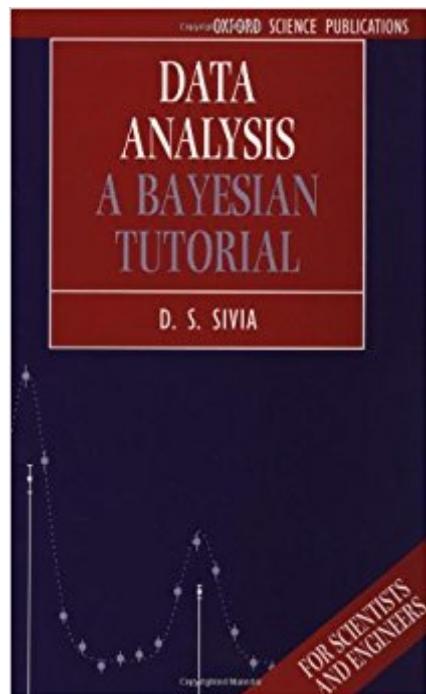


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Data Analysis: A Bayesian Tutorial (Oxford Science Publications)



Synopsis

This is the first book on the maximum entropy and Bayesian methods aimed at senior undergraduates in science and engineering. It takes the mystery out of statistics by showing how a few fundamental rules can be used to tackle a wide variety of problems in data analysis. After explaining the basic principles of Bayesian probability theory, their use is illustrated with a variety of examples ranging from elementary parameter estimation to image processing. Other topics covered include reliability analysis, multivariate optimization, least squares and maximum likelihood, error-propagation, hypothesis testing, maximum entropy, and experimental design. As a logical and unified approach to the subject of data analysis, with a self-contained tutorial approach, this work will be valued by instructors and students alike.

Book Information

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Customer Reviews

Mathematics looks like a pile of abstract facts, axioms and theorems to most people. It is hard to imagine that in some branches of mathematics, there are unsettled controversies about the meanings of basic notions like probability. Statistics is one of these branches, where professional researchers and lecturers can be divided into some sort of "schools of thought". This small book of 189 pages is a tutorial introduction into statistics. It addresses senior undergraduates and research students in science and engineering. If symbols like integrals, factorials or notions like Eigenvalues do frighten you, you should first complete some courses on calculus and algebra before reading this book. Contrary to "classic" text books on statistics, this book employs the so called Bayesian

understanding of probability. While the classic understanding of probability sees each probability as a long-run relative frequency, the Bayesian school sees it as a degree-of-belief (or plausibility). This may sound like a minor disagreement, but it leads to very different ways of solving problems. Throughout the book, the author explains seven examples of increasing complexity to the reader and solves the problems. Especially in the first two chapters, he simplifies his favourite applications of probability theory in order to explain basic concepts like probability, the error-bar, correlation, and marginal distributions. Each of the graphical panels is explained in detail to make it easier to understand the intuitive meaning of concepts like the probability density function. Often, the author also mentions common misconceptions and vividly explains the consequences of such misunderstandings.

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