

JOURNAL of the AUSTRALIAN MATHEMATICAL SOCIETY

Series B — Applied Mathematics

Volume 39 Part 1
JULY 1997

On the constructive approximation of non-linear operators in the modelling of dynamical systems A. P. Torokhti and P. G. Howlett	1
Source solutions for the nonlinear diffusion-convection equation G. C. Sander, R. D. Braddock, I. F. Cuning, J. Norbury and S. W. Weeks	28
On a boundary value problem posed by cancer therapy with neutron beams Nassar H. S. Haidar	46
Optimal control of a chemical reactor K. H. Wong and N. Lock	61
On the variational stability of a class of nonlinear parabolic optimal control problems Nikolaos S. Papageorgiou	77
A unified approach to problems of scattering of surface water waves by vertical barriers A. Chakrabarti, Sudeshna Banerjea, B. N. Mandal and T. Sahoo ..	93
On waves in the presence of vertical porous boundaries P. F. Rhodes-Robinson	104
Inf-sup conditions for finite-difference approximations of the Stokes equations Dongho Shin and John C. Strikwerda	121
Multiple-term approximations for Appell's F_1 function Magdi A. El-Gabali	135

The Journal of the Australian Mathematical Society began publication in 1959, and from 1975 appears in two series, Series A (Pure Mathematics and Statistics) and Series B (Applied Mathematics). Series B is published in volumes comprising four quarterly parts. Information about Series A and other publications of the Society may be found on the inside back cover.

It is the editorial policy of Series B 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.

Editor of the Journal, Series B

C. E. M. PEARCE, Applied Mathematics Department, The University of Adelaide, Australia, 5005.

Associate Editors

A. P. BASSOM
Department of Mathematics
University of Exeter
North Park Road
Exeter
Devon EX4QE
UNITED KINGDOM

B. D. CRAVEN
Department of Mathematics
University of Melbourne
Parkville Vic. 3052

A. EASTON
Department of Mathematics
Swinburne University of
Technology
PO Box 218
Hawthorn Vic. 3122

A. C. EBERHARD
Department of Mathematics
Royal Melbourne Institute of
Technology
GPO Box 2476V
Melbourne Vic. 3001

L. K. FORBES
Department of Mathematics
University of Queensland
St. Lucia Qld. 4072

J. F. HARPER
Department of Mathematics
Victoria University of
Wellington
PO Box 600
Wellington, New Zealand

J. M. HILL
Department of Mathematics
University of Wollongong
PO Box 1144
Wollongong NSW 2500

G. C. HOCKING
Department of Mathematics
and Statistics
Murdoch University
Murdoch WA 6150

C. A. HURST
Department of Physics and
Mathematical Physics
The University of Adelaide
Australia 5005

P. KLOEDEN
Weierstrass Institut
Mohrenstrasse 39
D-10117 Berlin Germany

M. R. OSBORNE
Program in Advanced
Computation
School of Mathematical
Sciences
Australian National University
ACT 0200

P. K. POLLETT
Department of Mathematics
University of Queensland
Qld 4072

S. M. SCOTT
Department of Physics
and Theoretical Physics
Australian National University
ACT 0200

K. L. TEO
School of Mathematics and Stats
Curtin University of
Technology
GPO Box U1987
Perth WA 6001

A. TORDESILLAS
Department of Mathematics
University of Melbourne
Parkville Vic. 3052

Assistant Editors

J. P. DENIER, A. GILL and J. A. K. STOTT, Applied Mathematics Department, The University of Adelaide, Australia, 5005.

Manuscripts (three copies) for publication should be sent to the editor or to an appropriate associate editor at the address given above. 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 outside cover.

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.

Journal of the Australian Mathematical Society, Series B—Applied Mathematics (ISSN 0334-2700) is published quarterly for A\$174 (Members A\$25) per annum by the Australian Mathematical Society, Mathematics Department, Australian National University, ACT 0200, Australia. Periodicals postage is paid at Ann Arbor, Michigan 48106, USA. Postmaster: Send address change notices to Dr A. Howe, Journal of the Australian Mathematical Society, Mathematics Department, Australian National University, ACT 0200, Australia.