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Book Review

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Principles of Statistical Analyses: Learning from Randomized Experiments by Ery Arias-Castro, Cambridge University Press. 2022. 389 pp., £29.99 (paperback). ISBN: 9781108747448

Aiming to provide a concise and thorough guide for readers with (some) mathematical experience, *Principles of Statistical Analyses* achieves this exceptionally well.

Part I builds the foundation for statistical inference by introducing the axioms of probability theory, presenting discrete, continuous, and multivariate distributions, and covering concentration inequalities and limit theorems as well as touches on stochastic processes. Part II focuses on practical issues of sampling and data collection. Although the author discusses these topics concisely, he successfully covers key aspects of experimental design and observational studies. The most substantial section of the book—in terms of both content and depth—is Part III, which introduces elements of statistical inference. It begins with statistical models, estimators and their properties, and tests, before delving into topics such as (one and multiple) proportions, (one, multiple, and multiple paired) numerical samples, correlational analysis, multiple testing, and, finally, regression analysis.

The clear advantages of *Principles of Statistical Analyses* are its conciseness, mathematical rigour, and a large number of problems (about 700). However, although knowledge of measure theory is (almost) unnecessary for understanding the book's material, the reader should be prepared to use knowledge of calculus and real analysis.

Overall, *Principles of Statistical Analyses* serves as an excellent introductory text for advanced undergraduates, early graduate students, and those with a background in mathematics seeking a systematic review of essential statistical topics.

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