

Lecture Notes in Computer Science

902

Edited by G. Goos, J. Hartmanis and J. van Leeuwen

Advisory Board: W. Brauer D. Gries J. Stoer

Mariangiola Dezani-Ciancaglini
Gordon Plotkin (Eds.)

Typed Lambda Calculi and Applications

Second International Conference
on Typed Lambda Calculi and Applications, TLCA '95
Edinburgh, United Kingdom, April 10-12, 1995
Proceedings



Springer

Series Editors

Gerhard Goos

Universität Karlsruhe

Vincenz-Priessnitz-Straße 3, D-76128 Karlsruhe, Germany

Juris Hartmanis

Department of Computer Science, Cornell University

4130 Upson Hall, Ithaca, NY 14853, USA

Jan van Leeuwen

Department of Computer Science, Utrecht University

Padualaan 14, 3584 CH Utrecht, The Netherlands

Volume Editors

Mariangiola Dezani-Ciancaglini

Department of Computer Science, University of Turin

Corso Svizzera, 185, I-10149 Turin, Italy

Gordon Plotkin

Department of Computer Science, University of Edinburgh

The King's Buildings, Mayfield Road, Edinburgh EH9 3JZ, United Kingdom

CR Subject Classification (1991): F.4.1, F.3.0, D.1.1

ISBN 3-540-59048-X Springer-Verlag Berlin Heidelberg New York

CIP data applied for

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 1995

Printed in Germany

Typesetting: Camera-ready by author

SPIN: 10485422

45/3140-543210 - Printed on acid-free paper

Preface

This volume is the proceedings of the Second International Conference on Typed Lambda Calculi and Applications, TLCA'95, held in Edinburgh, Scotland, from April 10 to April 12, 1995. There are 29 papers concerning the following topics:

- Proof theory of type systems;
- Logic and type systems;
- Typed λ -calculi as models of (higher-order) computation;
- Semantics of type systems;
- Proof verification via type systems;
- Type systems of programming languages;
- Typed term rewriting systems.

These were selected from a total of 58 submissions, of generally high quality.

We wish to express our gratitude to all the members of the Program Committee, and to the many referees who assisted them. Moreover, we would like to thank the members of the Organizing Committee and all those who submitted papers. Finally, we greatly appreciate the excellent cooperation with Springer-Verlag.

The lambda calculus has served as a source of ideas, problems and applications in computer science for over thirty years. This volume demonstrates its continuing vitality.

Turin, January 1995

Mariangiola Dezani-Ciancaglini

Gordon Plotkin

Program Committee

H. Barendregt	(Catholic University of Nijmegen)
M. Dezani	(Chairperson, University of Turin)
J-Y. Girard	(University of Marseilles)
R. Hindley	(University of Swansea)
F. Honsell	(University of Udine)
J. W. Klop	(CWI)
G. Longo	(ENS)
A. Meyer	(MIT)
G. Plotkin	(University of Edinburgh)
P. Scott	(University of Ottawa)
J. Smith	(University of Gothenburg/Chalmers)
J. Tiuryn	(University of Warsaw)

Referees

F. Alessi	T. Altenkirch	G. Amiot
F. Barbanera	E. Barendsen	G. Barthe
L.S. van Benthem Jutting	S. Berardi	C. Berline
M. Bezem	M. Boffa	G. Boudol
R. Blute	F. Cardone	G. Castagna
J.R.B. Cockett	M. Coppo	T. Coquand
A. Compagnoni	R.L. Crole	D. Cubric
P.L. Curien	W. Dekkers	R. Di Cosmo
P. Di Gianantonio	G. Dowek	P. Dybjer
T. Ehrhard	D. Fridlender	H. Geuvers
P. Giannini	G. Ghelli	M. Grabowski
P. de Groote	T. Hurkens	B. Intrigila
B. Jacobs	J.P. Jouannaud	R. Hasegawa
M. Hofmann	D. Kesner	Y. Lafont
M. Lenisa	U. de' Liguoro	P. Lincoln
P. Malacaria	S. Martini	J. Mason
E. Meijer	M. Miculan	E. Moggi
R. Nederpelt	V. van Oostrom	J. Otto
C. Paulin-Mohring	A. Piperno	E. Poll
R. Pollack	F. van Raamsdonk	L. Regnier
J.G. Riecke	S. Ronchi della Rocca	P. Rosolini
L. Roversi	M. Ruys	A. Salibra
A. Schubert	R.A.G. Seely	R. Statman
P. Urzyczyn	R.C. de Vrijer	B. Werner

Organizing Committee

G. Cleland, P. Gardner, M. Lekuse, G. Plotkin (University of Edinburgh)

Table of Contents

Comparing λ-calculus translations in sharing graphs	
<i>A. Asperti, C. Laneve</i>	1
Extensions of pure type systems	
<i>G. Barthe</i>	16
A model for formal parametric polymorphism: a PER interpretation for system $\mathcal{R}$	
<i>R. Bellucci, M. Abadi, P.-L. Curien</i>	32
A realization of the negative interpretation of the Axiom of Choice	
<i>S. Berardi, M. Bezem, T. Coquand</i>	47
Using subtyping in program optimization	
<i>S. Berardi, L. Boerio</i>	63
What is a categorical model of intuitionistic linear logic?	
<i>G.M. Bierman</i>	78
An explicit <i>Eta</i> rewrite rule	
<i>D. Briaud</i>	94
Extracting text from proofs	
<i>Y. Coscoy, G. Kahn, L. Théry</i>	109
Higher-order abstract syntax in Coq	
<i>J. Despeyroux, A. Felty, A. Hirschowitz</i>	124
Expanding extensional polymorphism	
<i>R. Di Cosmo, A. Piperno</i>	139
Lambda-calculus, combinators and the comprehension scheme	
<i>G. Dowek</i>	154
$\beta\eta$-equality for coproducts	
<i>N. Ghani</i>	171
Typed operational semantics	
<i>H. Goguen</i>	186
A simple calculus of exception handling	
<i>P. de Groote</i>	201
A simple model for quotient types	
<i>M. Hofmann</i>	216

Untyped λ-calculus with relative typing	
<i>M.R. Holmes</i>	235
Final semantics for untyped λ-calculus	
<i>F. Honsell, M. Lenisa</i>	249
A simplification of Girard's paradox	
<i>A.J.C. Hurkens</i>	266
Basic properties of data types with inequational refinements	
<i>H. Kondoh</i>	279
Decidable properties of intersection type systems	
<i>T. Kurata, M. Takahashi</i>	297
Termination proof of term rewriting system with the multiset path ordering. A complete development in the system Coq	
<i>F. Leclerc</i>	312
Typed λ-calculi with explicit substitutions may not terminate	
<i>P.A. Mellies</i>	328
On equivalence classes of interpolation equations	
<i>V. Padovani</i>	335
Strict functionals for termination proofs	
<i>J. van de Pol, H. Schwichtenberg</i>	350
A verified typechecker	
<i>R. Pollack</i>	365
Categorical semantics of the call-by-value λ-calculus	
<i>A. Pravato, S. Ronchi della Rocca, L. Roversi</i>	381
A fully abstract translation between a λ-calculus with reference types and standard ML	
<i>E. Ritter, A.M. Pitts</i>	397
Categorical completeness results for the simply-typed λ-calculus	
<i>A.K. Simpson</i>	414
Third-order matching in the presence of type constructors	
<i>J. Springintveld</i>	428
Author Index	443