

PROCEEDINGS
OF
THE ROYAL SOCIETY OF EDINBURGH

**PROCEEDINGS
OF
THE ROYAL SOCIETY
OF EDINBURGH**

Section A (Mathematics)

VOL. 82

1978-79

**PUBLISHED BY
THE ROYAL SOCIETY OF EDINBURGH
22 GEORGE STREET
EDINBURGH EH2 2PQ
1979**

CONTENTS

NO		PAGE
1	The Schrödinger equation as a singular perturbation problem. By E. M. DE JAGER and T. KÜPPER	1
2	On the non-regularity of tangent sphere bundles. By DAVID E. BLAIR	13
3	The initial value problem for a nonlinear semi-infinite string. By R. W. DICKEY	19
4	Variational method for the Hartree equation of the helium atom. By PETER BADER	27
5	On relaxation oscillations in a forced van der Pol oscillator. By P. HABETS	41
6	Norm inequalities involving derivatives. By W. D. EVANS and A. ZETTL	51
7	The treatment of a Neumann boundary value problem for force-free fields by an integral equation method. By RAINER KRESS	71
8	On the definition of the absolute temperature—a reconciliation of the classical method with that of Carathéodory. By JOHANN WALTER	87
9	Periodic solutions of ordinary differential equations with one-sided growth restrictions. By J. MAWHIN and W. WALTER	95
10	Dirichlet, Neumann and mixed Dirichlet-Neumann boundary value problems for $U_{xy} = 0$ in rectangles. By ALI I. ABDUL-LATIF	107
11*	A coordinatisation of implicative (semi-)lattices by Baer semigroups. By T. S. BLYTH	111
12	A note on the coordinatisation of implicative (semi-)lattices by Baer semi-groups. By C. S. JOHNSON JR	115
13	A class of symmetric ordinary differential operators whose deficiency numbers differ by an integer. By RICHARD C. GILBERT	117
14	Oscillation theorems for semilinear elliptic differential operators. By MANABU NAITO and NORIO YOSHIDA	135
15	Perturbation of nonlinear partial differential variational inequalities, II. By ELENA STROESCU	153
16	Semigroups of translations associated with functional and functional differential equations. by JANET DYSON and ROSANNA VILLELLA-BRESSAN	171
17	Entire solutions of $\Delta^p u = f(r, u)$. by WOLFGANG WALTER and H. RHEE	189

18*	Some factorable nil rings of characteristic two. By J. DUNCAN and I. D. MACDONALD	193
19	Nonlinear parabolic problems in unbounded domains. By GUY MAHLER	201
20*	Complementary variational principles for free molecular channel flow. By R. J. COLE	211
21	Multiplicity and bifurcation of periodic solutions in ordinary differential equations. By B. LALOUX	225
22	Jacobi fields and geodesic spheres. By L. VANHECKE and T. J. WILLMORE	233
23	Weyl's m -coefficient in a B^* -algebra. By JAMES MOODIE	241
24	A quasi-periodic boundary value problem for the Laplacian and the continuation of its resolvent. By H. D. ALBER	251
25*	Computing values of a function on $[0, 1]$ from its moments. By JET WIMP	273
26	Strongly irregular boundary value problems. By BERND SCHULTZE	291
27	The essential self-adjointness of differential operators. By R. G. KELLER	305
28	The essential self-adjointness of differential operators with positive coefficients. By R. G. KELLER	345

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

The following contributions have been accepted for publication and will appear in 1979:

STEVEN B. BANK

On the hypertranscendence of meromorphic solutions of certain functional equations.

G. BOILLAT and T. RUGGERI

Reflexion and transmission of discontinuity waves through a shock wave.

H. R. DOWSON and T. A. GILLESPIE

A representation theorem for a complete Boolean algebra of projections.

U. ELIAS

A classification of the solutions of a differential equation according to their behaviour.

L. E. FRAENKEL

On regularized distance and related functions.

C. H. HOUGHTON

Anti-isomorphisms of completely 0-simple semigroups.

MAN KAM KWONG

A second order Dirichlet differential expression that is not bounded below.

ERICH MARTENSEN

Rothe's method for the wave equation in several space dimensions.

P. NISTRI

Positive solutions of a non-linear eigenvalue problem with discontinuous non-linearity.

C. R. PUTNAM

Hyponormal and essentially normal operators.

B. SCHULTZE

Green's matrix and the formula of Titchmarsh-Kodaira for singular left-definite canonical eigenvalue problems.

RICHARD SILKOWSKI

A star-shaped condition for stability of linear retarded functional differential equations.

RUSSELL A. SMITH

The Poincaré-Bendixson theorem for certain differential equations of higher order.

J. WEYER

Regularität in der nichtlinearen Spektraltheorie.

PROCEEDINGS OF THE ROYAL SOCIETY OF EDINBURGH

(Section A)

Volume 82

1979

Parts 3/4

CONTENTS

JANET DYSON and ROSANNA VILLELLA-BRESSAN Semigroups of translations associated with functional and functional differential equations	171
WOLFGANG WALTER and H. RHEE Entire solutions of $\Delta^p u = f(r, u)$	189
J. DUNCAN and I. D. MACDONALD Some factorable nil rings of characteristic two	193
R. J. COLE Complementary variational principles for free molecular channel flow	211
L. VANHECKE and T. J. WILLMORE Jacobi fields and geodesic spheres	233
JAMES MOODIE Weyl's m -coefficient in a B^* -algebra	241
H. D. ALBER A quasi-periodic boundary value problem for the Laplacian and the continuation of its resolvent	251
JET WIMP Computing values of a function on $[0, 1]$ from its moments	273
BERND SCHULTZE Strongly irregular boundary value problems	291
R. G. KELLER The essential self-adjointness of differential operators	305
R. G. KELLER The essential self-adjointness of differential operators with positive coefficients	345
INDEX	361
CONTENTS	v

ISSN 0308-2105

Proc. Roy. Soc. Edinb., A. 82

*Published by The Royal Society of Edinburgh
22 George Street, Edinburgh EH2 2PQ*

Printed in Northern Ireland at The Universities Press (Belfast) Ltd.