

Volume 3 Number 4 December 1994



*Combinatorics,
Probability &
Computing*

Editor-in-Chief: Béla Bollobás

Managing Editors: Graham Brightwell, Andrew Thomason

Editors:

Noga Alon
László Babai
Jean-Claude Bermond
Norman Biggs
Walter Deuber
Martin Dyer
Geoff Eagleson
Peter Frankl
Alan Frieze
Ron Graham
Mark Jerrum
Jeff Kahn
Frank Kelly
Greg Lawler
Brendan McKay
James Oxley
Alexander Razborov
Vera Sós
Umesh Vazirani
Peter Winkler



Cambridge University Press

EDITOR-IN-CHIEF

BÉLA BOLLOBÁS

Department of Pure Mathematics and Mathematical Statistics, 16 Mill Lane,
Cambridge CB2 1SB, Email: B.Bollobas@pmms.cam.ac.uk

MANAGING EDITORS

GRAHAM BRIGHTWELL

Department of Statistical and Mathematical
Sciences, London School of Economics,
Houghton Street, London, WC2A 2AE,
Email: grb10@phx.cam.ac.uk

ANDREW THOMASON

Department of Pure Mathematics and
Mathematical Statistics, 16 Mill Lane,
Cambridge CB2 1SB,
Email: A.G.Thomason@pmms.cam.ac.uk

EDITORIAL BOARD

NOGA ALON

Department of Mathematics, Tel Aviv
University, Ramat Aviv, 69978 Tel Aviv,
Israel,

Email: noga@math.tau.ac.il

Probabilistic methods in combinatorics

LÁSZLÓ BABAI

Department of Computer Science,
University of Chicago, 1100 East 58th
Street, Chicago, IL 60637,

Email: laci@cs.uchicago.edu

Algebraic methods, finite groups, algorithms

JEAN-CLAUDE BERMOND

13S CNRS, Université de Nice – Sophia
Antipolis, Bat ESSI, 930 route des Colles,
BP 145, F-06903 Sophia Antipolis Cedex,
France,

Email: bermond@mimosa.unice.fr

Interconnection networks, graph theory and

parallel computing

NORMAN BIGGS

Department of Statistical and
Mathematical Sciences, London School of
Economics, Houghton Street, London
WC2A 2AE,

Email: biggs@vax.lse.ac.uk

Algebraic combinatorics, computational

learning theory

WALTER DEUBER

Fakultät für Mathematik, Universität

Bielefeld, Postfach 8640,

D-4800 Bielefeld I, Germany,

Email: deuber@mathematik.uni-bielefeld.de

Ramsey theory

MARTIN DYER

School of Computer Studies, University of

Leeds, Leeds LS2 9JT,

Email: dyer@dcs.leeds.ac.uk

Algorithms and complexity theory

GEOFF EAGLESON

Australian Graduate School of
Management, U.N.S.W. P.O.Box 1,
Kensington, NSW 2033, Australia,

Email: GeoffE@agsm.unsw.oz.au

Probability theory, limit theorems

PETER FRANKL

Shibuya-ku, Higashi 1-10-3-301,

Tokyo, Japan

and

CNRS, ER175 Combinatoire 54 Bd. Raspail,

F-75006 Paris, France,

Email: combinatorics@cs.meiji.ac.jp

Hypergraphs, set systems

ALAN FRIEZE

Department of Mathematics, Carnegie-

Mellon University, Pittsburgh, PA 15213,

Email: aflp+@andrew.cmu.edu

Random graphs, algorithms

RON GRAHAM

AT&T Bell Laboratories, 2T102

600 Mountain Avenue, Murray Hill, N.J.

07974, Email: rig@research.att.com

Discrete mathematics, combinatorial probability

MARK JERRUM

Department of Computer Science, The

University of Edinburgh, The King's

Buildings, Edinburgh EH9 3JZ,

Email: mrj@dcs.ed.ac.uk

Randomised algorithms, complexity theory

JEFF KAHN

Department of Mathematics, Rutgers

University, New Brunswick, NJ 08903,

Email: jkahn@elbereth.rutgers.edu

Extra-combinatorial methods, hypergraphs

FRANK KELLY

Department of Pure Mathematics and

Mathematical Statistics, 16 Mill Lane,

Cambridge CB2 1SB,

Email: F.P.Kelly@statslab.cam.ac.uk

Applied probability, optimization, network flow

GREG LAWLER

Department of Mathematics, Box 90320,

Duke University, Durham,

NC 27708-0320, USA,

Email: jose@math.duke.edu

Probability theory

BRENDAN MCKAY

Computer Science Department, Australian

National University, G.P.O. Box 4,

Canberra, ACT 2601, Australia,

Email: bdm@anucsd.anu.edu.au

Probability theory, enumeration, asymptotics

JAMES OXLEY

Department of Mathematics, Louisiana

State University, Baton Rouge, LA

70803-4918,

Email: oxley@marais.math.lsu.edu

Matroid theory

ALEXANDER RAZBOROV

Steklov Mathematical Institute,

Vavilova 42, GSP-1, 117966 Moscow,

Email: razb@log.mian.su

Boolean complexity theory

VERA SÓS

Mathematical Research Institute,

Reáltanoda utca 13-15, P.O. Box 127,

H-1364 Budapest, Hungary,

Email: 1014sos@ella.hu

Graph theory, combinatorics, number theory

UMESH VAZIRANI

Department of Electrical Engineering and

Computer Science, University of California

at Berkeley, Berkeley, CA 94720,

Email: vazirani@vina.berkeley.edu

Complexity theory, randomized algorithms

PETER WINKLER

AT & T Bell Laboratories, Room 2D - 147,

600 Mountain Avenue, Murray Hill, NJ

07974-0636, USA,

Email: pw@research.att.com

Posets, random structures

© CAMBRIDGE UNIVERSITY PRESS 1994

SUBSCRIPTIONS

Combinatorics, Probability & Computing (ISSN: 0963-5483) is published quarterly in March, June, September and December. The subscription price of Volume 3, 1994, is £91 net (USA, Canada and Mexico US\$167) post free; single parts cost £24 net (USA, Canada and Mexico US\$43) plus postage. Four parts form a volume. Orders, which 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 2RU, or in the USA, Canada and Mexico to Cambridge University Press, The Journals Department, 40 West 20th Street, New York, NY 10011-4211, USA. Copies of the journal for subscribers in the USA, Canada and Mexico are sent by air to New York to arrive with minimum delay. Second class postage paid at New York, NY and at additional mailing offices. Japanese prices for institutions (including ASP delivery) are available from Kinokuniya Company Ltd, P.O. Box 55, Chitose, Tokyo 156, Japan.

POSTMASTER: Send address changes to USA, Canada and Mexico to *Combinatorics, Probability & Computing*, Cambridge University Press, 110 Midland Avenue, Port Chester, NY 10573-4930, USA.

Claims for missing issues should be made immediately on receipt of the subsequent issue.

COPYING

This journal is registered with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA. 01923. 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 \$5.00. This consent does not extend to multiple copying for promotional or commercial purposes. Code 0963 5483/93 \$5.00 + .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 or the American branch of Cambridge University Press.

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