Lecture Notes in Computer Science

144

Computer Algebra

EUROCAM '82, European Computer Algebra Conference
Marseille, France, 5–7 April 1982

Edited by Jacques Calmet

Editor

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PREFACE

EUROCAM '82 is the first major conference to be organized by the European computer algebra community. The symposia in the field previously held in Europe (Stockholm, 1974 and Marseilles, 1979) had for main sponsor and organizer the SIGSAM group of the ACM. In January of 1981 it was decided that the time for a purely European conference had come. Indeed the number of researchers active in the field of computer algebra and the quality of their work had steadely increased over the recent years in our part of the world.

This meeting has been held in Marseilles which has a long experience in organizing similar colloquia. In fact EUROCAM '82 can as well be considered as being the sixth in the "International Colloquium on Advanced Computing Methods" series initialized in 1970 with A. Visconti. It was hosted by the newly operating "Centre International de Rencontres Mathématiques" in the Luminy campus of the University of Aix-Marseille II which turned out to be a very pleasant meeting place.

Invited, selected (referred), informal talks and demonstrations of systems were presented during the conference. Only the invited and selected ones appear in these proceedings. The selection of papers has been the responsability of the program committe with the help of outside referees when appropriate. When the decision to held EUROCAM '82 was taken it was assumed that both the number of papers submitted for selection and the number of attendees would be large enough to insure its success. This has indeed be true and one can predict that this is only the first one in a series of European conferences on Computer Algebra.

As the main organizer of EUROCAM '82 I want to express my gratitude to Marc Bergman who was in charge of the local arrangements. This was not an easy job because the number of attendees was almost twice as large as expected. The program committee members spent much time and efforts in setting up the final program. Special thanks are deserved to the sessions chairmen who have been successful in keeping a strict schedule for the 55 communications presented during the three days of the conference. They are: G.E. Collins, I. Frick, J.P. Fitch, M. Mignotte, R. Loos, J. Davenport, A.C. Norman, J. Smit, P.S. Wang, J. van Hulzen, A.C. Hearn, J. Aman, D.R. Musser and M. Bergman.

ACM and its specialzed group SIGSAM have given to EUROCAM '82 their official approval for cooperation. This was showing their confidence in the scientific quality of this first European conference. Besides this motivation when applying for it I was driven by a very personal will of keeping closed links with this world-wide professional organization. I am grateful to the SIGSAM chairman, Tony Hearn, for helping me with this application.

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REMERCIEMENTS

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INTRODUCTION

This is the second Computer Algebra Conference proceedings
published by Springer-Verlag in its Lecture Notes in Computer
Science series. The first ones appeared in LNCS 72 in 1979.

For many years this discipline was in search of its identity. This
is illustrated well enough by the different names used to identify
it. Almost any combination of the words: algebraic, symbolic,
computation, manipulation, applied mathematics has indeed be a name
for it. Computer Algebra may not be the best one but it indicates
rather well that algebraic algorithms are the core of the field. It
shows also the important role played by Mathematics in this domain
of Computer Science. One of the main achievements of the discipline
in the recent years has probably been to succeed in convincing
mathematicians that it can provide them with many non-trivial
mathematical problems well suited for their skill and training.
They range from proving an existence (or non-existence) solution to
an equivalence problem in the canonical approach to simplification
to finding constructive methods to solve various problems (root
finding, factorization, integration,...) on different algebraic
structures. We hope that the large variety of topics covered in
these proceedings is a good illustration of this statement.

The design, analysis and implementation of constructive algebraic
algorithms is probably the ultimate goal of computer algebraists.
As a consequence the heuristic approach sometimes used to solve
problems some years ago is becoming less and less important
nowadays . At that time opinions were expressed that computer
algebra has closed links with artificial intelligence. This is
therefore no longer true at present.

A constant feature of the discipline is the importance given to
applications. This can be checked in any conference proceedings
where several sections are always devoted to them. This is probably
due to the fact that results first reported as applications have
sometimes be included in computer algebra systems.
In fact some of the papers listed as applications in these
proceedings ought to be part of the algorithm sections. It was
mainly for a convenient planning of the sessions that they are not.

It was the will of the program committee to have invited talks on
data type analysis and rewrite rules as well as on algebraic
specifications in software development. Although some of these
topics may presently be considered as lying on the border line of
our field we think that we have many useful informations to learn
from them on how to design the next generation of computer algebra
systems.

These proceedings reflect most of the lines of research in our
domain including one which is only mentionned in the talk on
algebra system development: the availability of personal algebra
machines in the near future. This will have a big impact on the use

of such systems and has been expected by practitionners of the field for many years.

The ordering of the sections in this volume only reflects the late arrival of some of the contributions, not the actual one at the conference.
It is our hope that these proceedings will help the scientific community to be better acquainted with the research going on in our domain. For those also interested in more basic materials we may suggest to read the 1982 Computing Supplementum (Springer-Verlag Ed.) which intends to fill a previously existing gap.

Jacques Calmet