


# Preface

“Wir behalten von unseren Studien am Ende doch nur das, was wir praktisch anwenden.”

“In the end, we really only retain from our studies that which we apply in a practical way.”

J. W. Goethe, Gespräche mit Eckermann, 24. Feb. 1824.

The complexity of statistical data nowadays requires modern and numerically efficient mathematical methodologies that can cope with the vast availability of quantitative data. Risk analysis, calibration of financial models, medical statistics and biology make extensive use of mathematical and statistical modeling.

*Practice makes perfect.* The best method of mastering models is working with them. In this book we present a collection of exercises and solutions which can be helpful in the advanced comprehension of *Mathematical Statistics*. Our exercises are correlated to [Spokoiny and Dickhaus \(2014\)](#). The exercises illustrate the theory by discussing practical examples in detail. We provide computational solutions for the majority of the problems. All numerical solutions are calculated with R and Matlab. The corresponding quantlets – a name we give to these program codes – are indicated by  in the text of this book. They follow the name scheme MSExyz123 and can be downloaded from the Springer homepage of this book or from the authors' homepages.

Mathematical Statistics is a global science. We have therefore added, below each chapter title, the corresponding translation in one of the world languages. We also head each section with a proverb in one of those world languages. We start with a German proverb from Goethe (see above) on the importance of practice.

We have tried to achieve a good balance between theoretical illustration and practical challenges. We have also kept the presentation relatively smooth and, for more detailed discussion, refer to more advanced text books that are cited in the reference sections.

The book is divided into three main parts where we discuss the issues relating to option pricing, time series analysis and advanced quantitative statistical techniques.

The main motivation for writing this book came from our students of the course *Mathematical Statistics* which we teach at the Humboldt-Universität zu Berlin. The students expressed a strong demand for solving additional problems and assured us that (in line with Goethe) giving plenty of examples improves learning speed and quality. We are grateful for their highly motivating comments, commitment and positive feedback. Very special thanks go to our students Shih-Kang Chao, Ye Hua, Yuan Liao, Maria Osipenko, Ceren Önder and Dedy Dwi Prastyo for advise and ideas on solutions. We thank Niels Thomas from Springer Verlag for continuous support and for valuable suggestions on writing style and the content covered.

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Exercises and Solutions

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