

Springer

Berlin

Heidelberg

New York

Barcelona

Hong Kong

London

Milan

Paris

Singapore

Tokyo

Olivier Danvy Andrzej Filinski (Eds.)

Programs as Data Objects

Second Symposium, PADO 2001
Aarhus, Denmark, May 21-23, 2001
Proceedings



Springer

Series Editors

Gerhard Goos, Karlsruhe University, Germany
Juris Hartmanis, Cornell University, NY, USA
Jan van Leeuwen, Utrecht University, The Netherlands

Volume Editors

Olivier Danvy
Andrzej Filinski
BRICS, Department of Computer Science, University of Aarhus
Ny Munkegade, Building 540, 8000 Aarhus, Denmark
E-mail: {danvy/andrzej}@brics.dk

Cataloging-in-Publication Data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Programs as data objects : second symposium ; proceedings / PADO 2001,
Aarhus, Denmark, May 21 - 23, 2001. Olivier Danvy ; Andrzej Filinski
(ed.). - Berlin ; Heidelberg ; New York ; Barcelona ; Hong Kong ;
London ; Milan ; Paris ; Singapore ; Tokyo : Springer, 2001
(Lecture notes in computer science ; Vol. 2053)
ISBN 3-540-42068-1

CR Subject Classification (1998): F.3, D.3, F.4.1, D.2

ISSN 0302-9743

ISBN 3-540-42068-1 Springer-Verlag Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer-Verlag. Violations are liable for prosecution under the German Copyright Law.

Springer-Verlag Berlin Heidelberg New York
a member of BertelsmannSpringer Science+Business Media GmbH

<http://www.springer.de>

© Springer-Verlag Berlin Heidelberg 2001
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Boller Mediendesign
Printed on acid-free paper SPIN: 10781527 06/3142 5 4 3 2 1 0

Preface

This volume constitutes the proceedings of the Second Symposium on Programs as Data Objects (PADO-II), held at the University of Aarhus, Denmark, on May 21–23, 2001. PADO-II was colocated with the Third International Workshop on Implicit Computational Complexity (ICC 2001) and the Seventeenth Conference on the Mathematical Foundations of Programming Semantics (MFPS XVII).

The first PADO was organized by Harald Ganzinger and Neil Jones, in 1985. This second symposium took place at the occasion of Neil Jones's 60th birthday, and on his wish, we organized it as a research event. The call for papers was open and elicited 30 submissions from 12 countries. Overall, 145 reviews were collected, and based on these, the program committee selected 14 papers for presentation. With one exception, each submission received at least 4 reviews. Where relevant, a transcript of the (electronic) PC meeting was also enclosed.

PADO-II was sponsored by BRICS¹ and the Esprit Working Group APPSEM, and organized in cooperation with the European Association for Programming Languages and Systems (EAPLS) and the Special Interest Group on Programming Languages of the Association for Computing Machinery (ACM SIGPLAN). We gratefully acknowledge their support.

We also extend our thanks to the PC members and external reviewers for their time and thoughts, Janne Kroun Christensen and Karen Kjær Møller for their organizational help, the <bigwig> project for hosting our submission web site, and Daniel Damian for setting it up and maintaining it.

February 2001

Olivier Danvy and Andrzej Filinski

¹ Basic Research in Computer Science (www.brics.dk), funded by the Danish National Research Foundation.

Conference Organization

Conference Co-chairs

Oliver Danvy, BRICS, University of Aarhus, Denmark

Andrzej Filinski, BRICS, University of Aarhus, Denmark

Program Committee

Torben Amtoft	Boston University, USA
Charles Consel	LaBRI / ENSERB, France
Catarina Coquand	Chalmers University, Sweden
Radhia Cousot	Ecole Polytechnique, France
Olivier Danvy	University of Aarhus, Denmark
Andrzej Filinski	University of Aarhus, Denmark
Yoshihiko Futamura	Waseda University, Japan
Fritz Henglein	IT University, Denmark
Peter Lee	Carnegie Mellon University, USA
Y. Annie Liu	SUNY Stony Brook, USA
Dave MacQueen	Bell Labs, USA
James S. Royer	Syracuse University, USA
Morten Heine Sørensen	IT Practice, Denmark
Carolyn L. Talcott	Stanford University, USA
Jon L White	CommerceOne, Inc., USA

Additional Referees

Zino Benaissa, Edoardo S. Biagioni, Howard A. Blair, Craig Chambers, Weingan Chin, Lars R. Clausen, Pierre Cointe, Thierry Coquand, Niels Damgaard, Daniel Damian, Damien Doligez, Rémi Douence, R. Kent Dybvig, Pavel Emelianov, Gilberto Filé, John Gallagher, Roberto Giacobazzi, Robert Glück, John Hatcliff, Nevin Heintze, Thomas Hildebrandt, Zhenjiang Hu, Dieter Hutter, Kazuhiko Kakehi, Jerzy Karczmarczuk, Andy King, Naoki Kobayashi, Zenjiro Konishi, Kim G. Larsen, Mario Latendresse, Julia L. Lawall, Michael Leuschel, Jakob Lichtenberg, Francesco Logozzo, Henning Makholm, Jacques Malenfant, Brian Mayoh, Antoine Miné, Torben Æ. Mogensen, Eugenio Moggi, David Monniaux, Peter D. Mosses, Joachim Niehren, Susan Older, Alberto Pettorossi, François Pottier, Maurizio Proietti, Arne Ranta, Jakob Rehof, John Reppy, Laurent Réveillère, Martin C. Rinard, Kristoffer H. Rose, Abhik Roychoudhury, Louis Salvail, João Saraiva, David A. Schmidt, Jens Peter Secher, Mario Südholt, S. Doaitse Swierstra, Harald Søndergaard, Arnaud Venet, Hongwei Xi, Zhe Yang, Kwangkeun Yi.

Table of Contents

Invited Opening Talk

Program Analysis for Implicit Computational Complexity	1
<i>Neil D. Jones</i>	

Contributed Papers

Deriving Pre-conditions for Array Bound Check Elimination	2
<i>Wei-Ngan Chin, Siau-Cheng Khoo, Dana N. Xu</i>	
Type Systems for Useless-Variable Elimination	25
<i>Adam Fischbach, John Hannan</i>	
Boolean Constraints for Binding-Time Analysis	39
<i>Kevin Glynn, Peter J. Stuckey, Martin Sulzmann, Harald Søndergaard</i>	
Constraint Abstractions	63
<i>Jörgen Gustavsson, Josef Svenningsson</i>	
Implementing Circularity Using Partial Evaluation	84
<i>Julia L. Lawall</i>	
Combining Forward and Backward Analyses of Temporal Properties	103
<i>Damien Massé</i>	
Numerical Power Analysis	117
<i>Isabella Mastroeni</i>	
Run-Time Bytecode Specialization	138
<i>Hidehiko Masuhara, Akinori Yonezawa</i>	
A New Numerical Abstract Domain Based on Difference-Bound Matrices	155
<i>Antoine Miné</i>	
Partial Evaluation for Class-Based Object-Oriented Languages	173
<i>Ulrik P. Schultz</i>	
Driving in the Jungle	198
<i>Jens Peter Secher</i>	
Higher-Order Pattern Matching for Automatically Applying Fusion Transformations	218
<i>Ganesh Sittampalam, Oege de Moor</i>	

Dynamic Partial Evaluation	238
<i>Gregory T. Sullivan</i>	
Tag Elimination and Jones-Optimality	257
<i>Walid Taha, Henning Makholm, John Hughes</i>	
Invited Closing Talk	
Bottom-Up Deduction with Deletion and Priorities	276
<i>Harald Ganzinger</i>	
Author Index	279