

Preface

This book is a compilation of 21 of the papers presented at the International Cramér Symposium on Insurance Mathematics (ICSIM) held at Stockholm University on 11–14 June, 2013.

Each chapter is devoted to a single paper, and the chapters are grouped into five parts, each part representing one of the main topics of the symposium:

Part I—International Cramér Symposium on Insurance Mathematics.

Part II—Modern Risk Theory and Its Applications.

Part III—Stochastic Modelling of Insurance Business.

Part IV—New Mathematical Problems in Life and Non-Life Insurance.

Part V—Related Topics in Applied and Financial Mathematics.

Part I begins with the short chapter by Silvestrov and Martin-Löf ([Chap. 1](#)), which presents a summary of the symposium. The chapter by Martin-Löf ([Chap. 2](#)) is devoted to the work of Harald Cramér in the area of insurance mathematics. Djehiche and Sandström's chapter ([Chap. 3](#)) presents historical notes on the Scandinavian Actuarial Journal.

Part II begins with the chapter by Schmidli ([Chap. 4](#)), which presents new explicit formulas, based on Gerber–Shiu functions, for the value of the discounted capital injections in a classical compound Poisson risk model. D. Silvestrov's chapter ([Chap. 5](#)) presents a survey of results on improved asymptotics for ruin probabilities in the form of exponential asymptotic expansions, necessary and sufficient conditions and explicit rates of convergence in the classical Cramér–Lundberg, stable and diffusion approximations. Two chapters, by Ni and Petersson, continue this line of research. The chapter by Ni ([Chap. 6](#)) presents asymptotic exponential expansions for ruin probabilities for the Cramér–Lundberg risk model with non-polynomial type perturbations. Petersson's chapter ([Chap. 7](#)) presents asymptotic exponential expansions for ruin probabilities for the discrete time analogue of the perturbed Cramér–Lundberg risk model. This part also includes two chapters devoted to the study of risk models with heavy-tailed distributions. The chapter by Konstantinides and Kountzakis ([Chap. 8](#)) introduces a new expected shortfall-like risk measure. Rassoul's chapter ([Chap. 9](#)) presents empirical estimates for ruin probabilities in risk models with heavy-tailed distributions.

Part III begins with the chapter by Aas, Neef, Raabe and Vårli ([Chap. 10](#)), devoted to a simulation-based Asset Liability Management (ALM) model for computing the market value of the liabilities for a life insurance company, which is one of the key aspect of the Solvency II regulatory framework. This part also includes the chapter by Günther, Tsvete, Aas, Hagen, Kvifte and Borgan ([Chap. 11](#)), devoted to modelling insurance claims with a Poisson random effects model and a statistical analysis of the prediction performance of this model. The chapter by D’Amico, Gismondi, Janssen and Manca ([Chap. 12](#)) proposes effective stochastic modelling and computational methods based on alternating renewal processes in disability insurance claims studies.

Part IV begins with the chapter by Ekhedden and Hössjer ([Chap. 13](#)) on stochastic modelling of mortality, based on new advanced methods of variance decomposition. This part also includes the chapter by Yu. Kartashov, Golomoziy and N. Kartashov ([Chap. 14](#)), where new advanced results on stability of Markov chains are applied to an analysis of the impact of stress factors on the price of widow’s pensions. Tzougas and Frangos’ chapter ([Chap. 15](#)) presents a new method for the design of an optimal Bonus-Malus system using the Sichel distribution for modelling of the claim frequencies. The chapter by Mahmoudvand and Aziznasiri ([Chap. 16](#)) is also devoted to the study of Bonus-Malus systems in open and closed portfolios of insurance policies.

Part V begins with the chapter by De Gregorio and Macci ([Chap. 17](#)), devoted to the study of large deviations for a damped telegraph process, which may yield large deviation estimates for level crossing probabilities, such as ruin probabilities for some insurance models. Malmberg and Hössjer’s chapter ([Chap. 18](#)) presents a model of probabilistic choice when the set of options is infinite. The chapter by Engström and S. Silvestrov ([Chap. 19](#)) is devoted to a study of PageRank algorithms, which are used to rank nodes in networks and enable effective search tools for information databases. This has applications in many different areas, including insurance. This part also includes the chapter by Ogutu, Lundengård, S. Silvestrov and Weke ([Chap. 20](#)), where Vandermonde type matrix analysis is applied to problems of high order moment fitting for lattice tree and jump-diffusion models of price processes. Finally, Melnikov and Smirnov’s chapter ([Chap. 21](#)) is devoted to the study of option pricing and CVaR-optimal partial hedging in the framework of the two-state telegraph market model.

All chapters have been reviewed, and we are grateful to the reviewers for their work.

The book comprises selected refereed contributions from several large research communities in modern insurance mathematics and its applications. We hope that the book will be a useful source of inspiration for a broad spectrum of researchers, research students and experts from the insurance business. In this way, the book will contribute to the development of research and academy–industry co-operation in the area of insurance mathematics and its applications.

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