

# Book Reviews | Reseñas

## **SAMPLING THEORY AND PRACTICE**

Wu, C. & Thompson, M. E. (2020)

Springer Nature Switzerland AG

eBook ISBN 978-3-030-44246-0. Hardcover ISBN978-3-030-44244-6

Series ISSN 2199-0980. XX, 365

The book is divided into 3 parts clustering 17 chapters. It covers the basic aspects of basic sampling theory and deal with new research themes. Practical issues of methodological aspects of survey are considered and produced some chapters.

Basic Concepts in Survey Sampling are introduced in the first chapter which is followed by presenting Simple Single-Stage Sampling, the use of some grouping in the third chapter comprising Stratified Sampling and Cluster Sampling. Unequal Probability Sampling is the next chapter.

Are remarkable the chapters on using Models for estimation and prediction. They include Model based estimation, Calibration, Weighting, Regression Analysis, Estimating Equations, Empirical and Likelihood Methods derived from frequentist and Bayesian approaches.

The book devotes large discussions on the handling with missing data and using resampling for data analysis.

A series of chapters are devoted to practical issues of sampling survey as Household Surveys, Telephone and Web Surveys, Natural Resource Inventory Surveys, using graphs structures (Adaptive and Network Surveys), Dual Frame and Multiple Frame Surveys

Finally, Non-probability Survey Samples issues are briefly discussed.

This book will be good both for teaching and as a consulting source for survey sampling practice. The authors assumed that the reader is at home with probability and statistical inference.

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## **MATHEMATICS FOR MACHINE LEARNING**

Marc Peter Deisenroth, A. Aldo Faisal, and Cheng Soon Ong (2020).

Cambridge University Press

Many people working in Machine Learning consider that mathematical concepts are useless for them. When facing with needing understanding mathematical tools, used in advanced algorithms, they discover the need of having some mathematical skills. It covers basic mathematical concepts for machine learning. The book has two parts.

The first one is concerned with Machine Learning's mathematical foundations. It contents an Introduction and Motivation to the part, the needed Linear Algebra, Analytic Geometry, Matrix Decompositions, Vector Calculus, Probability and Distribution and Optimization. They are usually part of different courses in the curricula in data science, computer science for obtaining diploma and grades, but students and teachers do not consider worthy to learn that mathematics. This mistake leads to lacks of open views when dealing with practical machine learning modeling. The second part is concerned with presenting examples on machine learning algorithms and discussing how they use mathematics in their kernels. It is titled Central Machine Learning Problems and its 5 chapters discussed the problematics of fitting models to the observed Data. This is basically in the field of Statistical Data Analysis. The contents are Linear Regression modeling, reducing Dimensionality, Density Estimation and Classification. Density estimation is developed considering only Gaussian mixtures and classification using Support Vector Machines

This oeuvre will be a good help for researcher interested in obtaining a good understanding of the foundations of machine learning. It is of interest for newcomers as well as for teachers and researchers. Solutions to exercises and tutorials may obtained, under request, from the editorial.

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## **A FIRST COURSE IN STATISTICAL INFERENCE**

Jonathan Gillard (2020)

Series Title: Springer Undergraduate Mathematics Series

Springer International Publishing

eBook ISBN 978-3-030-39561-2. Softcover ISBN 978-3-030-39560-5

Series ISSN1615-2085

X+164

The author is a well-known professor and the book is a result of his courses. It provides a modern introduction to Statistical Inference. It is intended for undergraduate courses with a major in mathematics but is useful for Data Scientists interested in inferring from data. It is devised for a one semester first course in statistics.

The oeuvre presents ideas and concepts based on the frequentist statistical theory approach (sampling, point estimators, confidence intervals, hypothesis testing, ANOVA, bivariate regression). They are anchored by theorems and worked examples. In each chapter a set of exercises is proposed and their solutions are given. R sources are used for computation.

Readers should be familiar with basic probability.

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## **LINEAR TRANSFORMATION: EXAMPLES AND SOLUTIONS**

Nita H. Shah and Urmila B. Chaudhari (2021)

CRC Press

ISBN 9780367613259

This book presents the basics on linear transformation. Its use in applications, is one of the merits of these transformations. The book gives an overview of the themes and are discussed many illustrative. It may solve the needs of practitioners. The chapters cover discussions on definitions and properties of linear transformation, linear operators, composition of some linear transformations, kernels and range of linear transformations, inverse transformations, one-to-one and onto transformations, isomorphisms, matrix linear transformations, and similarity of two matrices.

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## **NONLINEAR OPTIMIZATION MODELS AND APPLICATIONS**

William P. Fox (2021)

ISBN 9780367444150

Chapman and Hall/CRC

X-416

The author is an emeritus professor and is experienced in teaching in Military universities. The book presents the needed concepts involved in mathematical optimization procedures emphasizing in the involved processes and interpretation of their outputs. A lot of problem-solving ideas and examples are developed. The book contains Worksheets supported by Excel, MATLAB®, and Maple™ of the procedure.

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