
Preface

This book is an introductory text to mathematical finance, with particular attention to linking theoretical concepts with methods used in financial practice. It succeeds a German language edition, Albrecher, Binder, Mayer (2009): *Einführung in die Finanzmathematik*. Readers of the German edition will find the structures and presentations of the two books similar, yet parts of the contents of the original version have been reworked and brought up-to-date. Today's financial world is fast-paced, and it is especially during financial downturns, as the one initiated by the 2007/08 Credit Crisis, that practitioners critically review and revise traditionally employed methods and models.

The aim of this text is to equip the readers with a comprehensive set of mathematical tools to structure and solve modern financial problems, but also to increase their awareness of practical issues, for instance around products that trade in the financial markets. Hence, the scope of the discussion spans from the mathematical modeling of financial problems to the algorithmic implementation of solutions. Critical aspects and practical challenges are illustrated by a large number of exercises and case studies.

The text is structured in such a way that it can readily be used for an introductory course in mathematical finance at the undergraduate or early graduate level. While some chapters contain a good amount of mathematical detail, we tried to ensure that the text is accessible throughout, not only to students of mathematical disciplines, but also to students of other quantitative fields, such as business studies, finance or economics. In particular, we have organized the text so that it would also be suitable for self-study, for example by practitioners looking to deepen their knowledge of the algorithms and models that they see regularly applied in practice.

The contents of this book are grouped in 15 modules which are to a large degree independent of each other. Therefore, a 15-week course could cover the book on a one-module-per-week basis. Alternatively, the instructor might wish to elaborate further on certain aspects, while excluding selected modules without majorly impairing the accessibility of the remaining ones. Conversely, single modules can be used separately as compact introductions to the respective topic in courses with a scope different from general mathematical finance.

Due to its compact form, we hope that students will find this book a valuable first toolbox when pursuing a career in the financial industry. However, it is obvious that there exists a wide range of other methods and tools that cannot be covered

in the present concise format and some readers might feel the need to study some aspects in more detail. To facilitate this, each module closes with a list of references for further reading of theoretical and practical focus. The reader is furthermore encouraged to check his/her understanding of the covered material by solving exercises as listed at the end of each module, and to implement algorithms to gain experience in implementing solutions. Some of the exercises further develop presented techniques and could also be included in the course by the instructor.

In terms of prior knowledge, the reader of this book will find some understanding of basic probability theory and calculus helpful. However, we have tried to limit any prerequisites as much as possible. To link the concepts to practical applications, we aimed at making the reader comfortable with a certain scope of technical language and market terms. Technical terms are printed in *italics* when used for the first time, whilst terms introducing a new subsection are printed in **bold**. To improve the text's readability, additional information is provided in footnotes in which one will also find biographic comments on some persons who have greatly contributed to developing the field of mathematical finance.

Several algorithmic aspects are illustrated through examples implemented in Mathematica and in the software package UnRisk PRICING ENGINE (in the following: UnRisk). UnRisk (www.unrisk.com) is a commercial software package that has been developed by MathConsult GmbH since 1999 to provide tools for the pricing of structured and derivative products. The package is offered to students free of charge for a limited period post purchase of this book. UnRisk runs on Windows engines and requires Mathematica as a platform.

We hope that you will enjoy assembling your first toolbox in mathematical finance by working through this book and look forward to receiving any comments you might have at quantmeth.comments@gmail.com.

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