

**PROCEEDINGS**  
**OF**  
**THE ROYAL SOCIETY OF EDINBURGH**

PROCEEDINGS  
OF  
THE ROYAL SOCIETY  
OF EDINBURGH

Section A (Mathematics)

VOL. 95

1983

PUBLISHED BY  
THE ROYAL SOCIETY OF EDINBURGH  
22 GEORGE STREET  
EDINBURGH EH2 2PQ

1983

## NOTES FOR AUTHORS

Papers to be considered for publication should be sent to the Editorial Secretary, The Royal Society of Edinburgh, 22 George Street, Edinburgh EH2 2PQ, Scotland.

A paper by more than one author must be submitted with a statement, signed by each author, to the effect that the paper in its entirety is approved by the joint authors and naming the author who will be responsible for correspondence with the Society.

Authors will receive fifty (50) offprints free of charge, this number to be shared between joint authors. Additional offprints may be obtained, in units of fifty, at a fixed scale of prices given on a form which will be attached to the proof.

In view of the high cost of publication, authors must prepare their papers as concisely as possible. Manuscripts should be submitted in triplicate and preferably should be typewritten on one side of A4 paper, double spaced with adequate margins. Authors are advised to retain a copy of their papers as the Society cannot accept responsibility for any loss.

Every paper must be accompanied by a Synopsis, in general not exceeding two hundred words, which will be printed in small type at the beginning of the paper.

References within the text should be indicated by bold numbers in square brackets, e.g. [2] or [3, p. 167]. For style of references at end of text, see recent issues of *Proceedings A*.

Authors should ensure that punctuation carries through the mathematics in the proper manner. The use of hyphens should be consistent. In the text avoid such abbreviations as: iff, w.r.t., a.e.,  $\forall$ ,  $\exists$ , and thm.

Footnotes should be avoided. Headings should not be underlined. Every effort should be made to avoid complicated subscripts, superscripts, ranges of summation and integration. Horizontal fraction signs should normally be avoided: use either solidus signs / or negative exponents. Replace  $e^{(\dots)}$  by  $\exp[. . .]$  if the expression in parenthesis is complicated. Simple formulae should *not* be displayed unless they require a formula number. Use the prime ' or  $d/dx$ , but preferably not a dot, to denote ordinary differentiation. If possible use subscripts to denote partial differentiation of  $\partial/\partial x$  etc. Bars reaching over several letters should be avoided: use  $\sqrt{()}$  or the exponent 1/2 for the square root. Sub-subscripts and super-superscripts should be avoided if possible: bars and other devices over indices cannot be supplied.

Note that confusion very often arises between 1 (one) and  $l$  (ell); 0 (zero) and  $O$  (Capital oh);  $\circ$  (composition) and  $o$  (lower case oh);  $x$  and  $\times$ ;  $U$  and  $\cup$ ;  $c$  and  $\subset$ ;  $\in$  (belongs to) and  $\epsilon$  (epsilon);  $\emptyset$  (empty set) and  $\phi$  (phi);  $1$  and comma  $,$ ; prime ' and  $^1$ ;  $K$  and  $\kappa$ ;  $p$  and  $\rho$ ;  $w$  and  $\omega$ ;  $\sum$  (summation) and  $\Sigma$  (capital sigma);  $\prod$  (product) and  $\Pi$  (capital pi);  $v$  (lower case vee) and  $\nu$  (Greek nu);  $a$  (lower case a) and  $\alpha$  (Greek alpha);  $y$  (lower case y) and  $\gamma$  (Greek gamma). Please provide pencilled indicators in the margin where necessary. Where capitals and lower case of the same shape have to be printed, please indicate accordingly. Show italics by single underlining (except in the formulae which are set up normally in italics), bold face/Clarendon by wavy underlining and Greek by red underlining.

The statement of theorems, lemmas, et cetera, will be printed in italics and should be underlined. In definitions key words only should be in italics.

Equations should be indicated by numbers in parentheses in the right-hand margin.

Proofs of papers will be sent to the author. The cost of *authors' corrections in excess of five per cent of the printers' charge* for the setting of a particular paper will be charged to the author.

### Copyright

© 1983 The Royal Society of Edinburgh and the authors of individual papers.

It is the policy of the Royal Society of Edinburgh not to charge any royalty for the production of a single copy of any one article made for private study or research. Requests for the copying or reprinting of any article for any other purpose should be sent to the Royal Society of Edinburgh, 22/24 George Street, Edinburgh EH2 2PQ

CONTENTS

JUAN L. VAZQUEZ	
On a semilinear equation in $\mathbb{R}^2$ involving bounded measures	181
D. C. TRUEMAN	
The lattice of congruences on direct products of cyclic semigroups and certain other semigroups	203
M. R. VAUGHAN-LEE and JAMES WIEGOLD	
Generation of $p$ -groups by elements of bounded breadth	215
B. J. HARRIS	
On the Titchmarsh–Weyl $m$ -functions	223
ROSS WILKINSON	
A description of $E$ -unitary inverse semigroups	239
HEINZ-DIETER NIESSEN	
Proof of a conjecture of Race	243
GAETANO FICHERA	
On a class of evolution problems	247
Z. M. FRANCO, HANS G. KAPER, MAN KAM KWONG and A. ZETTL	
Bounds for the best constant in Landau’s inequality on the line	257
V. B. MOSCATELLI and M. THOMPSON	
Estimates for the state density for ordinary differential operators with white gaussian noise potential	263
A. C. LAZER and P. J. McKENNA	
On a conjecture related to the number of solutions of a nonlinear Dirichlet problem	275
JOHN BORIS MILLER	
The Euler–Maclaurin formula generated by a summation operator	285
G. DANGELMAYR	
Singularities of dispersion relations	301
PETER J. OLVER	
Hyperjacobians, determinantal ideals and weak solutions to variational problems	317
B. J. HARRIS	
Bounds for the eigenvalues of separated Dirac operators	341