

Lecture Notes in Computer Science

581

Edited by G. Goos and J. Hartmanis

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



J.-C. Raoult (Ed.)

CAAP '92

17th Colloquium on Trees in Algebra
and Programming

Rennes, France, February 26–28, 1992

Proceedings

Springer-Verlag

Berlin Heidelberg New York

London Paris Tokyo

Hong Kong Barcelona

Budapest

Series Editors

Gerhard Goos
Universität Karlsruhe
Postfach 69 80
Vincenz-Priessnitz-Straße 1
W-7500 Karlsruhe, FRG

Juris Hartmanis
Department of Computer Science
Cornell University
5148 Upson Hall
Ithaca, NY 14853, USA

Volume Editor

Jean-Claude Raoult
IRISA, University of Rennes
Campus Universitaire de Beaulieu, Avenue du Général Leclerc
35042 Rennes Cedex, France

CR Subject Classification (1991): D.1, E.1, F

ISBN 3-540-55251-0 Springer-Verlag Berlin Heidelberg New York
ISBN 0-387-55251-0 Springer-Verlag New York Berlin Heidelberg

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 1992
Printed in Germany

Typesetting: Camera ready by author
Printing and binding: Druckhaus Beltz, Hemsbach/Bergstr.
45/3140-543210 - Printed on acid-free paper

Preface

This seventeenth Colloquium on Trees in Algebra and Programming was held jointly with the European Symposium on Programming, in Rennes, February 26-28, 1992. The previous colloquia were held in France, Italy, Germany, Spain, Denmark and England. Every even year, as in 1992, it is held jointly with ESOP; every other year, it is part of TAPSOFT (Theory And Practice of SOFTWARE development). The proceedings of ESOP appear in an accompanying volume of Lecture Notes in Computer Science.

In the beginning, CAAP was devoted to algebraic and combinatorial properties of trees, and to their role in various fields of computer science. As the reader will notice, the scope of CAAP has been extended to other discrete structures, like graphs, equations and transformations of graphs, and their links with logical theories. The programme committee received 40 submissions (one being too late), from which 18 were selected.

ESOP addresses fundamental issues and important developments in the specification and implementation of programming languages and systems. It continues lines begun in France and Germany under the names "Colloque sur la Programmation" and the GI workshop on "Programmiersprachen und Programmentwicklung". The programme committee received 71 submissions, from which 26 were selected.

Programme Committee for

CAAP

A. Arnold (Bordeaux)
A. Bertoni (Milano)
P. Darondeau (Rennes)
M. Dauchet (Lille)
R. De Nicola (Pisa)
M. Dezani-Ciancaglini (Torino)
J.W. Klop (Amsterdam)
M. Nivat (Paris)
A. Poigné (St. Augustin)
J.-C. Raoult (Rennes)*
M. Steinby (Turku)
C. Stirling (Edinburgh)
W. Thomas (Kiel)
J. Tiuryn (Warsaw)

(*chairmen)

ESOP

E. Astesiano (Genova)
G. Cousineau (Paris)
O.-J. Dahl (Oslo)
H. Kirchner (Nancy)
B. Krieg-Brückner (Bremen)*
T. Maibaum (London)
P. Mosses (Aarhus)
B. Nordström (Göteborg)
F. Orejas (Barcelona)
D. Sannella (Edinburgh)
P. Wadler (Glasgow)
R. Wilhelm (Saarbrücken)

Invited Speakers for

CAAP

Bruno Courcelle (Paris)
Harald Ganzinger (Saarbrücken)

ESOP

Ole-Johan Dahl (Oslo)
Andrezj Tarlecki (Warsaw)

The colloquium was sponsored by INRIA, CNRS, and the University of Rennes, and supported by GI, the University of Bremen, and the township of Rennes.

I wish to express my gratitude to all the members of the programme committees, as well as the referees listed below for their care in reviewing the submitted papers; I also thank Elisabeth Lebret, who took care efficiently of many details of the local organization.

Rennes, January 1992

Jean-Claude Raoult

List of Referees for CAAP 1992

André Arnold	G. Mauri
Egidio Astesiano	E. Moggi
Alberto Bertoni	Fritz Müller
M.A. Bonuccelli	David Murphy
Ahmed Bouajjani	Rocco De Nicola
Gérard Boudol	D. Niwinski
J.C. Bradfield	J.G. Penaud
Manfred Broy	Michele Pinna
Danilo Bruschi	V. van Oostrom
Felice Cardone	G. Pighizzini
Didier Caucal	Ramon Pino Perez
Mario Coppo	Adolfo Piperno
Philippe Darondeau	Detlef Plump
Max Dauchet	Axel Poigné
Mariangiola Dezani-Ciancaglini	Andreas Potthoff
Frank Drewes	E. Rachini
Hartmut Ehrig	Jean-Claude Raoult
D. Frutos Escrig	Ronchi Della Rocca
G. Faglia	Kay Salomaa
Boubakar Gamatié	Davide Sangiorgi
S. Gnesi	S. Seibert
Annegret Habel	Magnus Steinby
Furio Honsell	Colin Stirling
Ulrich Hustadt	Wolfgang Thomas
P. Inverardi	Sophie Tison
Claude Jard	Jerzy Tiuryn
Jean-Pierre Jouannaud	Pawel Urzyczyn
Richard Kennaway	E. Valkema
A.J. Kfoury	Fer-Jan de Vries
Jan Willem Klop	R.C. de Vrijer
Hans-Jörg Kreowski	Wand
Michel Latteux	Th. Wilke
Ugo de'Liguoro	M. Zacchi
Michael Löwe	W. Zielonka

Contents

A constructive valuation interpretation for classical logic and its use in witness extraction <i>F. Barbanera, S. Berardi</i>	1
Varieties of increasing trees <i>F. Bergeron, P. Flajolet, B. Salvy</i>	24
Origin functions in λ -calculus and term rewriting systems <i>Y. Bertot</i>	49
An algebraic approach to the interpretation of recursive types. <i>F. Cardone</i>	66
Decidability of reachability and disjoint union of term rewriting systems <i>A.-C. Caron</i>	86
A complete type inference algorithm for simple intersection types <i>M. Coppo, P. Giannini</i>	102
Monadic second-order definable graph transductions <i>B. Courcelle</i>	124
CTL* and ECTL* as fragments of the modal μ -calculus <i>M. Dam</i>	145
Power domains supporting recursion and failure <i>R. Heckmann</i>	165
Parallel contraction of Fibonacci trees and prefix computations on a family of interconnection topologies <i>W.-J. Hsu, C.V. Page, J. Liu</i>	182
Must preorder in non-deterministic untyped λ -calculus <i>U. de'Liguoro, A. Piperno</i>	203
A programming language for deriving hypergraphs <i>A. Maggiolo-Schettini, J. Winkowski</i>	221
Graph-grammars as context-dependent rewriting systems: a partial ordering semantics <i>U. Montanari, F. Rossi</i>	232

Empty stack pushdown ω -tree automata	248
<i>W. Peng, S. Purushothaman</i>	
Modulo counting quantifiers over finite trees	265
<i>A. Pothoff</i>	
Finite tree automata with cost functions	279
<i>H. Seidl</i>	
Partial type assignment in left-linear applicative term rewriting systems	300
<i>S. van Bakel., S. Smetsers, S. Brock</i>	
A linear algorithm for solving fixed-point equations on transition systems	322
<i>B. Vergauwen, J. Lewi</i>	
Beyond conditional equations: quasi-initial semantics for parametric algebraic specifications	342
<i>U. Wolter, M. Löwe</i>	