

Editorial Office and Address

Editor-in-Chief C. E. M. PEARCE, cpearce@maths.adelaide.edu.au

Executive Editor E. HUNT, ehunt@maths.adelaide.edu.au

Assistant Editors A. GOH and Y. STOKES

Department of Applied Mathematics, The University of Adelaide, SA 5005, Australia.

Associate Editors

A. P. BASSOM
The University of Exeter
North Park Road
Exeter, Devon EX4QE
United Kingdom
AP.Bassom@ex.ac.uk

A. J. BRACKEN
Department of Mathematics
The University of Queensland
St. Lucia QLD 4072
ajb@maths.uq.edu.au

B. D. CRAVEN
Department of Mathematics
The University of Melbourne
VIC 3010
craven@ms.unimelb.edu.au

A. C. EBERHARD
Department of Mathematics
Royal Melbourne Institute of
Technology
GPO Box 2476V
Melbourne VIC 3001
andrew.eberhard@ems.rmit.edu.au

L. K. FORBES
School of Mathematics
and Physics
The University of Tasmania
Hobart TAS 7001
Larry.Forbes@utas.edu.au
J. M. HILL

Department of Mathematics The University of Wollongong PO Box 1144 Wollongong NSW 2500 i.hill@uow.edu.au

G. C. HOCKING
Department of Mathematics
and Statistics
Murdoch University
Murdoch WA 6150
hocking@prodigal.murdoch.edu.au

C. A. HURST
Department of Physics and
Mathematical Physics
The University of Adelaide
Australia 5005
ahurst@physics.adelaide.edu.au

P. E. KLOEDEN Fachbereich Mathematik Johann Wolfgang Goethe Universität

D-60054 Frankfurt am Main Germany kloeden@math.uni-frankfurt.de

M. KRISNAMOORTHY CSIRO Mathematical and Information Sciences Private Bag 10

Clayton South MDC, VIC 3169 Australia

Mohan.Krisnamoorthy@csiro.au

R. McKibbin
Institute of Information
and Mathematical Sciences
Massey University,
Albany Campus
Private Bag 102 904
North Shore Mail Centre
Auckland
New Zealand
R.McKibbin@massey.ac.nz

W. MCLEAN
Department of Applied
Mathematics
University of New South Wales

Sydney NSW 2052 W.Mclean@unsw.edu.au

P. K. POLLETT
Department of Mathematics
The University of Queensland
QLD 4072
pkp@maths.uq.edu.au

D. RALPH
The Judge Institute of
Management Studies
Cambridge University
Trumpington St
Cambridge CB2 1AG
England
dr241@cam.ac.uk

H. M. SRIVASTAVA
Department of Mathematics
and Statistics
University of Victoria
Victoria B.C. V8W 3P4
Canada
hmsri@uvvm.uvic.ca

K. L. TEO
Department of Applied
Mathematics
Hong Kong Polytechnic
University
Hung Hom, Kowloon
Hong Kong
mateokl@polyu.edu.hk

A. TORDESILLAS
Department of Mathematics
The University of Melbourne
VIC 3010
A.Tordesillas@ms.unimelb.edu.au

J.-M. VANDEN-BROECK School of Mathematics The University of East Anglia Norwich NR4 7TJ England J.Vanden-Broeck@uea.ac.uk

G. C. WAKE
Department of Mathematics
and Statistics
The University of Canterbury
Private Bag 4800
Christchurch
New Zealand
g.wake@math.canterbury.ac.nz

G. J. WEIR Applied Mathematics Centre Industrial Research Ltd PO Box 31310 Lower Hutt New Zealand g.weir@irl.cri.nz

Cover design by HILARY BOOTH.

THE ANZIAM JOURNAL

Volume 44 Part 1 JULY 2002

Preface to this Special Issue C. E. M. Pearce	i
Taming the movable singularities Jarmo Hietarinta	1
Huxley and Fisher equations for gene propagation: An exact solution P. Broadbridge, B. H. Bradshaw, G. R. Fulford and G. K. Aldis	11
What is the discrete analogue of the Painlevé property? A. Ramani and B. Grammaticos	21
Asymptotology—a cautionary tale R. L. Dewar	33
Integrability, random matrices and Painlevé transcendents N. S. Witte, P. J. Forrester and Christopher M. Cosgrove	41
Nonlinear electron solutions and their characteristics at infinity Hilary Booth	51
Symmetry analysis of and first integrals for the continuum Heisenberg spin chain M. C. Nucci and P. G. L. Leach	61
Black holes and solitons of the quantized dispersionless NLS and DNLS equations Oktay K. Pashaev and Jyh-Hao Lee	73
An integrable system of partial differential equations on the special linear group Peter J. Vassiliou	83
Numerical solitary wave interaction: the order of the inelastic effect T. R. Marchant	95
Propagation of an electromagnetic soliton in a ferromagnetic medium V. Veerakumar and M. Daniel	103
Continued over	erleaf

Set by Te_XAdel , Adelaide, Australia. Printed by Instant Colour Press, Canberra, Australia.

the second Painlevé equation Yoshitsugu Takei	111
A Bäcklund transformation and nonlinear superposition formula for the Lotka-Volterra hierarchy Xing-Biao Hu and Johan Springael	121
Binary constrained flows and separation of variables for soliton equations Wen-Xiu Ma and Yunbo Zeng	129
On the geometry of the Painlevé V equation and a Bäcklund transformation W. K. Schief	141
Discrete equations corresponding to fourth-order differential equations of the P ₂ and K ₂ hierarchies N. A. Kudryashov and M. B. Soukharev	149
Inverse scattering for the matrix Schrödinger operator and Schrödinger operator on graphs with general self-adjoint boundary conditions M. S. Harmer	161
Diffeomorphisms on S ¹ , projective structures and integrable systems Partha Guha	169

The Journal of the Australian Mathematical Society began publication in 1959, and from 1975 appeared in two series, Series A (Pure Mathematics and Statistics) and Series B (Applied Mathematics). Series B is now The ANZIAM Journal and is published in volumes comprising four quarterly parts. There is also a fifth (electronic) part designed for rapid publication (http://jamsb.austms.org.au/). Editor: A. J. ROBERTS, Department of Mathematics & Computing, University of Southern Queensland, Toowoomba, QLD 4350; aroberts@usq.edu.au. All five parts are refereed. All accepted papers have the option of publication in the electronic part. Information about Series A and other publications of the Society may be found on the inside back cover.

It is the editorial policy of The ANZIAM Journal to consider papers in any field of applied mathematics and related mathematical sciences. Novel applications of mathematics in real situations are especially welcomed. All papers should include some indication of applicability, and an introduction that can be understood by non-specialist readers from the whole applied mathematical community.

Manuscripts (four copies) for publication should be sent to the editor or to an appropriate associate editor at the address given on the inside front cover. Such action is a representation by the author that the manuscript has not been copyrighted or published, and that it is not being considered for publication elsewhere. Please do not make initial submissions electronically.

Authors are asked to read the section "Preparation of Manuscripts" on the last page.

Irrespective of the number of authors, 20 free offprints of each copy are provided; additional offprints may be ordered at the expense of the authors.

Excessive costs incurred by the Society through corrections to or withdrawal of articles may be charged to the authors concerned.

The ANZIAM Journal (ISSN 1446-1811) is published quarterly for A\$302.50 (Members A\$48.40) per annum by the Australian Mathematical Society, Mathematics Department, Australian National University, ACT 0200, Australia. Send address change notices to Dr A. Howe, Journal of the Australian Mathematical Society, Mathematics Department, Australian National University, ACT 0200, Australia.