Readership: Teachers and students of number theory, and anybody else interested in this field.

This book is a collection of interesting and well-written papers on basic topics of number theory. All papers except one have previously been published, most in *American Mathematical Monthly*. Among the authors there are Euler and other great masters. Nine papers have been awarded.

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Bayesian Reliability

Michael S. Hamada, Alyson G. Wilson, Shane C. Reese, Harry F. Martz
Springer, 2008, xvi + 436 pages, € 69.95 / £ 62.99 / US$ 89.95, hardcover
ISBN: 978-0-387-77948-5

Table of contents

Readership: Reliability practitioners, Bayesian researchers in reliability. The book may also be used as a textbook for a course for advanced undergraduates or graduate students with at least one basic course in Statistics.

This is a very well written Bayesian book on reliability with almost encyclopedic coverage. The first chapter provides an overview of the reliability aspects of the whole book, while the next two chapters introduce readers to basics of Bayesian analysis right up to MCMC and various relevant software. Chapters 4 and 5 cover component and system reliability. A good first course on reliability can be based on these four chapters and parts of Chapter 1. The remaining chapters deal with more advanced and relatively new topics, namely, repairable systems, regression models in reliability, modeling reliability via degradation data, planning and choice of optimal design using a genetic algorithm, and assurance testing. This reviewer hasn't seen the last three topics so well analyzed elsewhere. All these topics are of great practical importance and point to the continuing vitality of the subject.

The strength and pioneering contributions of the book include Bayesian goodness of fit tests and model selection, Bayesian analysis of reliability based on fault trees and Bayesian networks, modeling with covariates, and use of degradation data to anticipate reliability breakdowns. The illustrative examples are taken from real life, and for each example several plausible models are tried out and compared, providing a flavor of robustness. My only criticism, if it can be called a criticism, is that it would have been good to compare the new tests of Valen Johnson with the more standard ones based on different kinds of Bayesian p-values due to Rubin, Gelman, Berger, and Bayarri. A similar remark holds for model selection.

Given the strengths of the book in both coverage and detailed modeling of reliability based on many different kinds of data, real life examples, and a thorough, rigorous, and

insightful Bayesian analysis, the book makes a major contribution to the literature on reliability.

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Design and Analysis of Experiments, Volume 1: Introduction to Experimental Design, Second Edition

Klaus Hinkelmann, Oscar Kempthorne
Wiley, 2008, xxiv + 631 pages, € 112.50 / £ 90.50 / US$ 135.00, hardcover
ISBN: 978-0-471-72756-9

Table of contents

Readership: Students in Statistics, graduate students, consulting statisticians and researchers interested in Theory of Experiments, both theoretical and applied.

The book of Hinkelmann and Kempthorne is a very good source of knowledge about designing and analysis of experiments. It makes the theory of experiments easier to understand and it may be useful as a textbook as well as a reference book.

This volume is a great extension of its first edition, especially by emphasizing the practical aspects of designing and analyzing experiments. Chapter 2 is expanded by two new subsections, in which particular steps of planning experiments are emphasized. The book allows practitioners and statisticians to understand each other better as well as to understand the relationship between the quality of experimental design and the validity of conclusions. The most commonly used experimental designs such as, e.g., Randomized Block Designs, Latin Squares, Factorial Experiments, Split-Plot Designs, or Repeated Measurements Designs are described with extended – in relation to the first edition – details on repeated measures.

The advantage of Hinkelmann and Kempthorn's book is the huge amount of numerical examples at the end of most chapters. Authors use the SAS® package, but the way of presenting the results may be easily applied to other statistical software.

The layout of the book, large and rich collection of examples and exercises, and very clear writing make this book highly recommended for students as well as for researchers in wide areas of science including agriculture, engineering, medicine, or economy.

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