A Chronicle of Permutation Statistical Methods
1920–2000, and Beyond

The focus of this book is on the birth and historical development of permutation statistical methods from the early 1920s to the near present. Beginning with the seminal contributions of R.A. Fisher, E.J.G. Pitman, and others in the 1920s and 1930s, permutation statistical methods were initially introduced to validate the assumptions of classical statistical methods. Permutation methods have advantages over classical methods in that they are optimal for small data sets and non-random samples, are data-dependent, and are free of distributional assumptions. Permutation probability values may be exact, or estimated via moment- or resampling-approximation procedures. Because permutation methods are inherently computationally-intensive, the evolution of computers and computing technology that made modern permutation methods possible accompanies the historical narrative.

Features
- A unique approach to explaining statistics by developing the history and establishing the rigor of a topic
- The first historical approach to this field and its development
- An extensive historical bibliography is provided

Contents

Fields of interest
Statistical Theory and Methods; Statistics for Business/Economics/Mathematical Finance/Insurance; Quantitative Finance

Target groups
Graduate

Discount group
Professional Non-Medical

Due January 2014
2014. VIII, 72 p. 17 illus., 4 in color. (SpringerBriefs in Statistics) Softcover
► $54.99
ISBN 978-3-642-45137-9

Statistical Inference on Residual Life

This is a monograph on the concept of residual life, which is an alternative summary measure of time-to-event data, or survival data. The mean residual life has been used for many years under the name of life expectancy, so it is a natural concept for summarizing survival or reliability data. It is also more interpretable than the popular hazard function, especially for communications between patients and physicians regarding the efficacy of a new drug in the medical field. This book reviews existing statistical methods to infer the residual life distribution. The review and comparison includes existing inference methods for mean and median, or quantile, residual life analysis through medical data examples. The concept of the residual life is also extended to competing risks analysis. The targeted audience includes biostatisticians, graduate students, and PhD (bio)statisticians.

Features
- Extensively reviews statistical inference methods on the mean residual lifetime
- Covers various aspects of frequentist and Bayesian methods for the quantile residual life function in survival analysis and reliability theory
- Presents new statistical methods to design based on the residual life distribution

Contents

Fields of interest
Statistics for Life Sciences, Medicine, Health Sciences; Biostatistics; Epidemiology

Target groups
Research

Discount group
Professional Non-Medical

Due January 2014
2014. X, 212 p. 17 illus., 12 in color. (Statistics for Biology and Health) Hardcover
► $109.00
ISBN 978-1-4939-0004-6
Continual improvements in data collection and processing have had a huge impact on brain research, producing data sets that are often large and complicated. By emphasizing a few fundamental principles, and a handful of ubiquitous techniques, Analysis of Neural Data provides a unified treatment of analytical methods that have become essential for contemporary researchers. Throughout the book the ideas are illustrated with more than 100 examples drawn from the literature, ranging from electrophysiology, to neuroimaging, to behavior.

Features
- Shows improvements in data collection and processing and their impact on brain research
- Examples drawn from the literature are included throughout this text, ranging from electrophysiology, neuroimaging and behavior

Contents

Fields of interest
Statistics for Life Sciences, Medicine, Health Sciences; Neurosciences; Statistical Theory and Methods

Target groups
Research

Discount group
Professional Non-Medical