

(The Australian & New Zealand Industrial and Applied Mathematics Journal)

Formerly known as
JOURNAL
of the
AUSTRALIAN MATHEMATICAL SOCIETY
Series B – Applied Mathematics

Editor of The ANZIAM Journal

C. E. M. PEARCE, Department of Applied Mathematics, The University of Adelaide, Australia, 5005; cpearce@maths.adelaide.edu.au.

Associate Editors

A. P. BASSOM Department of Mathematics University of Exeter North Park Road Exeter, Devon EX4OE United Kingdom AP.Bassom@ex.ac.uk A. J. BRACKEN

Department of Mathematics University of Queensland St. Lucia QLD 4072 ajb@maths.uq.edu.au B. D. CRAVEN

Department of Mathematics 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 Department of Mathematics University of Wollongong

Wollongong NSW 2500 i.hill@uow.edu.au G. C. HOCKING Department of Mathematics and Statistics

PO Box 1144

Murdoch University hocking@maths.uwa.edu.au

Murdoch WA 6150

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

R. McKibbin Department of Mathematics Massey University Private Bag 11222 Palmerston North 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 University of Queensland OLD 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

The Hong Kong Polytechnic University

Hung Hom, Kowloon

Hong Kong mateokl@polyu.edu.hk

A. TORDESILLAS Department of Mathematics University of Melbourne

VIC 3010

atordesi@mundoe.maths.mu.oz.au

J.-M. VANDEN-BROECK School of Mathematics University of East Anglia Norwich NR4 7TJ

England

J. Vanden-Broeck@uea.ac.uk

G. C. WAKE

Department of Mathematics and Statistics 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

Executive Editor

E. HUNT, Department of Applied Mathematics, The University of Adelaide, Australia, 5005; ehunt@maths.adelaide.edu.au .

Assistant Editors

J. P. DENIER and Y. STOKES Department of Applied Mathematics The University of Adelaide, Australia, 5005.

Cover design by HILARY BOOTH.

Land Operations Division, DSTO PO Box 1500, Salisbury, SA 5108.

THE ANZIAM JOURNAL

Volume 42 Part 4 APRIL 2001

Towards numerically estimating Hausdorff dimensions	
David E. Stewart	451
Equilibrium with fixed budgets and superlinear connections	
A. M. Rubinov and B. M. Glover	462
Early quasi-steady electro-magnetic fields about conducting surfaces	
Graham J. Weir	481
Bilateral estimates of the critical Mach number for some classes of carrying wing profiles	
F. G. Avkhadiev and A. M. Elizarov	494
Lipschitz stability of impulsive functional-differential equations	
D. D. Bainov and I. M. Stamova	504
On monotonicity and superadditivity properties of the entropy function	
S. S. Dragomir and C. J. Goh	515
Optimal control for quasilinear retarded parabolic systems	
Liping Pan and Jiongmin Yong	532
Comparison and linearized oscillation theorems for a nonlinear partial difference equation	
B. G. Zhang and Jian-She Yu	552
Asymptotic behaviour of a nonautonomous cooperative system	
Zhu Hongliang and Cui Jingan	561
On a periodic mutualism model	
Vongkun I i	569

Set by $Te_{\chi}Adel$, Adelaide, Australia. Printed by Instant Colour Press, Canberra, Australia. 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 accept 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 (three 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.

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

Irrespective of the number of authors, 50 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 0334-2700) is published quarterly for A\$280.50 (Members A\$42.90) 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.