effective administrator he was responsible, almost single-handedly, for the establishment of an outstanding successful centre of theoretical physics in Birmingham, and later contributed much to theoretical physics in Oxford. A meticulous collector of correspondence, Sir Rudolf left a fascinating collection of letters, in some cases spanning more than seven decades.

This collection includes correspondence with his parents, his wife, the Russian-born physicist Genia Kannegieser, life-long friends such as Hans Bethe, and many great physicists, including Wolfgang Pauli, Niels Bohr, Werner Heisenberg, Lev Landau, and George Placzek, to name but a few. This first volume, which covers the years 1922 to 1945, contains much of the early family correspondence, letters exchanged between Rudolf and Genia Peierls before and after their marriage in 1931, correspondence relating to early developments in quantum physics, and interesting material relating to the development of nuclear weapons. The extensive apparatus provides an invaluable background which allows the reader to put the presented documents into their multi-faceted social, political and scientific context.

Statistics and Data Analysis for Financial Engineering - David Ruppert 2015-04-21
The new edition of this influential textbook, geared towards graduate or advanced undergraduate students, teaches the statistics necessary for financial engineering. In doing so, it illustrates concepts using financial markets and economic data, R Labs with real-data exercises, and graphical and analytic methods for modeling and diagnosing modeling errors. These methods are critical because financial engineers now have access to enormous quantities of data. To make use of this data, the powerful methods in this book for working with quantitative information, particularly about volatility and risks, are essential. Strengths of this fully-revised edition include major additions to the R code and the advanced topics covered. Individual chapters cover, among other topics, multivariate distributions, copulas, Bayesian computations, risk management, and cointegration. Suggested prerequisites are basic knowledge of statistics and probability, matrices and linear algebra, and calculus. There is an appendix on probability, statistics and linear algebra. Practicing financial engineers will also find this book of interest.

Actuarial Models - Vladimir I. Rotar 2014-08-18
Actuarial Models: The Mathematics of Insurance, Second Edition thoroughly covers the basic models of insurance processes. It also presents the mathematical frameworks and methods used in actuarial modeling. This second edition provides an even smoother, more robust account of the main ideas and models, preparing students to take exams of the Societ

Predictive Modeling Applications in Actuarial Science - Edward W. Frees 2014-07-28
This book is for actuaries and financial analysts developing their expertise in statistics and who wish to become familiar with concrete examples of predictive modeling.

Regression Modeling with Actuarial and Financial Applications Edward W. Frees 2009-11-30
This text gives budding actuaries and financial analysts a foundation in multiple regression and time series. They will learn about these statistical techniques using data on the demand for insurance, lottery sales, foreign exchange rates, and other applications. Although no specific knowledge of risk management or finance is presumed, the approach introduces applications in which statistical techniques can be used to analyze real data of interest. In addition to the fundamentals, this book describes several advanced statistical topics that are particularly relevant to actuarial and financial practice, including the analysis of longitudinal, two-part (frequency/severity), and fat-tailed data. Datasets with detailed descriptions, sample statistical software scripts in 'R' and 'SAS', and tips on writing a statistical report, including sample projects, can be found on the book's Web site: http://research.bus.wisc.edu/RegActuaries.

Modelling Mortality with Actuarial Applications Angus S. Macdonald 2018-05-03
Modern mortality modelling for actuaries and actuarial students, with example R code, to unlock the potential of individual data.

Regression Modeling with Actuarial and Financial Applications - Edward W. Frees 2010
This book teaches multiple regression and time series and how to use these to analyze real data in risk management and finance.

Nonlife Actuarial Models - Yiu-Kuen Tse 2009-09-17
This class-tested undergraduate textbook covers the entire syllabus for Exam C of the Society of Actuaries (SOA).

Generalized Linear Models for Insurance Data - Piet de Jong 2008-02-28

This is the only book actuaries need to understand generalized linear models (GLMs) for insurance applications. GLMs are used in the insurance industry to support critical decisions. Until now, no text has introduced GLMs in this context or addressed the problems specific to insurance data. Using insurance data sets, this practical, rigorous book treats GLMs, covers all standard exponential family distributions, extends the methodology to correlated data structures, and discusses recent developments which go beyond the GLM. The issues in the book are specific to insurance data, such as model selection in the presence of large data sets and the handling of varying exposure times. Exercises and data-based practicals help readers to consolidate their skills, with solutions and data sets given on the companion website. Although the book is package-independent, SAS code and output examples feature in an appendix and on the website. In addition, R code and output for all the examples are provided on the website.

Handbook of Volatility Models and Their Applications - Luc Bauwens 2012-04-17
A complete guide to the theory and practice of volatility models in financial engineering Volatility has become a hot topic in this era of instant communications, spawning a great deal of research in empirical finance and time series econometrics. Providing an overview of the most recent advances, Handbook of Volatility Models and Their Applications explores key concepts and topics essential for modeling the volatility of financial time series, both univariate and multivariate, parametric and non-parametric, high-frequency and low-frequency. Featuring contributions from international experts in the field, the book features numerous examples and applications from real-world projects and cutting-edge research, showing step by step how to use various methods accurately and efficiently when assessing volatility rates. Following a comprehensive introduction to the topic, readers are provided with three distinct sections that unify the statistical and practical aspects of volatility: Autoregressive Conditional Heteroskedasticity and Stochastic Volatility presents ARCH and stochastic volatility models, with a focus on recent research topics including mean, volatility, and skewness spillovers in

equity markets Other Models and Methods presents alternative approaches, such as multiplicative error models, nonparametric and semi-parametric models, and copula-based models of (co)volatilities Realized Volatility explores issues of the measurement of volatility by realized variances and covariances, guiding readers on how to successfully model and forecast these measures Handbook of Volatility Models and Their Applications is an essential reference for academics and practitioners in finance, business, and econometrics who work with volatility models in their everyday work. The book also serves as a supplement for courses on risk management and volatility at the upper-undergraduate and graduate levels.
Basic Business Statistics - Mark L. Berenson 1999-06-01

Financial Modeling, Actuarial Valuation and Solvency in Insurance - Mario V. Wüthrich 2013-04-04
Risk management for financial institutions is one of the key topics the financial industry has to deal with. The present volume is a mathematically rigorous text on solvency modeling. Currently, there are many new developments in this area in the financial and insurance industry (Basel III and Solvency II), but none of these developments provides a fully consistent and comprehensive framework for the analysis of solvency questions. Merz and Wüthrich combine ideas from financial mathematics (no-arbitrage theory, equivalent martingale measure), actuarial sciences (insurance claims modeling, cash flow valuation) and economic theory (risk aversion, probability distortion) to provide a fully consistent framework. Within this framework they then study solvency questions in incomplete markets, analyze hedging risks, and study asset-and-liability management questions, as well as issues like the limited liability options, dividend to shareholder questions, the role of re-insurance, etc. This work embeds the solvency discussion (and long-term liabilities) into a scientific framework and is intended for researchers as well as practitioners in the financial and actuarial industry, especially those in charge of internal risk management systems. Readers should have a good background in probability

theory and statistics, and should be familiar with popular distributions, stochastic processes, martingales, etc.

Risk Modelling in General Insurance - Roger J. Gray 2012-06-28
A wide range of topics give students a firm foundation in statistical and actuarial concepts and their applications.

Fundamentals of Actuarial Mathematics. David Promislow 2011-01-06
This book provides a comprehensive introduction to actuarial mathematics, covering both deterministic and stochastic models of life contingencies, as well as more advanced topics such as risk theory, credibility theory and multi-state models. This new edition includes additional material on credibility theory, continuous time multi-state models, more complex types of contingent insurances, flexible contracts such as universal life, the risk measures VaR and TVaR. Key Features: Covers much of the syllabus material on the modeling examinations of the Society of Actuaries, Canadian Institute of Actuaries and the Casualty Actuarial Society. (SOA-CIA exams MLC and C, CSA exams 3L and 4.) Extensively revised and updated with new material. Orders the topics specifically to facilitate learning. Provides a streamlined approach to actuarial notation. Employs modern computational methods. Contains a variety of exercises, both computational and theoretical, together with answers, enabling use for self-study. An ideal text for students planning for a professional career as actuaries, providing a solid preparation for the modeling examinations of the major North American actuarial associations. Furthermore, this book is highly suitable reference for those wanting a sound introduction to the subject, and for those working in insurance, annuities and pensions.

Effective Statistical Learning Methods for Actuaries I-II Michel Denuit 2020-11-16
This book summarizes the state of the art in tree-based methods for insurance: regression trees, random forests and boosting methods. It also exhibits the tools which make it possible to assess the predictive performance of tree-based models. Actuaries need these advanced analytical tools to turn the massive data sets now at their disposal into opportunities. The

exposition alternates between methodological aspects and numerical illustrations or case studies. All numerical illustrations are performed with the R statistical software. The technical prerequisites are kept at a reasonable level in order to reach a broad readership. In particular, master's students in actuarial sciences and actuaries wishing to update their skills in machine learning will find the book useful. This is the second of three volumes entitled Effective Statistical Learning Methods for Actuaries. Written by actuaries for actuaries, this series offers a comprehensive overview of insurance data analytics with applications to P&C, life and health insurance.

Fundamentals of Retiree Group Benefits - Dale Yamamoto 2015-06-30
Retiree group benefits have earned a reputation for being difficult to understand. Half retirement benefit and half group insurance – few professionals have mastered both fields. Complex finances blend the world of pension mathematics and health plan pricing. The purpose of this textbook is to provide the fundamental basics of all aspects of retiree group benefits—from goals and objectives of providing the benefit to the actuarial considerations of accounting and funding the programs. This one book contains everything pertaining to the subject of retiree group benefits. Its chapters cover the prevalence of the benefit, Medicare, plan design, funding and legal issues, accounting rules and actuarial methods and assumptions.

Statistical and Probabilistic Methods in Actuarial Science - Philip J. Boland 2007-03-05
Statistical and Probabilistic Methods in Actuarial Science covers many of the diverse methods in applied probability and statistics for students aspiring to careers in insurance, actuarial science, and finance. The book builds on students' existing knowledge of probability and statistics by establishing a solid and thorough understanding of

Regression Modeling with Actuarial and Financial Applications - Edward W. Frees 2010
This title gives actuarial and finance students a foundation in multiple regression and time series, and discusses advanced statistical topics that are relevant to actuarial and financial

practice.

Introduction to Regression Modeling - Bovas Abraham 2006
Looking for an easy-to-understand text to guide you through the tough topic of regression modeling? INTRODUCTION TO REGRESSION MODELING (WITH CD-ROM) offers a blend of theory and regression applications and will give you the practice you need to tackle this subject through exercises, case studies. and projects that have you identify a problem of interest and collect data relevant to the problem's solution. The book goes beyond linear regression by covering nonlinear models, regression models with time series errors, and logistic and Poisson regression models.

Introduction to Ratemaking and Loss Reserving for Property and Casualty Insurance - Robert L. Brown 2001-05

Actuarial Modelling of Claim Counts - Michel Denuit 2007-07-27
There are a wide range of variables for actuaries to consider when calculating a motorist's insurance premium, such as age, gender and type of vehicle. Further to these factors, motorists' rates are subject to experience rating systems, including credibility mechanisms and Bonus Malus systems (BMSs). Actuarial Modelling of Claim Counts presents a comprehensive treatment of the various experience rating systems and their relationships with risk classification. The authors summarize the most recent developments in the field, presenting ratemaking systems, whilst taking into account exogenous information. The text: Offers the first self-contained, practical approach to a priori and a posteriori ratemaking in motor insurance. Discusses the issues of claim frequency and claim severity, multi-event systems, and the combinations of deductibles and BMSs. Introduces recent developments in actuarial science and exploits the generalised linear model and generalised linear mixed model to achieve risk classification. Presents credibility mechanisms as refinements of commercial BMSs. Provides practical applications with real data sets processed with SAS software. Actuarial Modelling of Claim Counts is essential reading for students in actuarial science, as well as practicing and academic actuaries. It is also ideally suited for professionals involved in the insurance industry, applied mathematicians, quantitative economists, financial engineers and statisticians.

Metamodeling for Variable Annuities - Guojun Gan 2019-07-05
This book is devoted to the mathematical methods of metamodeling that can be used to speed up the valuation of large portfolios of variable annuities. It is suitable for advanced undergraduate students, graduate students, and practitioners. It is the goal of this book to describe the computational problems and present the metamodeling approaches in a way that can be accessible to advanced undergraduate students and practitioners. To that end, the book will not only describe the theory of these mathematical approaches, but also present the implementations.

Health Insurance Ermanno Pitacco 2014-11-04
Health Insurance aims at filling a gap in actuarial literature, attempting to solve the frequent misunderstanding in regards to both the purpose and the contents of health insurance products (and 'protection products', more generally) on the one hand, and the relevant actuarial structures on the other. In order to cover the basic principles regarding health insurance techniques, the first few chapters in this book are mainly devoted to the need for health insurance and a description of insurance products in this area (sickness insurance, accident insurance, critical illness covers, income protection, long-term care insurance, health-related benefits as riders to life insurance policies). An introduction to general actuarial and risk-management issues follows. Basic actuarial models are presented for sickness insurance and income protection (i.e. disability annuities). Several numerical examples help the reader understand the main features of pricing and reserving in the health insurance area. A short introduction to actuarial models for long-term care insurance products is also provided. Advanced undergraduate and graduate students in actuarial sciences; graduate students in economics, business and finance; and professionals and technicians operating in insurance and pension areas will find this book of benefit.

Modeling Count Data - Joseph M. Hilbe

2014-07-21

"This entry-level text offers clear and concise guidelines on how to select, construct, interpret, and evaluate count data. Written for researchers with little or no background in advanced statistics, the book presents treatments of all major models using numerous tables, insets, and detailed modeling suggestions. It begins by demonstrating the fundamentals of linear regression and works up to an analysis of the Poisson and negative binomial models, and to the problem of overdispersion. Examples in Stata, R, and SAS code enable readers to adapt models for their own purposes, making the text an ideal resource for researchers working in public health, ecology, econometrics, transportation, and other related fields"--

Financial Signal Processing and Machine Learning - Ali N. Akansu 2016-04-20
The modern financial industry has been required to deal with large and diverse portfolios in a variety of asset classes often with limited market data available. Financial Signal Processing and Machine Learning unifies a number of recent advances made in signal processing and machine learning for the design and management of investment portfolios and financial engineering. This book bridges the gap between these disciplines, offering the latest information on key topics including characterizing statistical dependence and correlation in high dimensions, constructing effective and robust risk measures, and their use in portfolio optimization and rebalancing. The book focuses on signal processing approaches to model return, momentum, and mean reversion, addressing theoretical and implementation aspects. It highlights the connections between portfolio theory, sparse learning and compressed sensing, sparse eigen-portfolios, robust optimization, non-Gaussian data-driven risk measures, graphical models, causal analysis through temporal-causal modeling, and large-scale copula-based approaches. Key features: Highlights signal processing and machine learning as key approaches to quantitative finance. Offers advanced mathematical tools for high-dimensional portfolio construction, monitoring, and post-trade analysis problems. Presents portfolio theory, sparse learning and compressed sensing, sparsity methods for investment portfolios. including eigen-portfolios, model return, momentum, mean reversion and non-Gaussian data-driven risk measures with real-world applications of these techniques. Includes contributions from leading researchers and practitioners in both the signal and information processing communities, and the quantitative finance community.