

# Preface

This book is a collection of state-of-the-art surveys on various topics in mathematical finance, with an emphasis on recent modeling and computational approaches. The volume is related to a Special Semester on Stochastics with Emphasis on Finance that took place from September to December 2008 at the Johann Radon Institute for Computational and Applied Mathematics (RICAM) of the Austrian Academy of Sciences in Linz, Austria.

The Special Semester was built around a number of selected topics and each of these topics was the theme of an international workshop with about 20 invited speakers. Besides a Tutorial, a Kick-Off Workshop focusing also on “Academics meeting Practitioners” and a Concluding Workshop, the thematic workshops concerned the following topics:

Advanced Modelling in Finance and Insurance; Optimization and Optimal Control; Inverse and Partial Information Problems: Methodology and Applications; Computational Methods with Applications in Finance, Insurance and the Life Sciences; Stochastic Methods in Partial Differential Equations and Applications of Deterministic and Stochastic PDEs.

In addition to the workshops, the idea arose to collect surveys on important aspects and recent developments related to the topics of the Special Semester and this forms the contents of the present volume. The topics covered include the following (listed alphabetically and grouped according to their relation with the topics of the Special Semester in the above order):

- Affine diffusion processes in finance
- Default and prepayment modeling using Levy processes
- Volatility inference in models beyond semimartingales
- Optimal asset allocation
- Optimal consumption and investment in illiquid markets and with downside risk measures
- Multiperiod acceptability functionals
- Worst-case portfolio optimization
- Good deal bounds
- Optimal investment and hedging under partial and inside information
- Regularization of inverse problems and calibration of option price models
- Advanced simulation techniques
- Applications of Malliavin Calculus
- Probabilistic schemes for fully nonlinear PDE's

The contributions themselves are arranged in alphabetic order according to the first named author.

More details on the Special Semester and the full workshop program can be found at the RICAM Special Semester webpage at:

<http://www.ricam.oeaw.ac.at/specsem/sef>

We would like to take this opportunity to thank all those who have contributed scientifically to this Special Semester, in particular the authors of this volume and the speakers at the workshops as well as the (more than 250) participants in the workshops. Further thanks go to the Austrian Academy of Sciences and in particular the Johann Radon Institute of Computational and Applied Mathematics in Linz and its director Heinz W. Engl for making this Special Semester possible. We also thank Robert Plato from the publishing house de Gruyter for the professional editorial support during the preparation of this volume.

Lausanne, Padua and Vienna, June 2009,

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