

Preface

This book originally grew out of my notes on the statistical inference courses at the Department of Statistics, University of Mumbai. I have experienced that reasonably good M.Sc. (Statistics) students are many a time not able to understand or solve problems from some available texts on statistical inference. These books are excellent in terms of content, but the presentation is highly sophisticated. For instance, proofs of various theorems are given in brief and a few examples are provided. To overcome this difficulty, I have solved many examples and, wherever necessary, a program in R is also given. Further, important proofs in this book are presented in such a manner that they are easy to understand.

Through this book, we expect students to know matrix algebra, calculus, probability theory, and distribution theory. This book will serve as an excellent tool for teaching statistical inference courses. The book consists of many solved and unsolved problems. Instructors can assign homework problems from the exercises and students will find the solved examples hugely beneficial in solving the exercise problems.

In “Prerequisite”, we have discussed some basic concepts like distribution function and order statistics and illustrated them by using interesting examples. Chapter 1 deals with sufficiency and completeness. In this chapter, we have solved 37 examples. Chapter 2 deals with unbiased estimation. In the last 30 years of my teaching, I found that students were always confused about the relationship between sufficiency and unbiasedness. We have explained this relationship with various examples in this chapter. Chapter 3 is devoted to method of moments and maximum likelihood. In Chap. 4, we deal with lower bound for the variance of an unbiased estimator. Popular concepts like Cramer–Rao (1945, 1946) and Bhattacharya (1946, 1950) lower bound are discussed in detail. Chapter 4 also deals with Chapman and Robbins (1951) and Kiefer (1952) lower bound for the variance of an estimate but does not require regularity conditions. In Chap. 5, the concept of consistency is discussed in detail and illustrated by using different examples. In Chap. 6, Bayesian estimation is briefly discussed. Chapters 7 and 8 are significantly large chapters. Testing of hypothesis is studied in Chap. 7, whereas unbiased and

other tests are studied in Chap. 8. We have given R programs in various chapters. No originality is claimed except perhaps in the presentation of the material.

It will prove difficult to thank all my friends who have contributed in some or other way to make this book a reality. I am thankful to Prof. R.B. Bapat for his valuable suggestions to improve upon the content and presentation of the book. I also thank Dr. T.V. Ramanathan for making some valuable suggestions. I am thankful to Shamim Ahmad, senior editor at Springer India for encouraging me to publish this book through Springer and making it easy to go through the process. I thank Prof. Seema C. for reading the book for language. I am equally thankful to Dr. Alok Dabade, Prof. Shailaja Kelkar, Dr. Mehdi Jabbari Nooghabi, Prof. S. Annapurna and Prof. Mandar Bhanushe for various academic discussions related to the book and drawing figures. I am also very thankful to my son Anand and daughter Vaidehi who helped me solve various problems. Further, I am thankful to my wife Dr. (Mrs.) Vijayanti for the insightful discussions on our book.

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In spite of my best efforts, there might be some errors and misprints in the presentation. I owe these mistakes and request the readers to kindly bring them to my notice.

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