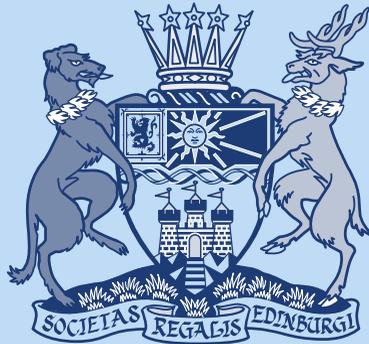


Volume 153 Part 1 (2023) pages 1–368

ISSN 0308-2105

THE ROYAL SOCIETY OF  
EDINBURGH



PROCEEDINGS SECTION A  
MATHEMATICS

PUBLISHED BY THE RSE SCOTLAND FOUNDATION  
22 GEORGE STREET, EDINBURGH EH2 2PQ

## EDITORIAL BOARD

J. M. FRASER (Editor in Chief)

University of St Andrews

*Fractal geometry*

A. BARTEL

University of Glasgow

*Number theory, arithmetic geometry, representation theory of finite groups*

T. E. BRENDLE

University of Glasgow

*Geometric and combinatorial group theory; low dimensional topology*

I. CHEVYREV

University of Edinburgh

*Stochastic and rough analysis*

M. COTI ZELATI

Imperial College London

*Analysis of PDEs, fluid dynamics, mixing*

F. A. DAVIDSON

University of Dundee

*Quantitative (systems) biology; applied analysis*

L. FOSCOLO

University College London

*Differential geometry, geometric analysis*

M. GRANT

University of Aberdeen

*Algebraic and differential topology and their applications*

S. GUTIERREZ

University of Birmingham,

*Harmonic analysis with applications to PDEs*

J. HICKMAN

University of Edinburgh

*Harmonic analysis*

S. HUCZYNSKA

University of St Andrews

*Combinatorics, graph theory, mathematical aspects of cryptography*

Y. LEN

University of St Andrews

*Algebraic and tropical geometry*

X. LI

University of Glasgow

*Operator algebras, functional analysis and related topics*

D. MACLAGAN

University of Warwick

*Combinatorial and computational commutative algebra and algebraic geometry*

A. MONDINO

University of Oxford

*Geometric analysis, optimal transport, analysis and geometry of metric (measure) spaces*

V. MOROZ

University of Swansea

*Nonlinear elliptic PDEs*

S. PRENDIVILLE

Lancaster University

*Additive combinatorics and analytic number theory*

L. SCARDIA

Heriot-Watt University

*Calculus of variations and PDEs*

M. J. TINDALL

University of Reading

*Mathematical biology, pharmacology and medicine*

S. WHITE

University of Oxford

*Functional analysis and operator algebras*

### Curator

K. RUDY

University of St Andrews

### Subscription details

The journal is published and distributed every two months by Cambridge University Press on behalf of the RSE Scotland Foundation.

An annual subscription costs £764.00/\$1424.00 (Online plus Print) or £651.00/\$1193.00 (Online only). Orders should be placed with Cambridge University Press, Journals Fulfilment Department, UPH, Shaftesbury Road, Cambridge CB2 8BS UK Telephone: +44 (0)1223 326070; Fax: +44 (0)1223 325150; e-mail: [journals@cambridge.org](mailto:journals@cambridge.org).

This journal is included in the Cambridge Core service which can be found at <https://www.cambridge.org/core/journals/proceedings-of-the-royal-society-of-edinburgh-section-a-mathematics>. Each new issue will be made available shortly before publication of the printed version. Volumes 61 to 153 (1941–2023) are also available via Cambridge Core.

© 2023 The Royal Society of Edinburgh

The Royal Society of Edinburgh, Scotland's National Academy, is Scottish Charity No. SC000470

The RSE Scotland Foundation, a charitable body connected to the Society, is Scottish Charity

No. SC024636