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Editorial

This special issue of the journal is devoted to unification theory. Unification, or equation solving, has been studied since mathematics exists, but this decade has seen an incredible surge of interest and important breakthroughs have been made in the domain. This is certainly due to the fact that unification is at the very heart of computation in a given logic and thus has a considerable role in today and future computer science and artificial intelligence.

As a consequence of the increasing activity in the field, two international workshops on unification have been organized in 1987 and 1988 and will now happen every year. It is also time to summarize current knowledge and to group together the recent contributions in one book. This is precisely the purpose of this special issue that presents papers covering the main topics on the area. Let us briefly summarize the contents of the first volume.

In order to get a better understanding of *Unification Theory*, Jörg Siekmann gives a large survey of the domain and recall its early history. Moreover, a very complete list of references on unification theory is also given that the reader will find extremely helpful.

Ursula Martin and Tobias Nipkow present in their paper, *Boolean Unification - The Story So Far*, the current state of knowledge on boolean unification. This has important applications in circuit design, verification and testing.

Narrowing, a powerful technique to compute equation solutions modulo an equational theory presented with a canonical term rewriting system, is further investigated: the narrowing process is in general not terminating and the search space is quite large, so it is crucial to find restrictions of the process that are still complete. A first technique introduced by Jean-Marie Hullot in 1980 and called basic narrowing is refined in the paper *Basic Narrowing Revisited* by Werner Nutt, Pierre Rety and Gert Smolka. They introduce a new approach to the problem using transformation rules and show how basicness can be combined with normalization. Another approach is followed by Jia-Huai You in *Enumerating Outer Narrowing Derivations for constructor-Based Term Rewriting Systems*. It consists of applying a specific strategy which is still complete for a restricted class of term rewriting systems.

From the logic programming point of view records are quite useful, so that a framework that gives them a semantics together with the tools to deals with, in particular unification, is fundamental. This is the purpose of *Inheritance Hierarchies: Semantics and Unification* by Gert Smolka and Hassan Ait Kaci.

Disunification (i.e. solving problems of the form $t \neq t'$) has a lot of important applications in theorem proving and constraint logic programming. The paper by Hubert Comon and Pierre Lescanne, *Equational Problems and Disunification*, presents an extended and remarquably clear approach to the problem of solving a combination of equations and disequations.

This first volume ended with *On the Relationship of Congruence Closure and Unification* by Paris Kanellakis and Peter Revesz. They study the relationship between congruence closure and syntactic unification, its dual, and the complexity evaluation of the unification algorithm on parallel architectures.

This first volume is thus particularly rich and I hope the reader will find it useful either as a reference or as a starting point for further research on unification theory.

Finally, I would like to thank the authors for their contribution to the field and all the referees for their considerable work that altogether have contributed to make this issue of very high quality.

Claude Kirchner.
Nancy, February 1989.