

# Preface

This book is an outcome of the CIMPA-UNESCO-MESR-MINECO-MOROCCO research school entitled “Statistical Methods and Applications in Finance and Actuarial Science”. The research school, organized by the Cadi Ayyad University in Marrakech, in collaboration with the International Centre for Pure and Applied Mathematics (CIMPA), was held in Marrakech and Kelaat M’gouna between 8 and 20 April 2013.

This volume of proceedings from the conference provides an opportunity for readers to engage with the lecture notes for two of the courses and seven refereed papers that were presented during the school.

The volume comprises two parts. The first is devoted to applications in Finance and includes a series of lectures presented by F. Viens during the conference entitled “A didactic introduction to risk management via hedging in discrete and continuous time” as well as three refereed contributions. The first of these, by M. Eddahbi and S.M. Lalaoui Ben Cherif, entitled “Sensitivity analysis for time-inhomogeneous Lévy process: a Malliavin calculus approach and numerics”, is devoted to the study of sensitivity analysis, with respect to the parameters of the model, within the framework of a time-inhomogeneous Lévy process. The second, by N. Privault and D. Yang, is entitled “Variance GGC asset price models and their sensitivity analysis” and treats the problem of computation of sensitivities or Greeks under different examples of Lévy type models. On the other hand, the third contribution, by J. Vives, entitled “Decomposition of the pricing formula for stochastic volatility models based on Malliavin-Skorohod type calculus”, treats the problem of obtaining decompositions of the derivative price formula for stochastic volatility jump diffusion models that clarify the exact role of correlation and jumps in derivative prices.

The second part of this volume is devoted to applications to Insurance and the study of stochastic differential equations of different types. This part opens with the lecture notes for the course by B. Djehiche, entitled “Statistical estimation techniques in life and disability insurance—a short review”. This lecture is a short introduction to some basic aspects of statistical estimation techniques known as

graduation techniques in life and disability insurance. Subsequently, four refereed contributions are included. The contributions by A. Al-Hussein, A. Al-Hussein and B. Gherbal, entitled respectively “Necessary and sufficient conditions of optimal control for infinite dimensional SDE” and “Sufficient conditions of optimality for forward-backward doubly SDEs with jumps”, are devoted to optimal control problems. The contribution by M. Benabdallah, S. Bouhadou and Y. Ouknine, entitled “On the pathwise uniqueness of solutions of one-dimensional stochastic differential equations with jumps”, treats the problem of uniqueness of the solution of one-dimensional stochastic differential equations with jumps, and finally the contribution by E.H. Essaky and M. Hassani, entitled “BSDE approach for Dynkin game and American game option”, is devoted to study of the existence of a value as well as a saddle point for a Dynkin game under weaker conditions. This contribution also discusses American game option pricing problems in finance and their relationship with backward stochastic differential equations with double reflecting barriers.

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