# THE ANNALS of MATHEMATICAL STATISTICS

FOUNDED AND EDITED BY H. C. CARVER, 1930-1938 EDITED BY S. S. WILKS, 1938-1949

THE OFFICIAL JOURNAL OF THE INSTITUTE OF MATHEMATICAL STATISTICS

Contents	PAGE
Alternative Models for the Analysis of Variance. Henry Scheffé.  The Theory of Decision Procedures for Distributions with Monotone Likelihood Ratio. SAMUEL KARLIN AND HERMAN RUBIN.	251 272
On the Power of Certain Tests for Independence in Bivariate Populations. H. S. Konijn The Efficiency of Some Nonparametric Competitors of the t-test. J. L. Hodges, Jr. and E. L. Lehmann	
On Regular Best Asymptotically Normal Estimates. Chin Long Chiang	336 352
The Estimation of the Size of a Stratified Animal Population. D. G. Chapman and C. O. Junge, Jr.	375
On the Design and Comparison of Certain Dichotomous Experiments. Russell N. Bradt and Samuel Karlin.	390
Tables of Expected Values of Order Statistics and Products of Order Statistics for Samples of Size Twenty and Less from the Normal Distribution. D. TEICHROEW. Estimation of Location and Scale Parameters by Order Statistics from Singly and	410
Doubly Censored Samples. Part I. A. E. SARHAN AND B. G. GREENBERG.  A Waiting Line Process of Markov Type. A. B. CLARKE.	427 452
Accurate Sequential Tests on the Mean of an Exponential Distribution. G. E. Albert.	460
On the Normal Approximation to the Hypergeometric Distribution. W. L. Nicholson Charts of the Power of the F-test. Martin Fox	471 484
Estimating the Parameters of a Truncated Gamma Distribution. Douglas G. Chapman Approximate Upper Percentage Points for Extreme Values in Multinomial Sampling.	498
ROBERT M. KOZELKA	
On the Simultaneous Analysis of Variance Test. K. V. RAMACHANDRAN	
On the Distribution of the Likelihood Ratio. Robert V. Hogg	529
Some Results on Restricted Occupancy Theory. John E. Freund and Arthur N.	532
POZNER A Vector Form of the Wald-Wolfowitz-Hoeffding Theorem. D. A. S. Fraser	<b>5</b> 40
Abstracts of Papers	
Report of the Princeton Meeting	<b>561</b>
Report of the Chicago Meeting	
Report of the Treasurer of the Institute	

Vol. 27, No. 2 — June, 1956

## THE ANNALS OF MATHEMATICAL STATISTICS

#### Editor T. E. HARRIS

#### ASSOCIATE EDITORS

Z. W. BIRNBAUM HERMAN CHERNOFF WILFRID J. DIXON J. M. HAMMERSLEY

L. J. SAVAGE J. WOLFOWITZ

#### WITH THE COOPERATION OF

R. L. ANDERSON R. C. BOSE D. G. CHAPMAN K. L. CHUNG D. R. COX J. F. DALY D. A. DARLING CYRUS DERMAN J. L. DOOB D. A. S. FRASER
J. L. HODGES, JR.
SAMUEL KARLIN
O. A. KEMPTHORNE
J. C. KIEFER
C. H. KRAFT
W. H. KRUSKAL
SOLOMON KULLBACH
L. M. LECAM

F. J. MASSEY
G. E. NOETHER
HOWARD RAIFFA
H. E. ROBBINS
MILTON SOBEL
C. M. STEIN
D. R. TRUAX
LIONEL WEISS
M. A. WOODBURY

#### PAST EDITORS OF THE ANNALS

H. C. CARVER, 1930-1938

T. W. Anderson, 1950–1952E. L. Lehmann, 1953–1955

S. S. Wilks, 1938-1949

Published quarterly by the Institute of Mathematical Statistics in March,

Subscription Rates. Current issues are \$12 per volume (four issues of one calendar year) in the U. S. and Canada, \$10 per volume elsewhere. Single issues are \$3.50. Back numbers are \$12 per volume, \$3.50 per issue, \$200 for the first 25 volumes, \$10 per additional volume purchased at the same time as Volume I through XXV.

June, September and December at Baltimore, Maryland.

Communications concerning subscriptions, back numbers, payment of dues, etc., should be addressed to A. H. Bowker, Treasurer, Department of Statistics, Stanford University, Stanford, Calif.

Communications concerning membership, changes of address, etc., should be addressed to George E. Nicholson, Jr., Secretary, Department of Statistics, University of North Carolina, Chapel Hill, N. C. Changes of address which are to become effective for a given issue of the *Annals* should be reported to the Secretary on or before the 10th of the month preceding the month of issue.

Editorial Office. The Rand Corporation, 1700 Main St., Santa Monica, Calif., T. E. Harris, Editor.

Preparation of manuscripts. Manuscripts should be submitted to the editorial office. Each manuscript should be typewritten, double spaced, with wide margins at sides, top, and bottom, and the original should be submitted with one additional copy, on paper that will take corrections. Dittoed or mimeographed papers are acceptable only if completely legible. Footnotes should be reduced to a minimum, and where possible replaced by remarks in the text, or a bibliography at the end of the paper; formulae in footnotes should be avoided. References should follow current *Annals* style.

Figures, charts, and diagrams should be professionally drawn on plain white paper or tracing cloth in black India ink twice the size they are to be printed.

Authors are asked to keep in mind the typographical difficulties of complicated mathe-

(Continued on inside back cover)

COMPOSED AND PRINTED AT THE WAVERLY PRESS, INC., BALTIMORE, MARYLAND, U. S. A.

### **NEW POLICY FOR ABSTRACTS**

The Institute of Mathematical Statistics has a new policy on abstracts. They should be submitted in duplicate to the Editor, preferably on abstract blanks, which can be obtained from the IMS Secretary. Abstracts must be received at least 47 days before the first day of the meeting at which they are to be presented, indicating whether presented by title or in person. (Only one contributed paper may be given in person at any one meeting.) They may be printed prior to the publication of the report of the meeting. Those received by April 30 will appear in the September Annals, by July 31 in December, etc. Abstracts should be limited to 200 words or the equivalent, and should avoid displayed expressions and complicated formulae. They can be accepted from non-members of the IMS only if transmitted by members.