CAMBRIDGE

New and Forthcoming Titles in Combinatorics!

Forthcoming...

Analytic Combinatorics

Philippe Flajolet and Robert Sedgewick \$90.00: Hardback: 978-0-521-89806-5: 821 pp.

New in Paperback!

Geometric Folding Algorithms Linkages, Origami, Polyhedra

Erik D. Demaine and Joseph O'Rourke \$49.99: Paperback: 978-0-521-71522-5: 496 pp.

Trends in Stochastic Analysis

Edited by Jochen Blath, Peter Mörters, and Michael Scheutzow

London Mathematical Society Lecture Note Series

\$76.00: Paperback: 978-0-521-71821-9: 384 pp.

Groups, Graphs and TreesAn Introduction to the Geometry of Infinite Groups

John Meier

London Mathematical Society Student Texts \$110.00: Hardback: 978-0-521-89545-3: 232 pp. \$40.00: Paperback: 978-0-521-71977-3

Stochastic Approximation A Dynamical Systems Viewpoint

Vivek S. Borkar \$70.00: Hardback: 978-0-521-51592-4: 176 pp.

Combinatorial Games

Tic-Tac-Toe Theory

József Beck

Encyclopedia of Mathematics and its Applications \$170.00: Hardback: 978-0-521-46100-9: 746 pp.

2nd Edition!

Multiply Periodic Functions

H. F. Baker

Cambridge Mathematical Library \$50.00: Paperback: 978-0-521-54648-5: 350 pp.













Prices subject to change.

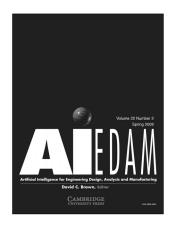
www.cambridge.org/us/mathematics

1-800-872-7423



CAMBRIDGE

JOURNALS



AI EDAM

Artificial Intelligence for Engineering Design, Analysis and Manufacturing

AI EDAM

is available online at journals.cambridge.org/aie

To subscribe contact Customer Services

in Cambridge:

Phone +44 (0)1223 326070 Fax +44 (0)1223 325150 Email journals@cambridge.org

in New York:

Phone (845) 353 7500 Fax (845) 353 4141 Email subscriptions_newyork@cambridge.org

Editor

David C. Brown, Worcester Polytechnic Institute, USA

This journal publishes original articles about significant AI theory and applications based on the most up-to-date research in all branches of phases of emgineering. Suitable topics include: analysis and evaluation; selection; configuration and design; manufacturing and assembly; and concurrent engineering.

Price information is available at journals.cambridge.org/aie

Free email alerts

Keep up-to-date with new material – sign up at journals.cambridge.org/register

For a free online sample visit journals.cambridge.org/aie



JOURNALS



Journal of Functional Programming

Journal of Functional Programming

is available online at journals.cambridge.org/jfp

To subscribe contact Customer Services

in Cambridge:

Phone +44 (0)1223 326070 Fax +44 (0)1223 325150 Email journals@cambridge.org

in New York:

Phone (845) 353 7500 Fax (845) 353 4141 Email subscriptions_newyork@cambridge.org

Editors-In-Chief

Paul Hudak, Yale University, USA Xavier Leroy, INRIA Rocquencourt, France

Journal of Functional Programming is the only journal devoted soley to the design implementation and application of functional programming languages, spanning the range from mathematical theory to industrial practice. Coverage includes functional languages and extensions, implementation techniques, reasoning and proof, program transformation and synthesis, type theory, parallelism and applications.

New in 2008 - Manuscripts can now be submitted electronically using the Manuscript Central System.

Price information is available at journals.cambridge.org/jfp

Free email alerts

Keep up-to-date with new material – sign up at journals.cambridge.org/register

For a free online sample visit journals.cambridge.org/jfp



JOURNALS



Robotica

An Official Journal of the International Federation of Robotics

Robotica

is available online at journals.cambridge.org/rob

To subscribe contact Customer Services

in Cambridge:

Phone +44 (0)1223 326070 Fax +44 (0)1223 325150 Email journals@cambridge.org

in New York:

Phone (845) 353 7500 Fax (845) 353 4141 Email subscriptions_newyork@cambridge.org

Editor-in-Chief

G. S. Chirikjian, Johns Hopkins University, USA

Robotica is a forum for the multidisciplinary subject of robotics and encourages developments, applications and research in this important field of automation with regard to industry, health, education and economic and social aspects. Coverage includes activities in hostile environments, applications in the service and manufacturing industries, biological robots, on-line robots and various other areas.

Price information is available at journals.cambridge.org/rob

Free email alerts

Keep up-to-date with new material – sign up at journals.cambridge.org/register

For a free online sample visit journals.cambridge.org/rob



SUBSCRIPTIONS

Combinatorics, Probability and Computing (ISSN: 0963-5483) is published bimonthly in January, March, May, July, September and November by Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge, CB2 8RU, UK / Cambridge University Press, 40 West 20th Street, New York, N.Y. 10011-4211. The subscription price of Volume 18, 2009 is £308 net (USA, Canada and Mexico US\$616) post free, institutions print and electronic; institutions electronic only £277 / \$554; single parts cost £57 net (USA, Canada and Mexico US\$113) plus postage. Prices include delivery by air. Six parts form a volume. Orders must be accompanied by payment, may be sent to any bookseller, subscription agent or to the publisher: Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge, CB2 8RU, or in the USA, Canada and Mexico to Cambridge University Press, Journals Fulfillment Department, 100 Brook Hill Drive, West Nyack, New York 10994-2133. EU subscribers outside the UK who are not registered for VAT should add VAT at their county's rate. VAT registered subscribers should provide their VAT registration number. Japanese prices for institutions are available from Kinokuniya Company Ltd., P.O. Box 55, Chitose, Tokyo156, Japan. Copies of the Journal for subscribers in the USA, Canada and Mexico are sent by air to New York. Periodical postage paid at New York, N.Y. and additional mailing offices. POSTMASTER Send address changes to Combinatorics, Probability and Computing, Cambridge University Press, 100 Brook Hill Drive, West Nyack, N.Y. 10994-2133.

Claims for missing issues can only be considered if made immediately upon receipt of the subsequent issue. Copies of back numbers are available from Cambridge University Press.

COPYING This journal is registered with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA. 01923, USA. Organisations in the USA who are also registered with the C.C.C. may therefore copy material (beyond the limits permitted by section 107 and 108 of US copyright law) subject to payment to C.C.C. of the per-copy fee of \$16.00. This consent does not extend to multiple copying for promotional or commercial purposes. Code 0963-5483/09 \$16.00. Organisations authorised 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 authorised to supply single copies of separate articles for private use only.

For all other use, permission should be sought from Cambridge University Press.

Cover design by Gabriella Bollobás based on a tessellation by Andreas Dress.

INSTRUCTIONS FOR AUTHORS

Editorial policy The journal welcomes submissions in any of the areas of Combinatorics, Probability, or Computer Science, not just those dealing explicitly with relations between the three. Its scope covers combinatorics in a broad sense, including classical and algebraic graph theory, probabilistic methods, random structures, combinatorial probability and limit theorems for random combinatorial structures; and the theory of algorithms, including complexity theory, randomised algorithms, probabilistic analysis of algorithms, computational learning theory and optimisation.

Submission of manuscripts Authors are strongly encouraged to submit papers electronically, ideally in the form of a pdf or postscript file. Papers should be sent to the editorial office at cpc@msci.memphis.edu, or can alternatively be submitted through any member of the Editorial Board. Papers may also be submitted in hard copy: three copies should be sent accompanied by the author's address, telephone, fax number, and email address.

Submission of a paper is taken to imply that it has not been previously published and that it is not being considered for publication elsewhere. Authors of articles published in the journal assign copyright to Cambridge University Press and will receive a copyright assignment form for signature upon acceptance of their paper.

On final acceptance of a paper, authors will be asked to send LaTeX source code, along with figure files and author-defined macros, to the editorial office. The publisher reserves the right to typeset any article by conventional means if the author's LaTeX code presents problems in production.

Layout of manuscripts Papers should begin with an abstract of not more than 300 words. References should be listed in alphabetical order at the end of the main text.

Proof reading Typographical or factual errors only may be changed at proof stage. The publisher reserves the right to charge authors for correction of non-typographical errors. No page charge is made. The journal sends author proofs in pdf format, but requires a marked hard copy to be returned to the publisher unless corrections are very light. See instructions with the pdf proof.

Offprints 50 offprints of each article will be supplied free to each first named author. Extra offprints may be purchased from the publisher if ordered at proof stage.



Combinatorics, Probability & Computing

CONTENTS

Introduction	1
Dedication	2
Perturbed Identity Matrices Have High Rank: Proof and Applications NOGA ALON	3
Majority Bootstrap Percolation on the Hypercube JÓZSEF BALOGH, BÉLA BOLLOBÁS AND ROBERT MORRIS	17
Deciding Relaxed Two-Colourability: A Hardness Jump R. BERKE AND T. SZABÓ	53
Line-of-Sight Percolation BÉLA BOLLOBÁS, SVANTE JANSON AND OLIVER RIORDAN	83
Intersecting Families are Essentially Contained in Juntas IRIT DINUR AND EHUD FRIEDGUT	107
Deterministic Random Walks on the Two-Dimensional Grid BENJAMIN DOERR AND TOBIAS FRIEDRICH	123
Line-of-Sight Networks ALAN FRIEZE, JON KLEINBERG, R. RAVI AND WARREN DEBANY	145
The Ramsey Number for 3-Uniform Tight Hypergraph Cycles P. E. HAXELL, T. ŁUCZAK, Y. PENG, V. RÖDL, A. RUCIŃSKI AND J. SKOKAN	165
The Probability That a Random Multigraph is Simple SVANTE JANSON	205
Learning Complexity vs Communication Complexity NATI LINIAL AND ADI SHRAIBMAN	227
Constrained Ramsey Numbers PO-SHEN LOH AND BENNY SUDAKOV	247
Upper Bounds for Online Ramsey Games in Random Graphs MARTIN MARCINISZYN, RETO SPÖHEL AND ANGELIKA STEGER	259
Online Ramsey Games in Random Graphs MARTIN MARCINISZYN, RETO SPÖHEL AND ANGELIKA STEGER	271

Cambridge Journals Online

For further information about this journal please go to the journal website at: **journals.cambridge.org/cpc**

CAMBRIDGE UNIVERSITY PRESS