

**FOREWORD**

## **Foreword: Special issue on the future of applied stochastic models and data analysis**

This special issue of the journal *Applied Stochastic Models in Business and Industry* consists in a choice of papers presented by participants to the 17th international conference on Applied Stochastic Models and Data Analysis, ASMDA 2017, held in London, June 6-9, 2017. Researchers, scientists, and practitioners from different parts of the world were brought together to present and discuss significant recent developments in stochastic modeling and data analysis.

This issue includes eight research articles that were first presented at the conference, then selected by the guest editors, and finally undergone the peer-review process according to the standards of the journal.

The first four papers deal with stochastic models with applications to finance and insurance.

Ekaterina Bulinskaya proposes methods for asymptotic analysis and optimization solving in models arising in insurance and finance but not limited to these two only. Although only two simple cases are presented, the methods can be useful for solving other optimization and stability problems.

Samuel Cohen, Robert Elliott, and Tak Kuen Siu give an introduction to risk neutral pricing of financial assets through a binomial model. Martingale representation, backward stochastic differential equations, and the Malliavin calculus, which are difficult concepts in a continuous time setting, are thus introduced via a standard simple discrete time model.

Griselda Deelstra, Sinem Kozpinar, and Matthieu Simon consider the evaluation of spread and basket options when the underlying asset prices are driven by Markov-modulated Lévy processes with synchronous jumps. In this general regime-switching framework, lower and upper bounds to the exact option prices are obtained based upon ideas from the literature without regime switching. The obtained spread and basket option price approximations are illustrated with examples in different regime switching models.

Claude Lefèvre and Philippe Picard consider a general epidemic model whose spread is partially controlled by a health organization. Thus, they show that standard life insurance principles can be applied to guarantee the insurance coverage of such an epidemic.

The last four papers deal with classical themes on distributions for random variables, random vectors and random sequences, in probability, statistics and data analysis.

Narayanaswamy Balakrishnan, Phalguni Nandab, and Suchandan Kayal deal with comparisons in terms of various stochastic orderings of the smallest- and largest-order statistics arising from independent heterogeneous generalized modified Weibull-distributed random variables.

James R. Bozeman, Matt Davey, Sam Hutchins, Jillian Mori, Abigail Salvadore, and Kayla St. Germain propose a convexity ratio to serve as a guide to reshape voting districts that have likely been gerrymandered. Algorithms for finding the convexity ratio and designing nongerrymandered districts are proposed, applied to North Carolina and Illinois, and to reshape Texas voting districts. Comment are provided on how such a method can be used in other applications, for example, in geomarketing and on the electrical or police pistricting problem.

Stéphanie Bougeard, Véronique Cariou, Gilbert Saporta, and Ndèye Niang deal with regression analysis from large data sets. A new method, called regularized clusterwise multiblock regression, is proposed, combining clustering and a multiblock component-based model associated with a well-defined criterion to optimize. A simulation study and a real example in the field of indoor air quality are presented, and an R-package, called *mbclusterwise*, is available.

Jesus Garcia, Ramin Gholizadeh, and Veronica Gonzalez-Lopez develop a Bayesian information criterion to address the problem of deciding whether two independent samples coming from discrete Markovian processes are governed by the same stochastic law or not. A local metric between samples is thus defined for deriving the bound that must be used to take the decision. The distance is shown to be statistically sound and is applied to analyze the two lines of the production of alcohol fuel.

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