Wiley Computational Statistics

Wiley Computational Statistics, Second Edition Instruction Manual

A Comprehensive Guide to Modern and Classical Methods of Statistical Computing

1. Overview

This manual provides an overview of *Computational Statistics, Second Edition* by Geof H. Givens and Jennifer A. Hoeting. This publication serves as a comprehensive guide to modern and classical methods of statistical computing, designed for advanced undergraduate or graduate courses and as a reference for practicing statisticians.
The book covers a broad range of topics, explaining algorithms conceptually and through step-by-step descriptions, illustrated with detailed examples and exercises.

2. Key Topics and Features

The book is structured into four main parts, addressing key areas in computational statistics:

- **Optimization:** Methods for finding the best solutions to statistical problems.
- **Integration and Simulation:** Techniques for numerical integration and generating random samples.
- **Bootstrapping:** Resampling methods for estimating the sampling distribution of a statistic.
- **Density Estimation and Smoothing:** Approaches for estimating probability density functions and smoothing data.

Important features of this Second Edition include:

- Examples derived from real-world applications across various fields such as genetics, ecology, economics, network systems, biology, and medicine.
- Explanations of how computational methods are integral to major statistical approaches, including Bayesian models, linear and generalized linear models, random effects models, survival models, and hidden Markov models.
- Expanded coverage of Markov chain Monte Carlo (MCMC) methods.
- Introduction of new topics such as sequential sampling methods, particle filters, derivative-free

optimization, bootstrapping dependent data, and adaptive MCMC.

- New exercises and examples designed to enhance readers' ability to apply computational methods to diverse statistical problems.

3. Target Audience

This book is suitable for:

- Advanced undergraduate students enrolled in statistical computing courses.
- Graduate students studying computational statistics.
- Practicing statisticians seeking a comprehensive reference on computational methods.

4. Companion Resources

A companion website is available, offering datasets and comprehensive R code for the entire book. This resource supports practical application and understanding of the methods discussed.

5. About the Authors

Geof H. Givens, PhD

Associate Professor in the Department of Statistics at Colorado State University. Dr. Givens serves as Associate Editor for *Computational Statistics and Data Analysis*. His research focuses on statistical problems in wildlife conservation biology, including ecology, population modeling and management, and automated computer face recognition.

Jennifer A. Hoeting, PhD

Professor in the Department of Statistics at Colorado State University. Dr. Hoeting is an award-winning teacher and co-leads significant research efforts for the National Science Foundation. She has served as associate editor for the *Journal of the American Statistical Association*and *Environmetrics*. Her research interests include spatial statistics, Bayesian methods, and model selection.

Together, Givens and Hoeting have taught graduate courses on computational statistics for nearly twenty years and have conducted short courses for leading statisticians and scientists globally.

6. Product Specifications

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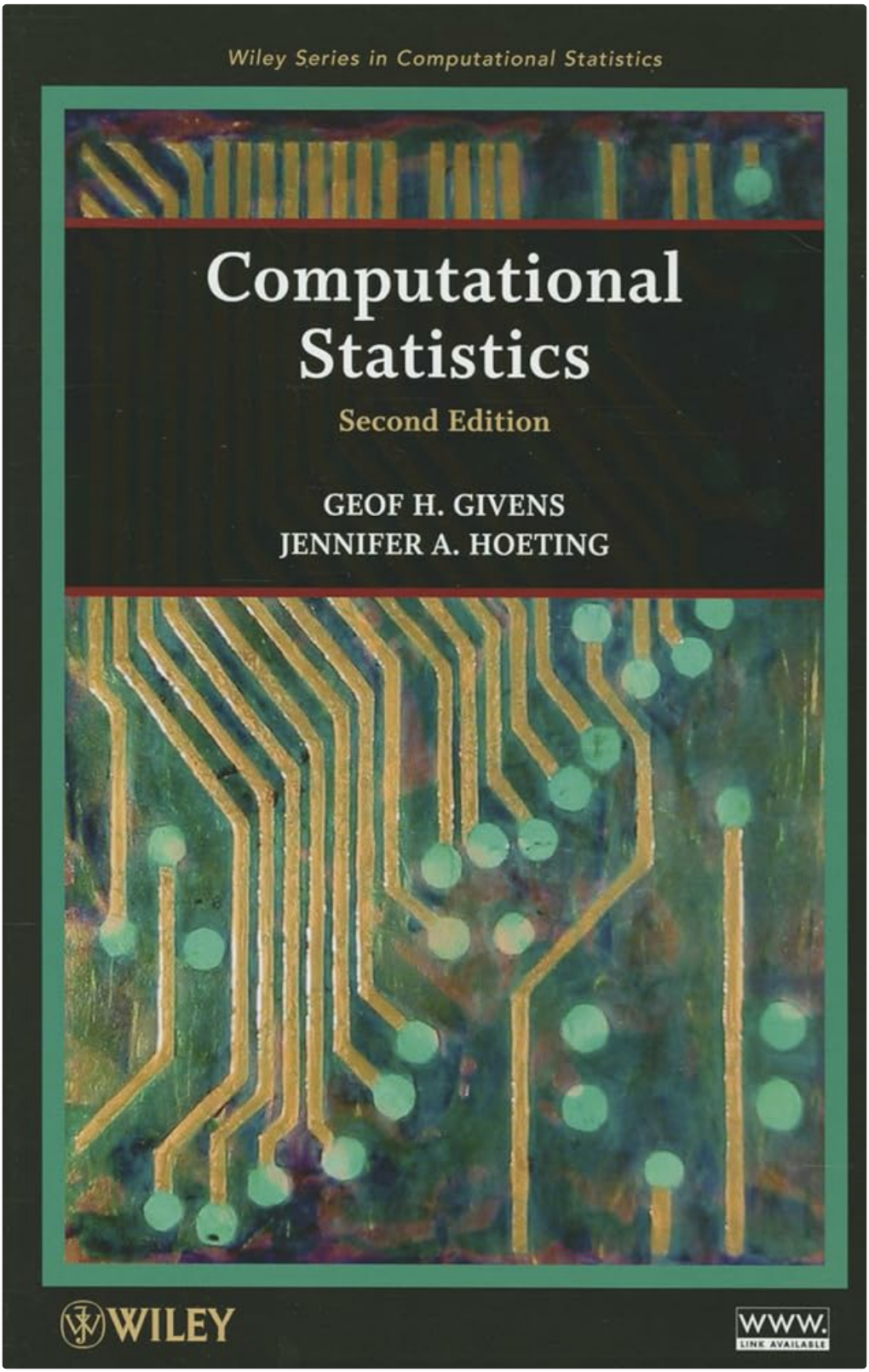

Image: Front cover of the book *Computational Statistics, Second Edition*. The cover features the title, authors' names, and a stylized circuit board design, indicating the computational nature of the subject.

8. Support and Contact

For inquiries regarding the content or companion resources, please refer to the publisher, Wiley. Additional information may be available on the book's official website, as indicated by "WWW. LINK AVAILABLE" on the cover.

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