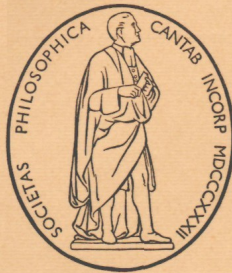


Proceedings of the
CAMBRIDGE PHILOSOPHICAL
SOCIETY

(MATHEMATICAL AND PHYSICAL SCIENCES)

VOLUME 58

PART 1



CAMBRIDGE UNIVERSITY PRESS

BENTLEY HOUSE, 200 EUSTON ROAD, LONDON, N.W. 1

AMERICAN BRANCH: 32 EAST 57TH STREET, NEW YORK 22, N.Y.

Price Thirty-eight Shillings Net (U.S.A. \$6.50)

Subscription price per volume £6. 10s. net post free (\$23.50 in U.S.A.)

January 1962

CAMBRIDGE PHILOSOPHICAL SOCIETY

FOUNDED 1819; ROYAL CHARTER 1832

Session 1961–1962

President: F. P. WHITE

Vice-Presidents: F. P. BOWDEN, J. D. BOYD, E. J. H. CORNER

Treasurer: R. C. EVANS

Secretaries: (Mathematical) J. H. WILLIAMSON

(Physical) T. E. FABER

(Biological) S. SMITH

The publications of the Society consist of the *Proceedings* and of the *Biological Reviews*. The publication of *Transactions* was suspended at the end of Volume XXII.

Orders should be sent to: THE MANAGER, CAMBRIDGE UNIVERSITY PRESS, BENTLEY HOUSE, 200 EUSTON ROAD, LONDON, N.W.1. Enquiries from the U.S.A. should be addressed to the Cambridge University Press, American Branch, 32 East 57th Street, New York 22, U.S.A.

For the purchase of early parts of the *Transactions*, *Proceedings* and *Biological Reviews* application should be made to the Secretaries. All parts of the *Proceedings* and *Biological Reviews* are available, and prices of sets or single parts will be quoted on application.

Fellows and Associates of the Society are particularly requested to inform the Secretaries of any change of postal address, and to send their subscriptions to the Treasurer, CAMBRIDGE PHILOSOPHICAL SOCIETY, FREE SCHOOL LANE, CAMBRIDGE.

All correspondence regarding library exchanges and Fellows' copies should be addressed to the Secretaries at the Society's office.

PROCEEDINGS of the CAMBRIDGE PHILOSOPHICAL SOCIETY

edited by

J. H. WILLIAMSON

in consultation with

J. W. S. CASSELLS

P. C. CLEMMOW

T. E. FABER

J. S. GRIFFITH

E. R. LAPWOOD


D. W. S. SCIAMA

F. SMITHIES

A. M. WALKER

E. C. ZEEMAN

1. Four parts of the *Proceedings* are issued each year.
2. Communications for the *Proceedings* should be sent to *The Librarian, Cambridge Philosophical Society, Free School Lane, Cambridge*. Papers by Fellows and Associates of the Society should be communicated directly by the author. **Other papers must be communicated by a Fellow**, who in doing so should give his opinion on the suitability of the paper for publication.
3. Papers occupying more than twenty pages of print can only rarely be accepted.
4. It is recommended that each paper be prefaced by a short abstract. Copies of a *Guide for the Preparation of Synopses*, prepared by the Abstracting Services Consultative Committee and issued by the Royal Society, may be obtained from the Librarian.
5. Drawings for illustration and diagrams should be on a large scale and on smooth white Bristol board in Indian ink. Lettering should be written clear of the diagram, and the desired position of the lettering indicated by pencilled lines.
6. References should be listed at the end of each paper. Titles of journals listed in *Mathematical Reviews* should be abbreviated as in *Mathematical Reviews*, except that proper names should be given in full. First and last page numbers should be given where relevant.
7. Authors are particularly requested to prepare their manuscripts in a form suitable for printing, with adequate margins. A pamphlet on the preparation of papers may be obtained from the Librarian. If a large number of corrections are required in the proofs, the Council reserves the right to make a charge towards the cost.
8. Authors may receive, on request, free offprints of *Proceedings* papers (fifty for a sole author, and a smaller number for each joint author).



The
Institution
of
Electrical
Engineers

Advertisement
Department

Savoy Place
London, W.C. 2

COVENT GARDEN 1871

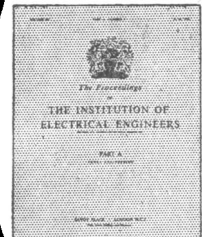
THE JOURNAL

The monthly JOURNAL goes to all members of The Institution, to non-members and subscribers. It contains authoritative articles dealing with all realms of electrical engineering. It also presents a synoptic review of Institution events and serves as the main channel of communication with the professional electrical engineer. Circulation A.B.C. 45,691.

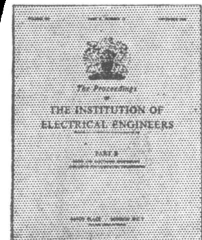


THE PROCEEDINGS

Part 'A'. Contains original academic papers describing new work in the heavy-current sphere of electrical engineering, covering power generation—transmission—distribution—installation; as well as reviews of progress. Published bimonthly (February, April, June, August, October and December) with a wholly subscribed circulation of 17,800.



Part 'B'. Contains original academic papers describing new work in the light-current sphere of electrical engineering, covering telecommunication—radio engineering—electronics; as well as reviews of progress. Published bimonthly (January, March, May, July, September and November) with a wholly subscribed circulation of 14,900.



JOURNAL OF THE SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS

1961

VOLUME 9, NUMBER 4, DECEMBER 1961

- | | |
|--|--|
| <i>Numerical Methods and the Bending of Ellipsoidal Shells.</i> G. D. GALLETTY, W. T. KYNER and C. E. MOLLER. | <i>On Digit Distributions for Random Variables.</i> ARTHUR WOUK. |
| <i>The Gradient Projection Method for Nonlinear Programming. Part II. Nonlinear Constraints.</i> J. B. ROSEN. | <i>An Essay on Prime Implicant Tables.</i> I. B. PYNE and E. J. MCCCLUSKEY, Jr. |
| <i>Random Plane Networks.</i> E. N. GILBERT. | <i>A New Matrix Calculus.</i> S. N. N. PANDIT. |
| <i>Almost Strictly Competitive Games.</i> ROBERT J. AUMANN. | <i>A Generalization of a Theorem of Lyapunov.</i> OLGA TAUSSKY. |
| <i>Multi-Terminal Network Flows.</i> R. E. GOMORY and T. C. HU. | <i>An Extension and Proof of the Root-Locus Method.</i> ALAN M. KRALL. |
| <i>Algorithms for Chebyshev Approximation by $ab^x + c$.</i> JOHN R. RICE. | <i>A New Treatment of Bose-Chaudhuri Codes.</i> H. F. MATTSON and G. SOLOMON. |
| <i>Diffusion from a Fixed Surface with a Concentration-Dependent Coefficient.</i> MAX A. HEASLET and ALBERTA ALKSNE. | <i>A Unified Approach to Certain Problems of Approximation and Minimization.</i> T. J. RIVLIN and H. S. SHAPIRO. |

The Journal is published quarterly. Subscriptions are \$10.00 per volume

Orders should be placed with the

SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS

Box 7541, Philadelphia 1, Pennsylvania, U.S.A.

ROYAL STATISTICAL SOCIETY

THE JOURNAL OF THE ROYAL STATISTICAL SOCIETY is published in two series: SERIES A (GENERAL), four issues a year, annual subscription £4. 4s. (U.S. \$12.00) post free; SERIES B (METHODOLOGICAL), two issues a year, annual subscription £3. 2s. (U.S. \$9.00) post free.

Contents of Series B (Methodological), Vol. 23, Part 2, 1961

- A Test of Homogeneity of Means under Restricted Alternatives. (With Discussion.) By D. J. BARTHOLOMEW.
- Optimal Programmes for Varietal Selection. (With Discussion.) By R. N. CURNOW.
- Some Stochastic Processes with Absorbing Barriers. By T. L. SAATY.
- Some Sequential Tests using Range. By W. G. GILCHRIST.
- First Emptiness in a Finite Dam. By B. WEESAKUL.
- The Construction of Optimal Designs for the One-Way Classification Analysis of Variance. By J. AITCHISON.
- Some Simple Wear-Dependent Renewal Processes. By A. MERCER.
- An Exact Distribution of the Fisher-Behrens-Welch Statistic for Testing the Difference between the Means of Two Normal Populations with Unknown Variances. By W. D. RAY and A. E. N. T. PITMAN.
- Closed Queueing Systems: A Generalisation of the Machine Interference Model. By F. BENSON and G. GREGORY.
- Testing for a Jump in the Spectral Function. By E. J. HANNAN.
- Moments of a Truncated Bivariate Normal Distribution. By S. ROSENBAUM.
- On Quadratic Estimates of the Interclass Variance for Unbalanced Designs. By R. R. READ.
- Mixtures of Geometric Distributions. By H. E. DANIELS.
- Prediction by Exponentially Weighted Moving Averages and Related Methods. By D. R. COX.
- The Randomization Bases of the Problem of the Amalgamation of Weighted Means. By D. E. BARTON and C. L. MALLOWS.
- Estimation from Quantiles in Destructive Testing. By H. P. STOUT and F. STERN.
- A Note on Maximum-Likelihood in the Case of Dependent Random Variables. By S. D. SILVEY.
- On some Properties of the Asymptotic Variance of the Sample Quantiles and Mid-Ranges. By P. K. SEN.
- Similarities between Likelihoods and Associated Distributions *a Posteriori*. By D. A. SPROTT.
- A Method of Maximum Likelihood Estimation. By F. S. G. RICHARDS.
- The Intervals between Regular Events Displaced in Time by Independent Random Deviations of Large Dispersion. By T. LEWIS.
- An Approach to the Scheduling of Jobs on Machines. By E. PAGE.

Obtainable through any bookseller or direct from:

ROYAL STATISTICAL SOCIETY
21 BENTINCK STREET, LONDON, W.1