Functional Programming

VOLUME 4 PART 3 JULY 1994

CAMBRIDGE UNIVERSITY PRESS'



EDITORS

Professor Henk Barendregt

Department of Computer Science Catholic University Nijmegen

Toernooiveld 1 6525 ED Nijmegen The Netherlands henk@cs.kun.nl

Professor Paul Hudak

Department of Computer Science Yale University

New Haven CT 06520 USA

hudak@yale.edu

Professor John Hughes

Department of Computer Sciences Chalmers University of Technology S-412 96 Göteborg

Sweden rjmh@cs.chalmers.se

Professor Simon L. Pevton Jones

Department of Computing Science University of Glasgow Glasgow G12 8QQ

UK

simonpj@dcs.glasgow.ac.uk

Professor Philip Wadler

Department of Computing Science University of Glasgow

Glasgow G12 8QQ

wadler@dcs.glasgow.ac.uk

EDITORIAL ASSISTANT

Jon Ritchie

Department of Computing Science University of Glasgow

Glasgow G12 800

ion@dcs.glasgow.ac.uk

EDITORIAL BOARD

Arvind

MIT Lab for Computer Science 545 Technology Square Cambridge MA 02139 USA

Lennart Augustsson

Department of Computer Science Chalmers University of Technology S-412 96 Göteborg

Sweden

Richard S. Bird

Oxford University Computing

Laboratory

Programming Research Group

8-11 Keble Road Oxford OX1 3QD

UK

F. Warren Burton

Department of Computer Science

Simon Fraser University

Burnaby

British Columbia V5A 1S6

Canada

Pierre-Louis Curien

CNRS-LIENS Ecole Normale Supérieure

45 rue d'Ulm F-75230 Paris France

Chris Hankin

Department of Computing Science

Imperial College 180 Oueen's Gate London SW7 2BZ

UK

Robert Harper

School of Computer Science Carnegie Mellon University Pittsburgh PA 15213-3890

USA

Thomas Johnsson

Department of Computer Science Chalmers University of Technology

S-412 96 Göteborg

Sweden

Neil D. Jones

DIKU

Universitetsparken 1,

DK-2100 Copenhagen Ø Denmark

Richard B. Kieburtz

Dept. of Computer Science &

Engineering

Oregon Graduate Institute 19600 NW von Neumann Drive

Reaverton

Oregon 97006-1999 USA

David MacQueen

AT&T Laboratories

Rm 2C-322

600 Mountain Avenue

Murray Hill NJ 07974 USA

G. E. Mints

Stanford University

Stanford CA 94305

Dept. of Philosophy

USA

John C. Mitchell

Department of Computer Science Margaret Jacks Hall Stanford University Stanford CA 94305-2140

LISA

Rishivur S. Nikhil

Digital Equipment Corporation Cambridge Research Laboratory One Kendall Square, Bldg. 700 Cambridge MA 02139

USA

John T. O'Donnell

Department of Computing Science

University of Glasgow Glasgow G12 8QQ

UK

Colin Runciman

Department of Computer Science

University of York Heslington York YO1 5DD

Mitchell Wand

College of Computer Science

169 Cullinane Hall Northeastern University Boston MA 02115

USA

John H. Williams

IBM Almaden Research Center

K53/803

650 Harry Road

San Jose, CA 95120-6099

USA

SUBSCRIPTIONS

Journal of Functional Programming (ISSN: 0956-7968) is published quarterly in January, April, July and October. The subscription price (excluding VAT) of Volume 4, 1994, is £82 net (USA, Canada and Mexico US\$142) post free; single parts cost £22 net (USA, Canada and Mexico US\$37) plus postage. Four parts form a volume. EC subscribers (outside the UK) who are not registered for VAT should add VAT at their country's rate. VAT registered subscribers should provide their VAT registration number. 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, NY10011-4211, 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.

Postmaster: send address changes in USA, Canada and Mexico to Journal of Functional Programming, Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211.

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