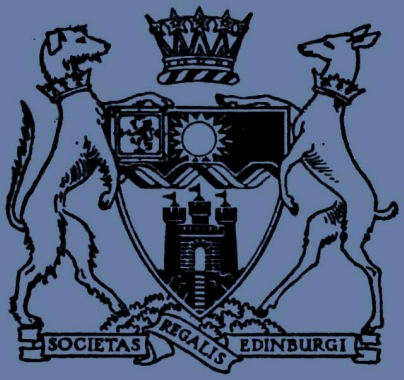
PEAMDU 73 1-336 (1975) Volume 73

THE ROYAL SOCIETY OF EDINBURGH



PROCEEDINGS

Section A (Mathematics)

PUBLISHED BY THE ROYAL SOCIETY OF EDINBURGH
22 GEORGE STREET, EDINBURGH, EH2 2PQ

1975

https://doi.org/10.1017/S0308210500016243 Published online by Cambridge University Press

EDITORIAL BOARD

Executive Editors

Professor W. D. COLLINS
University of Sheffield

Professor W. N. EVERITT
University of Dundee

Professor A. JEFFREY
University of Newcastle upon Tyne

Professor A. ERDÉLYI
University of Edinburgh

Professor D. S. JONES
University of Dundee

Dr J. B. MCLEOD
University of Oxford

Professor D. C. PACK
University of Strathclyde

Professor E. M. PATTERSON
University of Aberdeen

Professor R. A. RANKIN
University of Glasgow

Dr F. SMITHIES
University of Cambridge

Professor I. N. SNEDDON
University of Glasgow

Dr A. E. RITCHIE
General Secretary

W. H. RUTHERFORD
Executive Secretary

Royal Society of Edinburgh

Consulting Editors

Professor F. M. ARSCOTT
University of Manitoba

Professor F. V. ATKINSON
University of Toronto

Professor R. CONTI
Istituto Matematico, Firenze

Dr W. A. COPPEL
Australian National University

Dr M. S. P. EASTHAM
Chelsea College, London

Professor D. E. EDMUNDS
University of Sussex

Professor AVNER FRIEDMAN
Northwestern University, Evanston, Illinois, USA

Professor J. K. HALE
Brown University, Providence, RI, USA

Professor P. R. HALMOS
University of Indiana, Bloomington, USA

Professor Dr E. M. DE JAGER
University of Amsterdam

Professor TOSIO KATO
University of California, Berkeley, USA

Professor A. M. MACBEATH
University of Birmingham

Professor Dr E. MEISTER
Technical University of Darmstadt, Germany (FDR)

Professor ÅKE PLEIJEL
University of Uppsala, Sweden

Professor A. P. ROBERTSON
University of Western Australia, Nedlands, Australia

Professor G.-C. ROTA
Massachusetts Institute of Technology, USA

Professor S. M. SHAH
University of Kentucky, Lexington, Kentucky, USA

Professor Dr F. STUMMEL
Johann Wolfgang-Goethe University, Frankfurt am Main, Germany

Professor F. URSELL
University of Manchester

Professor J. WERMER
Brown University, Providence, RI, USA

https://doi.org/10.1017/S0308210500016243 Published online by Cambridge University Press

PROCEEDINGS

OF

THE ROYAL SOCIETY OF EDINBURGH

Section A (Mathematics)

VOL. 73

1975

PUBLISHED BY
THE ROYAL SOCIETY OF EDINBURGH
22 GEORGE STREET
EDINBURGH EH2 2PQ

1975

https://doi.org/10.1017/S0308210500016243 Published online by Cambridge University Press

CONTENTS

NO.		PAGE
1	Perturbation Theory for Sobolev Spaces. By FRIEDRICH STUMMEL, Department of Mathematics, Johann Wolfgang Goethe Universität, Frankfurt am Main. *Communicated by* Professor W. N. Everitt	5
2	Barriers bounded by Two Transition Points of Arbitrary Odd Order. By JOHN HEADING, Department of Applied Mathematics, University College of Wales, Aberystwyth. *Communicated by* Professor A. Jeffrey	51
3	Uniqueness of Sturm-Liouville Coefficients. By S. D. WRAY, Department of Mathematics, University of the Witwatersrand, Johannesburg, South Africa. *Communicated by* Professor F. F. Bonsall, F.R.S.	65
4	Comparison Theorems for a Class of Second-order Non-linear Ordinary Differential Equations. By DONALD C. BENSON, Department of Mathematics, University of California, Davis. *Communicated by* Professor W. N. Everitt	77
5	Qualitative Aspects of the Spatial Deformation of Non-linearly Elastic Rods. By STUART S. ANTMAN and KATHLEEN B. JORDAN. *Communicated by* Professor W. D. Collins	85
6	Smooth Fronted Waves in the Shallow Water Approximation. By ALAN JEFFREY, Department of Engineering Mathematics, University of Newcastle upon Tyne	107
7*	Convolution of Vector Measures. By A. J. WHITE, Department of Mathematics, University of Aberdeen. *Communicated by* Professor E. M. Patterson	117
8	Bifurcation and Asymptotic Bifurcation for Non-compact Non-symmetric Gradient Operators. By J. F. TOLAND, Fluid Mechanics Research Institute, University of Essex. *Communicated by* Professor W. N. Everitt	137
9	Circular Disc between Two Parallel Planes Close Together. By J. C. COOKE, Deal, Kent. *Communicated by* Professor W. D. Collins	149
10*	Applications of the Todd-Coxeter Algorithm to Generalised Fibonacci Groups. By C. M. CAMPBELL and E. F. ROBERTSON, Mathematical Institute, University of St Andrews. *Communicated by* Dr T. S. Blyth	163
11	Limit-*n* Criteria of Integral Type. By F. V. ATKINSON, University of Toronto. *Communicated by* Professor W. N. Everitt	167
12	Spectral Theory of Rotating Chains. By C. A. STUART, Battelle Institute, 7 Route de Drize, Carouge, Geneva. *Communicated by* Dr J. B. McLeod	199
13*	The Instability of Two Vortex Sheets enclosing a Subsonic Jet due to an Acoustic Point Source. By N. HARDISTY, Department of Mathematics, University of Dundee. *Communicated by* Professor D. S. Jones, F.R.S.	215
14	A Generalised Walsh-Lebesgue Theorem. By A. G. O'FARRELL, University of California, Los Angeles. *Communicated by* Professor J. Wermer	231
15	Differentiability on the Boundary of the Solutions of Linear Elliptic Boundary Value Problems. By RENATE SCHAPPEL, Mathematisches Seminar, Frankfurt am Main. *Communicated by* Professor W. N. Everitt	235

https://doi.org/10.1017/S0308210500016243 Published online by Cambridge University Press

NO. PAGE

16 Square Integrable Solutions of Perturbed Linear Differential Equations. By JAMES S. W. WONG, Department of Mathematics, University of Iowa, USA. *Communicated by* Professor W. N. Everitt 251

17 Absolutely Convergent Sturm-Liouville Expansions. By S. D. WRAY, School of Mathematical Sciences, Flinders University of South Australia. *Communicated by* Professor F. F. Bonsall 255

18 Linear-quadratic Optimal Control. By W. A. COPPEL, Department of Mathematics, Institute of Advanced Studies, Australian National University, Canberra. *Communicated by* Professor W. N. Everitt . . 271

19* Improved Boundedness Conditions for Lowndes' Operators. By PHILIP HEYWOOD, Department of Mathematics, University of Edinburgh . . 291

20* Deficiency Indices of Polynomials in Symmetric Differential Expressions, II. By ANTON ZETTL, Northern Illinois University, De Kalb, Illinois, and University of Dundee. *Communicated by* Professor W. N. Everitt . . 301

21* Runge's Theorem for Parabolic Equations in Two Space Variables. By DAVID COLTON, Department of Mathematics, University of Strathclyde, and Fachbereich Mathematik, Universität Konstanz. *Communicated by* Professor W. D. Collins 307

22 Analytic, Generalized, Hyperanalytic Function Theory and an Application to Elasticity. By ROBERT P. GILBERT, University of Delaware and Freie Universität, Berlin, and WOLFGANG L. WENDLAND, Technische Hochschule, Darmstadt. *Communicated by* Professor W. N. Everitt 317

* The thanks of the Society are due to the Carnegie Trust for the Universities of Scotland for grants towards the cost of these papers.

https://doi.org/10.1017/S0308210500016243 Published online by Cambridge University Press