

Preface

Over the last two decades, there has been a renewed interest in the area of concentration inequalities. The starting point of this short book was a project on exponential inequalities for martingales with a view toward applications in probability and statistics. During the preparation of this book, we realized that the classical exponential inequalities for sums of independent random variables were not well reported in the literature. This motivated us to write a chapter entirely devoted to sums of independent random variables, which includes the classical deviation inequalities of Bernstein, Bennett, and Hoeffding as well as less-recognized inequalities and new results. Some of these inequalities are extended to martingales in the third chapter, which deals with concentration inequalities for martingales and self-normalized martingales. We end this book with a brief chapter devoted to a few applications in probability and statistics, which shows the striking efficiency of martingales techniques on some examples. We wish to emphasize that this short book does not provide a complete overview of martingale exponential inequalities and their applications. More sophisticated results can be found in the literature. We hope that researchers interested in concentration inequalities for sums and martingales will find in this book useful tools for their future research.

Talence, France
Rennes, France
Versailles, France
June 2015

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Concentration Inequalities for Sums and Martingales

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2015, X, 120 p. 9 illus. in color., Softcover

ISBN: 978-3-319-22098-7