



Essentials of Probability Theory for Statisticians (Chapman & Hall/CRC Texts in Statistical Science)

By Michael A. Proschan, Pamela A. Shaw

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Essentials of Probability Theory for Statisticians provides graduate students with a rigorous treatment of probability theory, with an emphasis on results central to theoretical statistics. It presents classical probability theory motivated with illustrative examples in biostatistics, such as outlier tests, monitoring clinical trials, and using adaptive methods to make design changes based on accumulating data. The authors explain different methods of proofs and show how they are useful for establishing classic probability results.

After building a foundation in probability, the text intersperses examples that make seemingly esoteric mathematical constructs more intuitive. These examples elucidate essential elements in definitions and conditions in theorems. In addition, counterexamples further clarify nuances in meaning and expose common fallacies in logic.

This text encourages students in statistics and biostatistics to think carefully about probability. It gives them the rigorous foundation necessary to provide valid proofs and avoid paradoxes and nonsensical conclusions.

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Editorial Review

Review

"This book has tremendous potential for usage in statistics and biostatistics departments where the Ph.D. students would not necessarily have taken a measure theory course but would need a rigorous treatment of probability for their dissertation research and publications in statistical and biostatistics journals ... The authors are commended for providing this valuable book for students in statistics and biostatistics. The illustrative biostatistics examples (throughout chapter 10 but especially in chapter 11) provide motivating rewards for students."

?Robert Taylor, Clemson University

"... a very good textbook choice for our courses on advanced probability theory (I, II) at the graduate level."

?Jie Yang, University of Illinois at Chicago

"Many successful graduate students in statistics lack the mathematical prerequisites necessary for Billingsley's book and find such a course too hard ... The strong points of this book are a good selection of topics, good choices for proofs to include and omit, and interesting examples. Some of the examples motivate the need for mathematical theory while others illustrate the relation of the theory to statistical practice. When there is a need for it, the presentation of the material includes side explanations that should help a student with a less solid math background."

?Wlodek Byrc, University of Cincinnati

"I think the authors have done a great job at writing this book. The material is presented carefully and the examples and exercises are appropriate and extremely helpful ... The strongest point of this book is the large collection of statistical applications presented along with each topic. These examples are used to motivate the need for fundamental probabilistic results. The authors have also included a great set of exercises at the end of each section. Another good idea is the summary presented at the end of each chapter. ... I would be happy to adopt this book as a required text for the course that I teach; its content is appropriate and at the right level."

?Radu Herbei, Ohio State University

About the Author

Michael A. Proschan is a mathematical statistician in the Biostatistics Research Branch at the U.S. National Institute of Allergy and Infectious Diseases (NIAID). A fellow of the American Statistical Association, Dr. Proschan has published more than 100 articles in numerous peer-reviewed journals. His research interests include monitoring clinical trials, adaptive methods, permutation tests, and probability. He earned a PhD in statistics from Florida State University.

Pamela A. Shaw is an assistant professor of biostatistics in the Department of Biostatistics and Epidemiology at the University of Pennsylvania Perelman School of Medicine. Dr. Shaw has published several articles in numerous peer-reviewed journals. Her research interests include methodology to address covariate and outcome measurement error, the evaluation of diagnostic tests, and the design of medical

studies. She earned a PhD in biostatistics from the University of Washington.

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