

# Lecture Notes in Computer Science

Edited by G. Goos and J. Hartmanis

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## Rewriting Techniques and Applications

Dijon, France, May 20–22, 1985

Edited by Jean-Pierre Jouannaud



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## Foreword

This *First International Conference on Rewriting Techniques and Applications*, held in Dijon, Burgundy, France, May 20–22, 1985, was preceded by an earlier workshop at Schenectady, New York, USA. This first Workshop was organized as an answer to the surge of interest in term rewriting techniques. This surge has been sparked both by significant progress in understanding the theoretical aspects of rewriting systems and by the development of important new applications to these systems.

While the progress of research into rewriting systems has been significant, it has been impeded by the inordinate difficulty of implementing and using the increasingly complex algorithms prevalent in state-of-the-art term rewriting research. The main purpose of the first workshop was to offer to a wide community an easy access to sophisticated softwares.

Today, those software are used by a very large community and support many applications, some of them being described in these proceedings. Our goal now is to provide a regular forum for people working in the field of term rewriting or using term rewriting techniques in other fields of computer science. This conference proves the need of such a forum, both by focusing on new important advances in term rewriting technologies, and on new applications. I hope that this is a good start towards a regular international conference.

To emphasize the success of the conference, the committee decided to award Kathy Yelick, for her paper *Combining unification algorithms for confined regular equational theories*. The reasons are the following:

- Unification is a main topic in term rewriting techniques, and we are pleased to recognize a significant contribution in this area.
- Kathy Yelick is currently completing her master's degree at MIT, and we are pleased to recognize a major advance in this field by a young student.
- Yelick's paper solves a problem left open for many years: how to obtain a complete unification algorithm for a combination of theories that individually have a complete unification algorithm. More precisely, she shows how to lift a complete unification algorithm for the variable only case of each individual theory to a complete unification algorithm for the whole theory, under two basic assumptions on individual theories: they must be *confined* (i.e., involve different sets of symbols); they must be *regular* (i.e., the axioms must have exactly the same variables on their left and right hand sides, and a variable cannot be a left or right hand side of an axiom).

As a particular consequence, she obtains a completeness proof for Stickel's famous associative-commutative unification algorithm. As she points out, lifting the variable only case was the main difficulty of this algorithm, whose termination was only recently proved by François Fages in a paper published in the proceedings of CADE, 1984.

A few others should be mentioned, because they have made similar or related progress in this area: Claude Kirchner from Nancy, recently addressed the same problem, independently from Kathy Yelick. Based on a different approach, his algorithm is able to handle erasing axioms. However, theories are also assumed to be permutative, i.e., have finite congruence classes. Although they are different, both algorithms use complexity measures in order to prove termination. Not surprisingly, both complexity measures are variations around Fages's complexity measure used for proving termination of Stickel's algorithm. Fages's work should therefore also be recognized as a major step towards these new advances.

I finally want to thank many people for their help:

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Jean-Pierre Jouannaud

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## CONTENTS

Basic Features and Development of the Critical-Pair/Completion Procedure invited Lecture by B. Buchberger .....	1
Contextual Rewriting H. Zhang, J.L. Rémy .....	46
Thue Systems as Rewriting Systems invited lecture by R.V. Book .....	63
Deciding Algebraic Properties of Monoids Presented by Finite Church-Rosser Thue Systems F. Otto .....	95
Two Applications of Equational Theories to Data base Theory S.S. Cosmadakis, P.C. Kanellakis .....	107
An Experiment in Partial Evaluation: The Generation of a Compiler Generator N.D. Jones, P. Sestoft, H. Sondergaard .....	124
NARROWER: a New Algorithm for Unification and its Application to Logic Programming P. Réty, C. Kirchner, H. Kirchner, P. Lescanne .....	141
Solving Type Equations by Graph Rewriting H. Ait-Kaci .....	158
Termination invited lecture by N. Dershowitz .....	180
Path of Subterms Ordering and Recursive Decomposition Ordering Revisited M. Rusinowitch .....	225
Associative Path Orderings L. Bachmair, D.A. Plaisted .....	241
A Procedure for Automatically Proving the Termination of a Set of Rewrite Rules D. Detlefs, R. Forgaard .....	255
PETRIREVE: Proving Petri Net Properties with Rewriting Systems C. Choppy, C. Johnen .....	271
Fairness in Term Rewriting Systems S. Porat, N. Francez .....	287

Two Results in Term Rewriting Theorem Proving J. Hsiang .....	301
Handling Function Definitions through Innermost Superposition and Rewriting L. Fribourg .....	325
An Ideal-Theoretic Approach to Word Problems and Unification Problems over Finitely Presented Commutative Algebras A. Kandry-Rodi, D. Kapur, P. Narendran .....	345
Combining Unification Algorithms for Confined Regular Equational Theories K. Yelick .....	365
An Algebraic Approach to Unification under Associativity and Commutativity A. Fortenbacher .....	381
Unification Problems with One-Sided Distributivity S. Arnborg, E. Tidén .....	398
Fast Many-to-One Matching Algorithms P.W. Purdom, C.A. Brown .....	407
Complexity of Matching Problems D. Benanav, D. Kapur, P. Narendran .....	417
The Set of Unifiers in Typed $\lambda$ -Calculus as Regular Expression M. Zaionc .....	430
Equational Systems for Category Theory and Intuitionistic Logic invited lecture by G. Huet .....	441

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