# JOURNAL of the

## AUSTRALIAN MATHEMATICAL SOCIETY

### Series B — Applied Mathematics

### Volume 30 Part 4 APRIL 1989

The wave resistance formula of J. H. Michell (1898) and its significance to	
recent research in ship hydrodynamics	
E. O. Tuck	365
An analysis of the impact of T. M. Cherry's work on asymptotic expansions	
R. Grimshaw	378
Mathematical research at the Aeronautical Research Laboratories 1939-1960	
D. G. Hurley	389
An asymptotic solution of an integro-differential equation arising in magnetic	
coupling through thin shield walls	
G. F. Fitz-Gerald and N. A. McDonald	414
A functional differential equation arising in modelling of cell growth	
A. J. Hall and G. C. Wake	424
On generalised toroidal-poloidal solutions of vector field equations	
D. J. Ivers	436
On the existence and sensitivity analysis of optimal capital accumulation paths	
in continuous time, infinite horizon models	
Elias Flytzanis and Nikolaos S. Papageorgiou	450
Correction of finite difference eigenvalues of periodic Sturm-Liouville prob-	
lems	
Alan L. Andrew	460
Optimal control problems with elastic collisions	
J. M. Murray	470
On the problem of uncoupling systems of linear differential equations	
James M. Hill and Alex McNabb	483
Index for Volume 30	502

Set by the American Mathematical Society

Printed by Cushing-Malloy, Inc., Ann Arbor, Michigan, U.S.A.

https://doi.org/10.1017/S0334270000006305 Published online by Cambridge University Press

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 is understandable by non-specialist readers from the whole applied mathematical community.

#### Editor of the Journal, Series B

E. O. TUCK, Applied Mathematics Department, University of Adelaide, G.P.O. Box 498, Adelaide, S.A. 5001, Australia (on leave 1989). Acting Editor for 1989: C. E. M. PEARCE.

#### Associate Editors

R. H. J. GRIMSHAW School of Mathematics University of N.S.W. Kensington N.S.W. 2033

J. M. HILL Department of Mathematics University of Wollongong P.O. Box 1144 Wollongong N.S.W. 2500

C. A. HURST Department of Mathematical Physics University of Adelaide G.P.O. Box 498 Adelaide S.A. 5001

J. B. MOORE Department of Systems Engineering Institute of Advanced Studies A.N.U., P.O. Box 4 Canberra, A.C.T. 2600

M. R. OSBORNE Department of Statistics Institute of Advanced Studies A.N.U., P.O. Box 4 Canberra A.C.T. 2600 C. E. M. PEARCE Applied Mathematics Department University of Adelaide G.P.O. Box 498 Adelaide S.A. 5001

J. RICKARD Graduate School of Management University of Melbourne Parkville Vic. 3052

I. H. SLOAN School of Mathematics University of N.S.W. Kensington N.S.W. 2033

C. J. THOMPSON Department of Mathematics University of Melbourne Parkville Vic. 3052

W. W. WOOD Department of Mathematics University of Melbourne Parkville Vic. 3052

#### **Assistant Editors**

R. B. POTTS, E. A. COUSINS, Applied Mathematics Department, University of Adelaide, G.P.O. Box 498, Adelaide, S.A. 5001, Australia.

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, 100 free offprints of each paper 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\$110 (Members A\$16) per annum by the Australian Mathematical Society, Department of Mathematics, University of Queensland, St. Lucia, Qld. 4067, Australia. Second class postage is paid at Ann Arbor, Michigan 48106. Postmaster: Send address change notices to Dr B. D. Jones, Journal of the Australian Mathematical Society, Department of Mathematics, University of Queensland, St. Lucia, Qld. 4067, Australia.

### JOURNAL

### of the

### AUSTRALIAN MATHEMATICAL SOCIETY

Series B – Applied Mathematics

Volume 30 Part 4

**APRIL 1989** 

### SPECIAL BICENTENNIAL PAPERS

The first three papers in this issue are (much expanded) written versions of papers that were originally presented at the bicentennial Australian Mathematical Sciences Congress, Canberra, in May 1988, in which some published contributions by distinguished Australian mathematicians are critically assessed. In particular, one paper reviews the work of a very active group of mathematicians at the Aeronautical Research Laboratories in Melbourne, during the two decades 1940-1960. One important reason for the success of this group was that many of these mathematicians were graduates from the Mathematics Department at the University of Melbourne, where, over a period of fifty years, a high tradition of applied mathematics had been built up under the leadership of J. H. Michell and then T. M. Cherry. The impact of a single, but highly significant, contribution by each of these two mathematicians is discussed in the other papers of this set of three. It is hoped that these three papers will be of special interest to readers of this journal, both for their historical significance and because of their relevance to recent and on-going research in applied mathematics.

C. A. Hurst, Associate Editor