## BULLETIN

## of the

## AUSTRALIAN MATHEMATICAL SOCIETY

Volume 33 Number 3

A family of balanced ternary designs with block size four
by Diane Donovan..
Similarity between Kleinecke-Shirokov theorem and Fugledte-Putnam theorem by Takayuki Furuta
329
Extensions of three theorems for Fourier series on the disc to the torus by A. G. Miamee ..... 335
Laurent expansion of Dirichlet seriesby U. Balakrishnan
351
A commutativity result for rings
by A. A. Klein and I. Nada
359
359
On weak convergence implying strong convergence in $\mathrm{L}_{1}$-spaces by Eric J. Balder
363
363
Sets of constant width, the spherical intersection property and circumscribed balls by G. T. Sallee ..... 369
A coincidence theorem in topological vector spaces by Olga Hadžić ..... 373
Real hypersurfaces of a complex projective space by M. Kimura. ..... 383
Quasi-codivisible coversby Paul E. Bland
389
More about metric spaces on which continuous functions are uniformly continuous by Gerald Beer
397
397
Weak solutions of differential equations in Banach spaces
by Nikolaos S. Papageorgiou
by Nikolaos S. Papageorgiou ..... 407 ..... 407
Kneser's theorem for differential equations in Banach spaces by Nikolaos S. Papageorgiou
419
419
A note on periodic points of expanding maps of the interval by Bau-Sen Du
435
435
Orthogonality in normed spaces by J. R. Partington ..... 449
Uniform asymptotic smoothness of norms by T. Lewis, J. Whitfield and V. Zizler ..... 457
Asymmetric invariant sets for completely positive maps on $\mathrm{C}^{*}$-algebras by A. Guyan Robertson ..... 471
ABSTRACTS OF AUSTRALASIAN Ph.D. THESES
The simple intersection: capacity and delayby Ashley Wayne Plank
475
Integrable double Kerr-Schild spaces by Mark S. Hickman ..... 477

# BULLETIN OF THE AUSTRALIAN MATHEMATICAL SOCIETY 

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

## Associate Editors

Robert S. Anderssen
Alan L. Andrew
E. J. Billington
B. D. Craven

Brian A. Davey
P. Donovan
B. J. Gardner

J R Giles
J R. J Groves
J. A. Hempel
D. A Holton
D. C. Hunt
P. E. Kloeden

G Szekeres
Rodney Nillsen
D. G. Tacon

G B. Preston
J. H. Rubinstein

Leon Simon
Ross Street
E. U. Tarafdar

Colin J Thompson
A J van der Poorten
N C. Weber

## Assistant Editors

K. G. Smith G A Chandler

## 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 $\mathbf{P h D}$ 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

[^0]
## BULLETIN

## of the

## Australian Mathematical Society

Editor: Sheila Oates-Williams<br>Deputy Editor: H. B. Thompson<br>Honorary Editor: B. H. Neumann

Associate Editors
Robert S. Anderssen
B. J. Gardner P. E. Kloeden
G. Szekeres

Alan L. Andrew
J. R. Giles
J. R. J. Groves

Rodney Nillsen
G. B. Preston
D. G. Tacon
E. J. Billington
J. A. Hempel
J. H. Rubinstein
E. U. Tarafdar
B. D. Craven

Brian A. Davey
D. A. Holton
D. C. Hunt

Leon Simon
Colin J. Thompson
A. J. van der Poorten

Ross Street N. C. Weber
Assistant Editors
K. G. Smith G. A. Chandler

## VOLUME 33 (1986)

## Contents

Mohd. Ashraf, see Murtaza A. Quadri
Abdul Aziz. A new proof of Laguerre's theorem about the zeros of polynomials ..... 131
R. W. Bagley and M. R. Peyrovian. A note on compact subgroups of topological groups ..... 273
L. Balakrishnan. Laurent expansion of Dirichlet series ..... 351
Eric J. Balder. On weak convergence implying strong convergence in $L_{j}$-spaces ..... 363
Pall-Georg Becker-Landeck. Transcendence measures by Mahler`s transcendence method ..... 59
Gerald Beer. More about metric spaces on which continuous functions are uniformly continuous. ..... 397
Pall E. Bland. Quasi-codivisible covers. . ..... 389
Walter R. Bloom and Saroja Selvanathan. Hypergroup structures on the set of natural numbers ..... 89
Rólf Brandl and Daniela B. Nikolova. Simple groups of small Engel depth ..... 245
Oscar P. Brlvo. On a property of ideals of differentiable functions. ..... 293
R. A. Bryce. Sub-direct product closed Fitting classes . ..... 75
S. A. Choudum. A simple proof of the Erdös-Gallai theorem on graph sequences ..... 67
Marston Conder. A family of Hurwitz groups with non-trivial centres ..... 123
J. Defranza and D. J. Fleming. Positioning matrices with respect to the boundary of the maximal group. ..... 113
James K. Deveney and Joe Yanik. Fields countably generated over a proper subfield ..... 219
Diane Donovan. A family of balanced ternary designs with block size four ..... 321
Vesselin Drevsky. Torsion in the additive group of relatively free Lie rings ..... 81
Bau-Sen Du. A note on periodic points of expanding maps of the interval. ..... 435
Heneri A. M. Dzinotyweyi. Weighted function algebras on groups and semigroups ..... 307
David Elliott. On bounds for the Lipschitz constant of the remainder in polynomial approximation ..... 49
D. J. Fleminc, see J. Defranza ..... 155
Takayuki Furuta. Similarity between Kleinecke theorem and Fugledte-Putnam theorem ..... 329
Stuart John Goovenough. Error estimates for the approximation of functions by certain interpolation polynomials [A] ..... 157
S. J. Goodenough. A link between Lebesgue and Hermite-Fejér interpolation ..... 207
Olga Hadžić. A coincidence theorem in topological vector spaces. ..... 373
Mark S. Hickman. Integrable double Kerr-Schild spaces [A] ..... 477
Karl H. Hofmann and Verena S. Keith. Invariant quadratic forms on finite dimensional Lie algebras ..... 21
A. F. Horadam. see S. Pethe
C. B. Jay. Lambek's operational categories ..... 161
Stephen Joe, The numerical solution of second kind Fredholm integral equations [A] ..... 319
Verena S. Keith. see Karl H. Hofmann
M. A. Khan. see Murtaza A. Quadri
M. Kimura. Real hypersurfaces of a complex projective space ..... 383
A. A. Klein and I. Nada, A commutativity result for rings ..... 359
E. G. Kwon. A note on the coefficients of mixed normed spaces ..... 253
T. Lewis. J. Whitfield and V. Zizler. Uniform asymptotic smoothness of norms ..... 457
Richard I. Loebl. A note on containment of operators ..... 279
A. G. Miamee. Extensions of three theorems for Fourier series on the disc to the torus ..... 335
Sidney A. Morris and H. B. Thompson, Metrizability of subgroups of free topological groups ..... 103
I. Naida. see A. A. Klein
Takahiko Nakazi. Extensions of Jensen's inequality on the unit circle ..... 189
Gaston Mandata N'Guérékata. An asymptotic theorem for abstract differential equations. ..... 139
Daniela B. Nikolova. see Rolr Brandl
Nikolaos S. Papageorgiol. Weak solutions of differential equations in Banach spaces ..... 407
Nikolaos S. Papageorgiol, Knesers theorem for differential equations in Banach spaces ..... 419
J. R. Partivgiov. Orihogonality in normed spaces ..... 449
S. Pethe and A. F. Horadam, Generalised Gaussian Fibonacci numbers ..... 37
M. R. Peyrovian, see R. W. Bagley
Ashley Wayne Plank, The simple intersection: capacity and delay [A] ..... 475
Dinamérico, P. Pombo Jr., On adjoints of non-linear mappings ..... 227
G. B. Preston, The semidirect product of an inverse semigroup and a group ..... 261
Murtaza A. Quadri, Mohd. Ashraf and M. A. Khan, A commutativity condition for semi prime rings-ll. ..... 71
A. Guyan Robertson, Asymmetric invariant sets for completely positive maps on $\mathrm{C}^{*}$-algebras ..... 471
J. Sabina, Directional wave fronts of reaction-diffusion systems ..... I
G. T. Sallee, Sets of constant width, the spherical intersection property and circumscribed balls ..... 369
Saroja Selvanathan, see Walter R. Bloom
R. Sivasamy, A preemptive priority queue with a general bulk service rule. ..... 237
H. B. Thompson, see Sidney A. Morris
Klaus Thomsen, Automorphisms of homogeneous $\mathrm{C}^{*}$-algebras ..... 145
J. Whitfield, see T. Lewis
Sadayuki Yamamuro, Symmetry groups on ordered Banach spaces ..... 177
Kichoon Yang, Frenet formulae for holomorphic curves in the two quadric ..... 195
Joe Yanik, see James K. Deveney
V. Zizler, see T. Lewis
*[A] Abstract of PhD thesis.


[^0]:    (C) 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 SA2 00 per copy of articie is paid directly to CCC, 21 Congress Street. Salem. MA 01970 U S A Special requests should be addressed to the Treasurer. Austratran Mathernatical Publishing Association, Inc c/- Department of Mathematics. University of Queensiand St Lucta, Qid, 4067 Australia Serial-fee code 0004-9727/86 \$A2 $00+000$

