

**PROCEEDINGS
OF THE
EDINBURGH MATHEMATICAL SOCIETY**

PROCEEDINGS
OF THE
EDINBURGH MATHEMATICAL SOCIETY

EDITED BY
I. N. SNEDDON
G. MACKENZIE D. MARTIN

VOLUME II
1958-1959

OLIVER AND BOYD
EDINBURGH: TWEEDDALE COURT
LONDON: 59A WELBECK STREET, W.1

COPYRIGHT © 1959 THE EDINBURGH MATHEMATICAL SOCIETY

PRINTED AND PUBLISHED IN GREAT BRITAIN BY
OLIVER AND BOYD LTD., EDINBURGH

CONTENTS

	PAGE
AITKEN, A. C. The contributions of E. T. Whittaker to algebra and numerical analysis	31
BORWEIN, D. AND BOYD, A. V. Binary and ternary transformations of sequences	175
BOYD, A. V. N-ary transformations of sequences	221
BOYD, A. V. <i>See</i> Borwein, D. and Boyd, A. V.	
BRENNAN, J. G. A generalisation of a formula due to Schubert	79
BUTCHER, A. C. AND LOWNDES, J. S. The diffraction of transient electromagnetic waves by a wedge	95
COLLINS, W. D. Some integrals involving Legendre functions	161
FARAHAT, H. K. AND LEDERMANN, W. Matrices with prescribed characteristic polynomials	143
FULTON, J. An integral transform solution of the differential equation for the transverse motion of an elastic beam	87
GREEN, H. F. Convergence in sequence spaces	83
IBRAHIM, S. A. Zeros and periodicity of functions of infinite matrices	225
LEDERMANN, W. <i>See</i> Farahat, H. K. and Ledermann, W.	
LOCKETT, F. J. A method of deriving solutions of a class of boundary value problems	147
LOCKETT, F. J. Longitudinal elastic waves in cylinders and tubes—including thermoelastic effects	153
LOCKETT, F. J. AND SNEDDON, I. N. Propagation of thermal stresses in an infinite medium	237
LOWNDES, J. S. An application of the Kontorovich-Lebedev transform	135
LOWNDES, J. S. <i>See</i> Butcher, A. C. and Lowndes, J. S.	
MCCONNELL, J. Whittaker's correlation of physics and philosophy	57
MACKIE, A. G. A direct method of using the hodograph plane in fluid dynamics	107
MCLEOD, J. B. On four inequalities in symmetric functions	211
MARTIN, D. Sir Edmund Whittaker, F.R.S.	1
MINC, H. Enumeration of indices of given altitude and potency	207

MINC, H. A problem in partitions: enumeration of elements of a given degree in the free commutative entropic cyclic groupoid	223
MIRSKY, L. Inequalities for certain classes of convex functions	231
NOBLE, B. The approximate solution of dual integral equations by variational methods	115
RANKIN, R. A. Sir Edmund Whittaker's work on automorphic functions	25
RAYNER, F. J. Relatively complete fields	131
ROBERTSON, A. P. AND WESTON, J. D. A general basis theorem	139
SCHNEIDER, H. Note on the fundamental theorem on irreducible non-negative matrices	127
SNEDDON, I. N. <i>See</i> Lockett, F. J. and Sneddon, I. N.	
SYNGE, J. L. Whittaker's contribution to the theory of relativity	39
TEMPLE, G. Whittaker's work on the integral representation of harmonic functions	11
WATSON, G. N. A theorem on continued fractions	167
WESTON, J. D. A Banach space which is not equivalent to an adjoint space	105
WESTON, J. D. <i>See</i> Robertson, A. P. and Weston, J. D.	
WILLIAMSON, J. H. On theorems of Kawada and Wendel	71
WILLIAMSON, J. H. A theorem on algebras of measures on topological groups	195
Book Reviews	183
The Sir Edmund Whittaker Memorial Prize	69

The *Edinburgh Mathematical Notes* appear at the end of the volume

Proceedings of the Glasgow Mathematical Association

Editorial Committee : T. M. MACROBERT, R. A. RANKIN, R. P. GILLESPIE, T. S. GRAHAM
Department of Mathematics, The University, Glasgow
Volume 4. Part 2. July 1959

- C. J. TRANTER. Dual trigonometric Series.
A. P. GUINAND. A note on angles in an n -dimensional simplex.
HANS ZASSENHAUS. On trace bilinear forms on Lie-algebras.
J. W. S. CASSELS. On a problem of Rankin about the Epstein zeta-function.
D. BORWEIN. On an extension of a theorem on the equivalence between absolute Rieszian and absolute Cesàro summability.
T. M. MACROBERT. Integration of E -functions with respect to their parameters.
S. MORAN. Further duals of a verbal subgroup.
A. M. MACBEATH. Abstract theory of packings and coverings I.
S. SWIERCZROWSKI. Abstract theory of packings and coverings II.

The proceedings are published twice yearly, four parts comprising a volume of about 200 pages. The subscription price per volume is £2 (\$6.00), post free, payable in advance. Single parts may be supplied at a cost of 10s. 6d. (\$1.50), post free.

Inquiries and subscription orders should be sent to the publishers

OLIVER and BOYD, Tweeddale Court, 14 High Street, Edinburgh, 1

INTERNATIONAL JOURNAL OF ABSTRACTS STATISTICAL THEORY AND METHOD

The aim of this new Journal is to give complete coverage of papers in the field of statistical theory (including associated aspects and probability and other mathematical methods) and new contributions to statistical method as published after 1st October 1958.

All contributions in the following five journals—being wholly devoted to this field—will be abstracted: *Annals of Mathematical Statistics*; *Biometrika*; *Journal, Royal Statistical Society (Series B)*; *Bulletin of Mathematical Statistics*; *Annals, Institute of Statistical Mathematics*; and a further group of six journals will be abstracted on a virtually complete basis as follows: *Biometrics*; *Metrika*; *Metron*; *Review, International Statistical Institute*; *Technometrics*; *Sankhyā*. There are about 250 other journals partly devoted to statistical theory and method from which the appropriate papers will be abstracted.

A scheme of classification has been developed for the abstracts that is flexible and facilitates the transfer of code numbers to punched-cards. A unique aspect of this Journal is that the pages are colour-tinted according to the main sections of classification. This method of colour-coding the pages provides a distinctive and powerful visual aid in the identification of abstracts in whatever manner the Journal is filed for reference.

The abstracts will be about 400 words long—the recommendation of UNESCO for the “long” abstract service—and will be in the English language. This new Journal will be quarterly and contain approximately 1000 abstracts per year.

Annual Subscription £5 (U.S.A. & CANADA \$16.00)
Single Number 30s. (U.S.A. & CANADA \$ 4.50)

OLIVER AND BOYD LTD.
Tweeddale Court, 14 High Street, Edinburgh, 1

UNIVERSITY MATHEMATICAL TEXTS

General Editors

ALEXANDER C. AITKEN, D.SC., F.R.S., DANIEL E. RUTHERFORD, D.SC., DR. MATH.

The Series provides compact and inexpensive text-books on standard topics of mathematics, the aim being to carry the reader from an elementary or intermediate grade up to an honours grade in each subject.

<i>Determinants and Matrices</i>	PROF. A. C. AITKEN, D.SC., F.R.S.	7/6
<i>Statistical Mathematics</i>	PROF. A. C. AITKEN, D.SC., F.R.S.	7/6
<i>Theory of Ordinary Differential Equations</i>	J. C. BURKILL, SC.D., F.R.S.	8/6
<i>Waves</i>	PROF. C. A. COULSON, D.SC., F.R.S.	7/6
<i>Electricity</i>	PROF. C. A. COULSON, D.SC., F.R.S.	10/6
<i>Projective Geometry</i>	T. E. FAULKNER, PH.D.	7/6
<i>Integration</i>	R. P. GILLESPIE, PH.D.	7/6
<i>Partial Differentiation</i>	R. P. GILLESPIE, PH.D.	7/6
<i>Infinite Series</i>	PROF. J. M. HYSLOP, D.SC.	7/6
<i>Integration of Ordinary Differential Equations</i>	E. L. INCE, D.SC.	7/6
<i>Introduction to the Theory of Finite Groups</i>	W. LEDERMANN, PH.D., D.SC.	8/6
<i>Analytical Geometry of Three Dimensions</i>	PROF. W. H. MCCREA, PH.D., B.SC.	7/6
<i>A German-English Mathematical Vocabulary</i>	S. MACINTYRE, M.A., PH.D. AND E. WITTE	8/6
<i>Topology</i>	E. M. PATTERSON, PH.D.	8/6
<i>Functions of a Complex Variable</i>	E. G. PHILLIPS, M.A., M.SC.	7/6
<i>Volume and Integral</i>	PROF. W. W. ROGOSINSKI, DR. PHIL., F.R.S.	10/6
<i>Vector Methods</i>	D. E. RUTHERFORD, D.SC., DR. MATH.	7/6
<i>Classical Mechanics</i>	D. E. RUTHERFORD, D.SC., DR. MATH.	10/6
<i>Fluid Dynamics</i>	D. E. RUTHERFORD, D.SC., DR. MATH.	10/6
<i>Special Functions of Mathematical Physics and Chemistry</i>	PROF. I. N. SNEDDON, M.A., D.SC.	10/6
<i>Tensor Calculus</i>	BARRY SPAIN, B.A., M.SC., PH.D.	8/6
<i>Theory of Equations</i>	PROF. H. W. TURNBULL, F.R.S.	7/6

OLIVER AND BOYD

EDINBURGH: TWEEDDALE COURT
LONDON: 39A WELBECK STREET, W.1