

# MATHEMATICAL PROCEEDINGS

*of the  
Cambridge Philosophical Society*

VOLUME 107 PART 3

*May 1990*



CAMBRIDGE UNIVERSITY PRESS

# CAMBRIDGE PHILOSOPHICAL SOCIETY

FOUNDED 1819; ROYAL CHARTER 1832

1990

*President:* P. J. GRUBB

*Vice-Presidents:* A. D. BUCKINGHAM, K. A. JOYSEY  
W. A. MAIR

*Treasurer:* C. N. KENNEY

*Secretaries:* (Physical) J. E. FIELD (Biological) M. A. MESSAGE  
(Mathematical) J. E. ROSEBLADE

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 2RU, or in the USA and Canada, Cambridge University Press, Journals Department, 40 West 20th Street, New York, NY 10011. Second class postage paid at New York, NY, and at additional mailing offices. POSTMASTER: send address changes in USA and Canada to *Mathematical Proceedings*, Cambridge University Press, 110 Midland Avenue, Port Chester, New York, NY 10573.

*Fellows of the Society are particularly requested to inform the Secretaries of any change of postal address and to send their subscriptions to the Treasurer, at the Society's office.*

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 and 91–100) 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.

## MATHEMATICAL PROCEEDINGS of the CAMBRIDGE PHILOSOPHICAL SOCIETY

*edited by J. S. WILSON in conjunction with*

SIR MICHAEL ATIYAH  
M. T. BARLOW  
T. K. CARNE  
D. G. CRIGHTON  
P. GODDARD

R. HILL  
J. M. E. HYLAND  
W. B. R. LICKORISH  
N. G. LLOYD

T. J. RANSFORD  
J. E. ROSEBLADE  
C. B. THOMAS  
P. M. H. WILSON

1. *Mathematical Proceedings* (ISSN 0305-0041) is published six times a year in January, March, May, July, September and November. Two volumes of three parts are published each year. The subscription price (which includes second-class postage) of volumes 107 and 108 (1990) is £65.50 net per volume (US \$139.00 in the USA and Canada).

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 sent to the Editor, *Mathematical Proceedings*, Cambridge Philosophical Society, Bene't Street, Cambridge CB2 3PY, England. Papers in languages other than English should be sent only after prior consultation with the Editor.

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 60 free offprints, without covers, and may obtain more on payment. An order form is sent with the proofs.

© Cambridge Philosophical Society, 1990.

*Copying.* This journal is registered with the Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970. 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 \$5.00. Code 0305-0041/90 \$5.00 + .00. This consent does not extend to multiple copying for promotional or commercial purposes.

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 or the American Branch of Cambridge University Press.