MATHEMATICAL PROCEEDINGS

of the Cambridge Philosophical Society

VOLUME 148 PART 1

January 2010



CAMBRIDGEUNIVERSITY PRESS

CAMBRIDGE PHILOSOPHICAL SOCIETY

FOUNDED 1819; ROYAL CHARTER 1832

2010

President: A. G. SMITH

Vice-Presidents: A. W. CUTHBERT, J. M. E. HYLAND, J. D. MOLLON

Treasurer: G. A. REID

Secretaries: (Physical) C. Y. BARLOW, (Biological) C. J. HOWE,

(Mathematical) P. M. H. WILSON

The Society publishes Mathematical Proceedings (until 1975 entitled Proceedings) and Biological Reviews. The publication of Transactions was suspended at the end of Volume XXIII.

Orders, which must be accompanied by payment, may be sent to any bookseller or subscription agent or direct to the publisher: Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 8RU, or in the USA, Canada and Mexico, Cambridge University Press, Journals Fulfillment Department, 100 Brook Hill Drive, West Nyack, New York 10994–2133. Japanese prices for institutions are available from Kinokuniya Company Ltd, P.O. Box 55, Chitose, Tokyo 156, Japan.

Periodicals postage is paid at New York, NY, and at additional mailing offices. Postmaster: send address changes in USA, Canada and Mexico to *Mathematical Proceedings*, Cambridge University Press, 100 Brook Hill Drive, West Nyack, New York 10994–2133.

Correspondence about library exchanges should be sent to the Librarian at the Society's office.

Back numbers of Mathematical Proceedings and Biological Reviews may be obtained from the Cambridge Philosophical Society, Bene't Street, Cambridge CB2 3PY, England. All parts of Mathematical Proceedings (including indices to Vols. 1–50, 51–60, 61–70, 71–80, 81–90, 91–100, 101–110 and 111–120) and of Biological Reviews are available. Prices will be quoted on application. Some parts of Transactions are available from the above address. The complete set on microfilm may be obtained from Microfilm Division, E.P. Group of Companies, Bradford Road, East Ardsley, Wakefield, Yorkshire, price £77.

$\begin{array}{c} {\rm MATHEMATICAL~PROCEEDINGS} \\ {\it of~the} \end{array}$

CAMBRIDGE PHILOSOPHICAL SOCIETY edited by G.P. PATERNAIN in conjunction with

A. AVILA

G. R. GRIMMETT

T. J. PEDLEY

W. BALLMANN

J. M. E. HYLAND

J. SAXL

A. GRANVILLE

W. B. R. LICKORISH

D. M. A. STUART

R. MELROSE

P. M.H. WILSON

- 1. Mathematical Proceedings (ISSN 0305-0041) is published bimonthly, in January, March, May, July, September and November, in two volumes of three parts by Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 8RU, UK/Cambridge University Press, 32 Avenue of the Americas, New York, N.Y. 10013-2473. The subscription rate (excluding VAT) (which includes delivery by air) of volumes 148 and 149 (2010), which includes print and electronic access, is £525 (US \$893 in the USA, Canada and Mexico). The electronic-only price available to institutional subscribers is £453 (US \$781 in the USA, Canada and Mexico). Single parts cost £90 (US \$153 in USA, Canada and Mexico) plus postage. EU subscribers (outside the UK) who are not registered for VAT should add VAT at their country's rate. VAT registered subscribers should provide their VAT registration number.
- 2. Scope of the Mathematical Proceedings. Papers which advance knowledge of mathematics, either pure or applied, will be considered by the Editorial Committee. The work must be original and not submitted to another journal. Papers should be submitted to the Editor, Mathematical Proceedings, Cambridge Philosophical Society, Bene't Street, Cambridge CB2 3PY, UK. Papers in languages other than English should be sent only after prior consultation with the Editor, who may be contacted at mpeditor@hermes.cam.ac.uk. A paper may also be submitted electronically in pdf form together with the TeX file as attachment to an e-mail, i.e. not in the body of the e-mail.
- 3. Correction of proofs. If a paper is accepted, the author will receive in due course page proofs for him to correct and return within one week. To minimize disturbance of type, when words or phrases are added in proof, others of equal length should be removed if possible. If many corrections are made in the proofs, the Council reserves the right to charge the cost.
- 4. Authors receive a final PDF of their paper. They may order offprints via an order form sent with the proofs. © Cambridge Philosophical Society, 2010. Printed in the United Kingdom at the University Press, Cambridge.

This journal is included in the Cambridge Journals Online service which can be found at http://journals.cambridge.org. For further information on other Press titles access http://www.cambridge.org. Copying. This journal is registered with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, Mass. 01923, USA. Organizations in the USA who are also registered with CCC may therefore copy material (beyond the limits permitted by sections 107 and 108 of US copyright law) subject to payment to CCC of the per-copy fee of \$16.00. Code 0305-0041/2010 \$16.00. This consent does not extend to multiple copying for promotional or commercial purposes.

Organizations authorized by the Copyright Licensing Agency may also copy material subject to the usual conditions

ISI Tear Sheet Service, 3501 Market Street, Philadelphia, Pennsylvania 19104, USA, is authorized to supply single copies of separate articles for private use only. For all other use, permission should be sought from Cambridge University Press.