# Ergodic theory and dynamical systems 

EDITORS<br>Anthony Manning William Parry Ya B. Pesin J.-P. Thouvenot

## EDITORIAL BOARD

R. L. Adler (Thomas J. Watson
Research Center, Yorktown Heights)
L. A. Bunimovich (Georgia Institute of Technology)
A. Connes (IHES)
S. G. Dani (University of Göttingen)
W. de Melo (IMPA, Rio de Janeiro)
A. Fathi (ENS, Lyons)
J. Franks (Northwestern University)
D. Fried (Boston University)
H. Furstenberg (Hebrew University, Jerusalem)
M. R. Herman (Ecole Polytechnique, Palaiseau)
A. B. Katok (Pennsylvania State University)
U. Krengel (University of Göttingen)
F. Ledrappier (University of Paris 6)
G. A. Margulis (USSR Acad. of Sciences)
F. Przytycki (Polish Academy of Sciences)
S. M. Rees (University of Liverpool)
D. J. Rudolph (University of Maryland)
D. Ruelle (IHES)
D. Salamon (University of Warwick)
K. Schmidt (University of Warwick)
P. Walters (University of Warwick)

VOLUME 13
1993

PUBLISHED BY<br>the press syndicate of the university of cambridge<br>The Pitt Building, Trumpington Street, Cambridge CB2 1RP<br>40 West 20th Street, New York, NY 10011-4211, USA<br>10 Stamford Road, Oakleigh, Melbourne 3166, Australia

© Cambridge University Press 1993

## Contents

PART 1 MARCH ..... 1993
Characterizations of topological dynamical systems whose transformation group $C^{*}$-algebras are antiliminal and of type 1 Aoki, N. and Tomiyama J. ..... 1
A characterization of $\omega$-limit sets of maps of the interval with zero topological entropy Bruckner, A. M. and Smital, J. ..... 7
Sinai-Ruelle-Bowen measures for N -dimensional derived from Anosov diffeomorphisms Carvalho, M. ..... 21
Integer Cantor sets and an order two ergodic theorem Fisher, A. M. ..... 45
Regularity of time-preserving conjugacies for contact Anosov flows with $C^{1}$-Anosov splitting Hamenstädt, $U$. ..... 65
Some ergodic properties of commuting diffeomorphisms $H u, H$. ..... 73
Uniformly quasi-isometric foliations Kellum, M. ..... 101
An estimate of entropy for toroidal chaos Kwapisz, J. ..... 123
Algebraic torsion, zeta function and Dirichlet series for graph links in homology 3 -spheres Nemethi, A. ..... 131
Multiplicity two actions and loop space homology Paternain, G. P. ..... 143
Expansive geodesic flows on surfaces Paternain, M. ..... 153
Variation of Hausdorff dimension of Julia sets Ransford, T. J. ..... 167
Rigidity of centralizers of real analytic diffeomorphisms Rocha, J. ..... 175
Hausdorff dimension for non-invertible maps Simon, K. ..... 199
Core dimension group constraints for factors of sofic shifts Trow, P. and Williams, S. ..... 213
PART 2 JUNE 1993
Absolutely continuous conjugacy of expanding endomorphisms Arteaga, C. ..... 225
Newton's method and a class of meromorphic functions without wandering domains Bergweiler, W. ..... 231
On the asymptotic range of cocycles for shifts of finite types Coelho, Z. ..... 249
On the $C^{2}$ creation of links of critical points Contreras, $G$. ..... 263
Amenable actions of discrete groups Elliott, G. A. and Giordano, T. ..... 289
Almost everywhere exponential convergence of the modified Jacobi-Perron algorithm Ito, S., Keane, M. and Ohtsuki, M. ..... 319
Lefschetz formulae for Anosov flows on 3-manifolds Sanchez-Morgado, $H$. ..... 335
Connectedness of the tricorn Nakane, $S$. ..... 349
Symplectic displacement energy for Lagrangian submanifolds Polerovich, L. ..... 357
Homoclinic tangencies: moduli and topology of separatrices Posthumus, R. A. and Takens, F. ..... 369
Closed orbits in homology classes for Ansov flows Sharp, R. ..... 387
Some open sets of uniformly hyperbolic cocycles Young, L.-S. ..... 409
PART 3 SEPTEMBER 1993
A stochastic analogue of a theorem of Boyle's on almost flow equivalence Araújo, P. V. ..... 417
Crossed products of totally disconnected spaces by $\mathbb{Z}_{2} * \mathbb{Z}_{2}$
Bratteli, O., Evans, D. E. and Kishimoto, A. ..... 445
Periodic points and finite group actions on shifts of finite type Fiebig, U.-F. ..... 485
Orbital factor map Hamachi, T. and Kosaki, H. ..... 515
Poisson law for Axiom A diffeomorphisms Hirata, M. ..... 533
Gradient-like flows on 3-manifolds de Rezende, K. A. ..... 557
Cuntz-Krieger algebras associated with Fuchsian groups Spielberg, J. S. ..... 581
PART 4 DECEMBER 1993
Weak disks of Denjoy minimal sets Boyland, P. ..... 597
The crossed product of a UHF algebra by a shift Bratteli, O., Størmer, E., Kishimoto, A. and Rørdam, M. ..... 615
Knaster-like continua and complex dynamics Devaney, R. L. ..... 627
The enveloping semigroup of projective flows Ellis, $R$. ..... 635
Decomposing isometric extensions using group extensions Forrest, A. H. ..... 662
Global dynamical properties of Euler and backward Euler Hockett, K. ..... 675
A class of $C^{\infty}$-stable foliations $E l$ Kacimi Alaoui, A. and Nicolau, M. ..... 697
Mixing sets and relative entropies for higher-dimensional Markov shifts Kitchens, B. and Schmidt, K. ..... 705
Global stability of families of vector fields Labarca, R. and Plaza, S. ..... 737
Spectre quasi-discret et théorème ergodique de Wiener-Wintner pour les polynômes Lesigne, $E$. ..... 767
On the Pommerenke-Levin-Yoccoz inequality Petersen, C. L. ..... 785
Algorithmic complexity of points in dynamical systems White, H. S. ..... 807

## 1 Submission of typescripts

Two copies of the manuscript should be submitted to one of the four Executive Editors (addresses on outside front cover). The editor will acknowledge receipt of the manuscripts. It is important that authors inform the editor of any changes of address whilst their paper is under consideration.

## 2 Typescript

Papers should be typed, double-spaced, on one side only and with generous margins. The pages must be numbered.

The first page should give the title, the author's name and institution, and a short abstract intelligible to mathematicians.

The title, while brief, must be informative (e.g. A new proof of the ergodic theorem, whereas Some applications of a theorem of Birkhoff would be useless).

## 3 Notation

It is important that mathematical expressions are clear to a printer (who is not a mathematician). For instance, $n_{k}(n$ sub $k)$ is common usage, but avoid if possible using $c$ sub $n$ sub $k$. Fractions are generally best expressed by a solidus. Complicated exponentials like

$$
\exp \left\{z^{2} \sin \theta /\left(1+y^{2}\right)\right\}
$$

should be shown in this and no other way.
In the typescript, italics, small capitals and capitals are specified by single, double and triple underlining. Bold-faced type is shown by wavy underlining.

It helps if displayed equations or statements which will be quoted later are numbered in order on the right of their line. They can then be referred to by, for example, 'from (7)'.

The author must enable the printer (if necessary by pencilled notes in the margin) to distinguish between similar symbols such as $o, O, 0, \mathrm{O}, 0 ; x$, $\mathrm{X}, \times ; \phi, \Phi, \varnothing ; 1,1 ; \varepsilon, \epsilon ; \kappa, k$.

There is no need to underline Greek or script letters provided these are clearly typed. Any special symbols should be explained on a separate sheet of directions for the printer.

If an author wishes to mark the end of the proof of a theorem, the sign $\square$ may be used.

Footnotes should be avoided.

## 4 Diagrams

Figures and drawings should be on separate sheets in black ink. Photocopies are acceptable only if
they are as clear as the originals. Symbols, legends and captions should be given on a transparent overlay. Each text figure must be numbered as Figure 1, Figure 2,... and its intended position clearly indicated in the typescript. The author's name in pencil must be on all separate sheets of diagrams.

A figure is expensive to reproduce and should be included only when the subject matter demands it, or when it greatly clarifies the exposition.

The publisher recognizes that some authors do not have the facilities for producing drawings of a sufficiently high standard to be reproduced directly and is therefore willing to have such diagrams re-drawn, provided that they are clear.

## 5 Tables

Tables should be numbered (above the table) and set out on separate sheets. Indicate the position of each in the text as for figures.

## 6 References

References should be collected at the end of the paper numbered in alphabetical order of the authors' names. A reference to a book should give the title, in italics, and then in roman type the publisher's name and the place and year of publication;
[4] N. Dunford \& J. T. Schwartz Linear Operators Part I. Wiley: New York, 1958.
A reference to a paper should give in italics the title of the periodical, the number of the volume and year, and the beginning and end pages of the paper. Titles should be abbreviated as in Mathematical Reviews:
[6] J. E. Littlewood. The 'pits effect' for functions in the unit circle. J. Analyse Math. 23 (1970), 236-268.

## 7 Proofs

Authors receive one set of proofs for correction. If excessive alterations to the original manuscript are requested after the paper has been typeset, the author will be charged the cost of resetting. For papers with more than one author the proofs are sent to the first named author unless the editor receives other instructions. It is important that proofs are corrected and returned promptly.

## 8 Reprints

There are 100 reprints, free of charge, for each paper. For papers with several authors these reprints are divided between the authors. There are no page charges.

## Ergodic theory and dynamical systems

## VOLUME 13 PART 4 DECEMBER 1993

## CONTENTS

Boyland, P. Weak disks of Denjoy minimal sets ..... 597
Bratteli, O., Størmer, E., Kishimoto, A, and Rørdam, M. The crossed product of a UHF algebra by a shift ..... 615
Devaney, $R$. L. Knaster-like continua and complex dynamics ..... 627
Ellis, $R$. The enveloping semigroup of projective flows ..... 635
Forrest, A. H. Decomposing isometric extensions using group extensions ..... 661
Hockett. K. Global dynamical properties of Euler and backward Euler ..... 675
El Kacimi Alaoui, A. and Nicolau, M. A class of $C^{\infty}$-stable foliations ..... 697
Kitchens, B. and Schmidt, K. Mixing sets and relative entropies for higher-dimensional Markov shifts ..... 705
Labarca, R. and Plaza, S. Global stability of families of vector fields ..... 737
Lesigne, E. Spectre quasi-discret et théorème ergodique de Wiener- Wintner pour les polynômes ..... 767
Petersen. C. L. On the Pommerenke-Levin-Yoccoz inequality ..... 785
White. H. S. Algorithmic complexity of points in dynamical systems ..... 807
Index to Volume 13 ..... 831

Printed in Great Britain by J. W. Arrowsmith Ltd, Bristol

## CAMBRIDGE UNIVERSITY PRESS



