

BULLETIN

ISSN 0004-9727

of the

AUSTRALIAN MATHEMATICAL SOCIETY

Volume 31 Number 3

June 1985

Notes on irreducible ideals by David J. Smith	321
Wilansky's query on outer measures by Choo-Whan Kim	325
On the discrepancy of the sequence formed from multiples of an irrational number by Tony van Ravenstein	329
Intersections of finitely generated free groups by Peter Nickolas	339
Indecomposable 2-groups with all automorphisms central by M. J. Curran	349
Normal and subnormal subgroups in the group of units of group rings by Jairo Zacarias Goncalves	355
On a commutativity theorem for semi simple rings by Murtaza A. Quadri and Mohd. Ashraf	365
A note on arcwise connected sets and functions by Shri Ram Yadav and R. N. Mukherjee	369
The subvariety lattice of the variety of distributive double p -algebras by Wiesław Dziobiak	377
Trajectories of set valued integrals by Nikolaos S. Papageorgiou	389
A crossing theorem for distribution functions and their moments by H. L. MacGillivray	413
On convergence of closed sets in a metric space and distance functions by Gerald Beer	421
On the basis number of some complete bipartite graphs by J. McCall	433
Periodic points and chaos for expanding self-maps of the interval by Zhang Zhenhua	439
The Farkas lemma of Shimizu, Aiyoshi and Katayama by Charles Swartz	445
An Egorov's theorem for vector functions by P. Jiminez Guerra and Jose L. de Maria Gonzalez	451

ABSTRACTS OF AUSTRALASIAN PhD THESES

Eigenvalue approximation methods for quantum lattice Hamiltonians by P. G. Hornby	463
Unattained boundary points of the numerical range of Hilbert space operators by Srimati Majumdar	467
Chain decompositions of graphs by Donald Kenneth Skilton	471
Intersection properties of functions on cardinals by Greg G. Gibbon	475
Calculation of fundamental units in some types of quartic number fields by Neville Jeans	479

The University of Queensland Press, St Lucia, Queensland, 4067, Australia

Printed in Australia by Watson Ferguson & Co.

Registered by Australian Post—Publication No. QBQ2945

BULLETIN OF THE AUSTRALIAN MATHEMATICAL SOCIETY

Editors: Sheila Oates-Williams Deputy Editor: H. B. Thompson
Honorary Editor: B. H. Neumann

Associate Editors

Robert S. Anderssen	J. A. Eccleston	D. C. Hunt	Ross Street
Alan L. Andrew	B. J. Gardner	P. E. Kloeden	G. Szekeres
E. J. Billington	J. R. Giles	Rodney Nillsen	D. G. Tacon
B. D. Craven	J. R. J. Groves	G. B. Preston	E. U. Tarafdar
Brian A. Davey	J. A. Hempel	J. H. Rubinstei	Colin J. Thompson
P. Donovan	D. A. Holton	Leon Simon	A. J. van der Poorten
		Rudolf Vyborny	

Assistant Editors

Robert S. Anderssen M. S. Brooks

INFORMATION FOR AUTHORS

The BULLETIN of the Australian Mathematical Society aims at quick publication of original research in all branches of mathematics. Timely expository articles are also welcomed.

To ensure speedy publication, editorial decisions on acceptance or otherwise are taken quickly, normally within a month of receipt of the paper. Papers are accepted only after a careful evaluation by the Editor and an Associate Editor or other expert in the field.

As even minor revisions are generally not permitted, authors should read carefully all the details listed below and on the inside back cover.

For a paper to be acceptable for publication, not only should it contain new and interesting results but also

- (i) the exposition should be clear and attractive, and
- (ii) the manuscript should be in publishable form, without revision.

Nevertheless some meritorious papers will have to be rejected because speed of publication involves space limitations.

Authors should submit THREE clean, high quality copies to
The Editor, Bulletin of the Australian Mathematical Society,
Department of Mathematics, University of Queensland,
St. Lucia, Queensland, 4067, Australia

but should not send the original typescript of their papers, as material submitted to the BULLETIN will usually not be returned. Authors should note that each paper submitted must include an abstract and one or more classification numbers following the 1980 Mathematics Subject Classification.

Abstracts of PhD Theses

The BULLETIN endeavours to publish abstracts of all accepted Australasian PhD theses in mathematics. One restriction, however, is that the abstract must be received by the Editor within 6 months of the degree being approved.

©Copyright Statement. Where necessary, permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by the Treasurer, Australian Mathematical Publishing Association, Inc., for libraries and other uses registered with the Copyright Clearance Center (CCC), provided that the base fee of \$A2.00 per copy of article is paid directly to CCC, 21 Congress Street, Salem, MA 01970, U.S.A. Special requests should be addressed to the Treasurer, Australian Mathematical Publishing Association, Inc., c/- Department of Mathematics, University of Queensland, St. Lucia, Qld., 4067, Australia. Serial-fee code: 0004-9727/85 \$A2.00 + 0.00.

Continued Inside Back Cover

ISSN 0004-9727

BULLETIN

of the

Australian Mathematical Society

Editor: Sheila Oates-Williams

Deputy Editor: H. B. Thompson

Honorary Editor: B. H. Neumann

Associate Editors

Robert S. Anderssen	J. A. Eccleston	D. C. Hunt	Ross Street
Alan L. Andrew	B. J. Gardner	P. E. Kloeden	G. Szekeres
E. J. Billington	J. R. Giles	Rodney Nillsen	D. G. Tacon
B. D. Craven	J. R. J. Groves	G. B. Preston	E. U. Tarafdar
Brian A. Davey	J. A. Hempel	J. H. Rubinstein	Colin J. Thompson
P. Donovan	D. A. Holton	Leon Simon	A. J. van der Poorten
		Rudolf Výborný	

Assistant Editors

Robert S. Anderssen

M. S. Brooks

VOLUME 31 (1985)

The University of Queensland Press
St Lucia, Queensland, 4067, Australia

Printed by Watson Ferguson & Co., Brisbane, Queensland 4101, Australia

Contents

P. N. ÁNH, N. V. LOI and R. WIEGANDT, On the radical theory of Andrunakievich varieties	257
MOHD. ASHRAF, <i>see</i> MURTAZA A. QUADRI	
ABDUL AZIZ, On the zeros of a polynomial and its derivative	245
D. D. BAINOV, <i>see</i> S. G. HRISTOVA	
GERALD BEER, On convergence of closed sets in a metric space and distance functions	421
D. R. BREACH and ANNE PENFOLD STREET, Irreducible designs from supplementary difference sets	105
CARMEN SILVIA CARDASSI, Density of numerical radius attaining operators on some reflexive spaces	1
MARK FRANCIS COLLINS, Distribution-free tests of subhypotheses [A]*	315
M. J. CURRAN, Indecomposable 2-groups with all automorphisms central	349
STEFANIA DE STEFANO and SIMONETTA DI SIENO, A remark on completely reducible near-rings	35
SIMONETTA DI SIENO, <i>see</i> STEFANIA DE STEFANO	
BAU-SEN DU, The minimal number of periodic orbits of periods guaranteed in Sharkovskii's theorem	89
WIESŁAW DZIOBIAK, The subvariety lattice of the variety of distributive double p -algebras	377
PHILLIP MARTIN EDWARDS, Eventually regular semigroups [A]	157
P. FÖRSTER and E. SALOMON, Local definitions of local homomorphs and formations of finite groups	5
TAKAYUKI FURUTA, Extensions of the Fuglede-Putnam-type theorems to subnormal operators	161
GREG G. GIBBON, Intersection properties of functions on cardinals [A]	475
J. R. GILES, BRAILEY SIMS and S. SWAMINATHAN, A geometrically aberrant Banach space with normal structure	75
JAIRO ZACARIAS GONCALVES, Normal and subnormal subgroups in the group of units of group rings	355
JOSE L. DE MARIA GONZALEZ, <i>see</i> P. JIMINEZ GUERRA	
S. R. GRACE and B. S. LALLI, Oscillatory behavior of nonlinear differential equations with deviating arguments	127
P. JIMINEZ GUERRA and JOSE L. DE MARIA GONZALEZ, An Egorov's theorem for vector functions	451
J. E. HARMSE, Antipodal coincidence sets and stronger forms of connectedness	271
P. G. HORNBY, Eigenvalue approximation methods for quantum lattice Hamiltonians [A]	463
ROBERT B. HOWLETT, and RICHARD LEVINGSTON, On the laws of certain varieties of groups	145
S. G. HRISTOVA and D. D. BAINOV, Periodic solutions of quasilinear non-autonomous systems with impulses	185
S. G. HRISTOVA and D. D. BAINOV, Bilateral approximations and periodic solutions of systems of differential equations with impulses	293
NEVILLE JEANS, Calculation of fundamental units in some types of quartic number fields [A]	479
GRANT KEADY, The power concavity of solutions of some semilinear elliptic boundary-value problems	181
G. M. KELLY and F. ROSSI, Topological categories with many symmetric monoidal closed structures..	41
ALAN U. KENNINGTON, An improved convexity maximum principle and some applications [A]	159
CHOO-WHAN KIM, Wilansky's query on outer measure	325
B. S. KIRANAGI, <i>see</i> G. PREMA	
R. DAVID CHANDRA KUMAR, <i>see</i> R. K. SINGH	
B. S. LALLI, <i>see</i> S. R. GRACE	
J. P. LEE and Z. PIOTROWSKI, A note on spaces related to Namioka spaces	285
PUI-FAI LEUNG and LUEN-CHAU LI, On the spectrum of the biharmonic operator in a bounded domain	83
RICHARD LEVINGSTON, <i>see</i> ROBERT B. HOWLETT	
LUEN-CHAU LI, <i>see</i> PUI-FAI LEUNG	
N. V. LOI, <i>see</i> P. N. ÁNH	
H. L. MCGILLIVRAY, A crossing theorem for distribution functions and their moments	413
BOJAN MAGAJNA, On subnormality of generalized derivations and tensor products	235
SRIMATI MAJUMDAR, Unattained boundary points of the numerical range of Hilbert space operators [A]	467
J. McCALL, On the basis number of some complete bipartite graphs	433
R. N. MUKHERJEE, <i>see</i> SHRI RAM YADAV	
PETER NICKOLAS, Intersections of finitely generated free groups	339

Contents

*[A] Abstract of PhD thesis.