IMS Lecture Notes–Monograph Series Volume 22

Stochastic Inequalities

Moshe Shaked and Y. L. Tong, Editors

Proceedings of the Joint AMS-IMS-SIAM Summer Research Conference on Stochastic Inequalities, Seattle, Washington, July 1991. The conference focused on the recent developments in the theory and applications of stochastic inequalities with special emphasis on convexity-related, majorization-related inequalities and stochastic convexity; dependence-related probability and moment inequalities; inequalities in multivariate distributions and multivariate analysis; inequalities in reliability theory and queuing theory; and, applications in business and economics, operations research, and other related fields. This volume is a collection of papers based on the lectures given at the conference.

Contents

Inequalities for rare events in time-reversible Markov chains I by D. J. Aldous & M. Brown; *Skewness and kurtosis orderings: An introduction* by B. C. Arnold & R. A. Groeneveld; *Stochastic inequalities for a redundancy enchancement to a series or parallel system* by P. J. Boland; *Some remarks on a notion of positive dependence, association, and unbiased testing* by A. Cohen & H. B. Sackrowitz; *Further aspects of the comparison of two groups of ranked objects by matching in pairs* by H. A. David & J. Liu; *Inequalities for the parameters lambda(F), mu(F) with applications in nonparametric statistics* by C. Dorado & M. Hollander; *Orderings arising from expected extremes, with an application* by P. J. Downey & R. S. Maier; *A group action on covariances with applications to the comparison of linear normal experiments* by M. L. Eaton; *The role of a module in the failure of a system* by E. El-Neweihi & J. Sethuraman; *Extreme order statistics for a sequence of dependent random variables* by J. Glaz; *Partitioning inequalities in probability and statistics* by T. P. Hill; *Matrix extremes and related stochastic bounds* by D. R. Jensen; *Generalized majorization orderings and applications* by H. Joe; *Multivariate majorization by positive combinations* by H. Joe & J. Verducci; *Covariance spaces for measures on polyhedral sets* by J. H. B. Kemperman & M. Skibinsky; *Hyperbolic-concave functions and Hardy-Littlewood maximal functions* by R. P. Kertz & U. Rosler; *Lower bounds on multivariate distributions with preassigned marginals* by S. Kotz & J. P. Seeger; *Dependence of stable random variables* by M.-L. Ting Lee, S. T. Rachev, & G. Samorodnitsky; *A multivariate stochastic ordering by the mixed descending factorial moments with applications* by C. Lefevre & P. Picard; *Allocation through stochastic Schur convexity and stochastic transposition increasingness* by L. Liyanage & J. George Shanthikumar; *Extremal problems for probability distributions: A general method and some examples* by L. Mattner; *Concentration inequalities for multivariate distributions II: Elliptically contoured distributions* by M. D. Perlman; *Inequalities on expectations based on the knowledge of multivariate moments* by A. Prekopa; *On FKG-type and permanental inequalities* by Y. Rinott & M. Saks; *Optimal stopping values and prophet inequalities for some dependent random variables* by Y. Rinott & E. Samuel-Cahn; *Some applications of monotone transformations in statistics* by A. R. Sampson; *Secretary problems as a source of benchmark bounds* by S. M. Samuels; *Comparison of experiments of some multivariate distributions with a common marginal* by M. Shaked & Y. L. Tong; *On the bias of the jackknife estimate of variance* by R. A. Vitale

Pages . . . . . xvi+411
List price $40
IMS member price $24

Order prepaid from:
Institute of Mathematical Statistics
3401 Investment Boulevard, Suite 7
Hayward, California 94545 (USA)

Institute of Mathematical Statistics is collaborating with JSTOR to digitize, preserve, and extend access to *Statistical Science.* www.jstor.org

The Annual Index to the
Statistical Literature of the World

Current Index to Statistics
APPLICATIONS, METHODS AND THEORY
VOLUME 17 (1991)–NOW AVAILABLE

- Approximately 8900 articles from journals and books indexed for 1991.
- Complete coverage of 85 core journals in statistics, probability and related fields. Selected articles indexed from many other journals.
- Subject index lists articles alphabetically according to each *important word* in their titles, and according to carefully selected *key words* not appearing in titles.
- Author index lists each article under the name of the author.
- Reasonable prices:

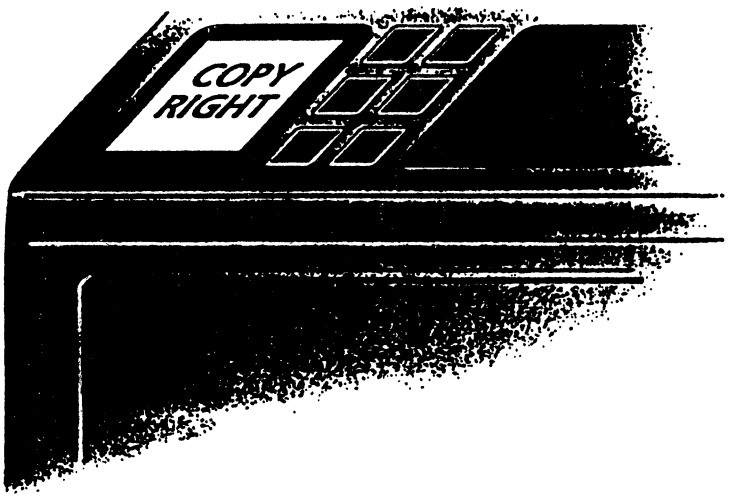
Volumes 1-11 and 16-18	Prices
IMS/ASA Members	**$25**
Individual Nonmembers	**$50**
Institutional Nonmembers	**$75**

Beginning in 1993, Nonmember Institutions in certain countries, reported by the World Bank as having low per-capita GNP (ask for list), may order at the Individual Nonmember price.

Special inventory-reduction sale on Volumes 12-15 effective for *all* purchases of excess copies through November 1993: $10 per copy.

Published jointly by the Institute of Mathematical Statistics and the American Statistical Association, Volumes 1-17 are available now at the above prices. Volume 18 (articles published in 1992) is expected in Autumn 1993. Please specify the applicable rate and volume number(s) desired. Order prepaid from:

Institute of Mathematical Statistics
3401 Investment Boulevard #7
Hayward, California 94545 (USA)



THE MOST ~~AN~~ IMPORTANT PART
OF YOUR PHOTOCOPIER
ISN'T PART OF
YOUR PHOTOCOPIER

Having a machine may not
permit you to photocopy books, journals,
newsletters and magazines.
The Copyright Clearance Center CAN.
Contact us to find out
how you too can COPY RIGHT!SM

COPYRIGHT CLEARANCE CENTER
222 Rosewood Drive, Danvers, MA 01923
Tel. (508) 750-8400 □ Fax (508) 750-4744

© 1993 Copyright Clearance Center

INSTITUTE OF MATHEMATICAL STATISTICS

(Organized September 12, 1935)

The purpose of the Institute is to foster the development and dissemination of the theory and applications of statistics and probability.

OFFICERS AND EDITORS

President:
Lawrence D. Brown, Department of Mathematics, White Hall, Cornell University, Ithaca, New York 14853-7901

President-Elect:
Stephen M. Stigler, Department of Statistics, University of Chicago, 5734 University Avenue, Chicago, Illinois 60637

Past President:
Willem R. van Zwet, Department of Mathematics, University of Leiden, P.O. Box 9512, 2300 RA Leiden, The Netherlands

Executive Secretary:
Diane M. Lambert, AT&T Bell Laboratories, 600 Mountain Avenue, Room 2C-256, Murray Hill, New Jersey 07974

Treasurer:
Jessica Utts, Division of Statistics, University of California, Davis. *Please send correspondence to:* IMS Business Office, 3401 Investment Boulevard #7, Hayward, California 94545

Program Secretary:
Iain M. Johnstone, Division of Biostatistics, HRP Building, Room 10, Stanford University, Stanford, California 94305-5092

Editor: *The Annals of Statistics*
Michael Woodroofe, Department of Statistics, Mason Hall, University of Michigan, Ann Arbor, Michigan 48109-1027

Editor: *The Annals of Probability*
Burgess Davis, Departments of Mathematics and Statistics, Purdue University, West Lafayette, Indiana 47907

Editor: *The Annals of Applied Probability*
J. Michael Steele, Department of Statistics, University of Pennsylvania, Philadelphia, Pennsylvania 19104-6302

Executive Editor: *Statistical Science*
Robert E. Kass, Department of Statistics, Carnegie Mellon University, Pittsburgh, Pennsylvania 15213

Editor: *The IMS Bulletin*
Susan R. Wilson, Centre for Mathematics and Its Applications, Australian National University, GPO Box 4, Canberra ACT 2601, Australia

Editor: *The IMS Lecture Notes–Monograph Series*
Robert J. Serfling, Department of Mathematical Sciences, Johns Hopkins University, Baltimore, Maryland 21218

Managing Editor:
John R. Collins, Department of Mathematics and Statistics, University of Calgary, 2500 University Drive NW, Calgary, Canada T2N 1N4

Managing Editor:
Robert Smythe, Department of Statistics, George Washington University, 2201 G Street N.W., Washington, D.C. 20052

Journals. The scientific journals of the Institute are *The Annals of Applied Probability, The Annals of Probability, The Annals of Statistics* and *Statistical Science.* The news organ of the Institute is *The Institute of Mathematical Statistics Bulletin.*

Individual and Organizational Memberships. All *individual members* pay basic membership dues of $50. Each regular member must elect to receive at least one scientific journal for an additional amount, as follows: *The Annals of Applied Probability* ($10), *The Annals of Probability* ($20), *The Annals of Statistics* ($20) or *Statistical Science* ($10). Of the total dues paid, $24 is allocated to *The IMS Bulletin* and the remaining amount is allocated equally among the scientific journal(s) received. Reduced membership dues are available to full-time students, permanent residents of countries designated by the IMS Council and retired members. Retired members may elect to receive *The IMS Bulletin* only for $20. *Organizational memberships* are available to nonprofit organizations at $425 per year and to for-profit organizations at $700 per year. Organizational memberships include two multiple-readership copies of all IMS journals in addition to other benefits specified for each category (details available from the IMS Business Office).

Individual and General Subscriptions. Subscriptions are available on a calendar-year basis. *Individual subscriptions* are for the personal use of the subscriber and must be in the name of, paid directly by, and mailed to an individual. Individual subscriptions for 1993 are available to *The Annals of Applied Probability* ($70), *The Annals of Probability* ($80), *The Annals of Statistics* ($80), *The IMS Bulletin* ($45) and *Statistical Science* ($70). *General subscriptions* are for libraries, institutions and any multiple-readership use. General subscriptions for 1993 are available for *The Annals of Applied Probability* ($70), *The Annals of Probability* ($130), *The Annals of Statistics* ($130), *The IMS Bulletin* ($50) and *Statistical Science* ($75). Air mail rates for delivery outside North America are $80 per title (excluding *The IMS Bulletin*).

Permissions policy. Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by the Institute of Mathematical Statistics, provided that the base fee of $7.50 per copy, plus $.00 per page is paid directly to the Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. For those organizations that have been granted a photocopy license by CCC, a separate system of payment has been arranged. The fee code for users of the Transactional Reporting Service is 0883-4237/93 $7.50 + .00.

Correspondence. Mail to IMS should be sent to the IMS Business Office (membership, subscriptions, claims, copyright permissions, advertising, back issues), the Editor of the appropriate journal (submissions, editorial content) or the Production Editor, Patrick Kelly, Department of Statistics, University of Pennsylvania, Philadelphia, Pennsylvania 19104-6302.

SPRINGER FOR STATISTICS

J.H.C. CREIGHTON, *San Francisco State University, CA*

A FIRST COURSE IN PROBABILITY MODELS AND STATISTICAL INFERENCE

This textbook provides an introductory course in probability and statistical inference. Its emphasis in the probability portion of the text is on developing a clear and concrete understanding of probability distributions as models for real-world situations. This understanding of probability distributions is then used to develop the basic principles of statistical inference and to apply these ideas in a wide variety of applications. A particular feature of the book is the author's use of exercises to develop the reader's understanding of important concepts. Each exercise comes with two levels of solutions: the first level consists of hints, clarifications, and references to relevant discussions in the text; while the second level provides detailed and complete solutions. The author presupposes no previous knowledge on the half of the reader and carefully discusses each of the main concepts from probability and statistics as they are introduced. As a result, this book makes an excellent introduction to this central component of any curriculum which includes quantitative methods.

1993/app. 592 pp., 184 illus./Hardcover/$49.95
ISBN 0-387-94114-2
Springer Texts in Statistics

P.K. ANDERSEN, *University of Copenhagen;* **Ø. BORGAN**, *University of Oslo;* **R. GILL**, *University of Utrecht and* **N. KEIDING**, *University of Copenhagen*

STATISTICAL MODELS BASED ON COUNTING PROCESSES

Modern survival analysis and more general event history analysis may be effectively handled in the mathematical framework of counting processes, stochastic integration, martingale central limit theory and product integration. This book presents this theory, which has been the subject of intensive research activity during the past one-and-a-half decades. The exposition of the theory is integrated with careful presentation of many practical examples, almost exclusively from the authors' own experience, with detailed numerical and graphical illustrations. Much of the material has so far only been available in the journal literature (if at all), and so a wide variety of researchers will find this an invaluable survey of the subject.

1993/767 pp., 128 pp., 29 tabs./Hardcover/$69.00
ISBN 0-387-97872-0
Springer Series in Statistics

D.G. KLEINBAUM, *University of North Carolina, Chapel Hill, NC*

LOGISTIC REGRESSION

A Self-Learning Text

This textbook provides students and professionals in the health sciences with a presentation of the use of logistic regression in research. The text is self-contained, and designed to be used both in class or as a tool for self-study. It arises from the author's many years of experience in teaching this material, and, the notes on which it is based have been used extensively throughout the world. The book covers all the major topics of application and includes a very wide range of examples to illustrate the material. As a result, it will be an excellent textbook for all those whose work uses logistic regression.

1993/app. 220 pp./Hardcover/$49.00 (tent.)
ISBN 0-387-94142-8
Springer Series in Statistics
Statistics in the Health Sciences

SECOND EDITION

M. TANNER, *University of Rochester, NY*

TOOLS FOR STATISTICAL INFERENCE

Methods for the Exploration of Posterior Distributions and Likelihood Functions

From the reviews of the first edition:
"In summary I found this book extremely useful as an introduction to an interesting, developing field in statistics. ...I highly recommend it for the library of every well-informed statistician."
–JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION

Provides a unified presentation of a variety of computational algorithms which are used in likelihood and Bayesian inference. In this second edition, Martin Tanner has taken the opportunity to expand the treatment of many of the techniques discussed, to devote more space to comparing the methods covered, and to describe the applications in more detail. Topics covered include: maximum likelihood, Monte Carlo methods, the EM algorithm, data augmentation techniques, imputation methods, the Gibbs sampler, the Metropolis algorithm, and the griddy Gibbs sampler. The reader is assumed to have a reasonable basic background in statistics as might be gained in the first year of graduate courses in statistical theory and methods, but otherwise the book is self-contained. As a result, the book will provide an invaluable survey of this fast-moving area of statistics for research statisticians and for other researchers and graduate students whose research touches on these techniques.

1993/156 pp., 63 illus./Hardcover/$39.95
ISBN 0-387-94031-6
Springer Series in Statistics

S. GUPTA *and* **J. BERGER**, *both of Purdue University, West Lafayette, IN (Eds.)*

STATISTICAL DECISION THEORY AND RELATED TOPICS V

This volume comprises the invited papers at the Fifth Purdue Symposium on Statistical Decision Theory and Related Topics. The series of conferences is now well-established as presenting a superb state-of-the-art review of the subject. These papers are grouped into six parts, each giving a detailed account of the latest theoretical and research developments in the areas of: A Retrospecitve on Wald's Decision Theory and Sequential Analysis, Asymptotics and Nonparametrics, Bayesian Analysis, Decision theory and Selection Procedures, Probability and Probabilistics, Structures, and Sequential, Adaptive and Filtering problems. Consequently, this volume is ideally suited for researchers and graduate students in statistics and the decision sciences.

1993/app. 553 pp., 64 illus./Hardcover/$59.00
ISBN 0-387-94143-6

Springer-Verlag
NEW YORK

J.D. JOBSON, *University of Alberta, Alberta, Canada*

APPLIED MULTIVARIATE DATA ANALYSIS

Volume I: Regression and Experimental Design

Volume II: Categorical and Multivariate Methods

"[W]ould make a fine text for an applied regression course for students with appropriate mathematical background. It will be an important addition to my reference library." –JASA

Volume I provides an easy to read survey of data analysis, linear regression models and analysis of variance. Real data examples complemented by a thorough overview of theory are used throughout the text providing a strong link to statistical software packages. Each chapter contains a set of theoretical questions which provide a step-by-step development of the underlying theory and a set of real data exercises is included at the end of each chapter. Readers should be familiar with statistical inference and have a working knowledge of calculus and linear algebra. A diskette containing selected data sets is included.

Volume II presents an easy to read introduction to techniques in multivariate analysis. In addition to the traditional topics of multivariate analysis, the book also covers multidimensional contingency tables, logistic regression, cluster analysis, multidimensional scaling, and correspondence analysis. The emphasis is on the practicalities of the subject, and includes numerous analyses of real data sets drawn from a wide range of business, social science, and biological science settings. It also contains many exercises which extend the analyses of the data sets and includes the use of statistical computing packages covering further theoretical results relevant to the book. As a result, any student whose work uses these techniques will find this to be an excellent introduction to the subject.

Vol I: 1991/621 pp., 93 illus./Hardcover/$59.00
ISBN 0-387-97660-4/Plus Diskette
Vol II: 1992/731 pp., 85 illus./Hardcover/$59.00
ISBN 0-387-97804-6/Plus Diskette
Springer Texts in Statistics

A. KARR, *National Institute of Statistical Sciences, Research Triangle Park, NC*

PROBABILITY

1993/app. 300 pp., 15 illus./Hardcover/$39.00
ISBN 0-387-94071-5
Springer Texts in Statistics

ORDER TODAY!

- **CALL: Toll-Free 1-800-SPRINGE(R):** 1-800-777-4643. In NJ call 201-348-4033 (8:30 AM-4:30 PM EST). Your reference number is S299.
- **WRITE:** Send payment plus $2.50 postage and handling for first book and $1.00 for each additional book to: Springer Verlag New York Inc., Dept. #S299, PO Box 2485, Secaucus, NJ 07096-2491. (CA, IL, MA, NY, NJ, PA, TX, VA and VT residents add sales tax, Canadian residents add 7% GST.)
- **VISIT:** Your local technical bookstore.

Instructors: Call or Write for information on textbook examination copies!

11/93 S299