

Problem #39

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Summary: Can the application condition on the Merge rule in the computation of dag-solved forms of unification problems be improved?

Rules are given in [JK91] for computing dag-solved forms of unification problems in equational theories. The *Merge* rule $x \approx s, x \approx t \Rightarrow x \approx s, s \approx t$ given there assumes that s is not a variable and its size is less than or equal to that of t . Can this condition be improved by replacing it with the condition that the rule *Check** does not apply? (In other words, is *Check** complete for finding cycles when *Merge* is modified as above?)

Remark

The problem has been solved by Hubert Comon [Com93] using an extended *Check* rule (requiring a congruence closure step). The original question—for whatever it may be worth—stands.

Bibliography

- [Com93] Hubert Comon. Personal communication, 1993.
- [JK91] Jean-Pierre Jouannaud and Claude Kirchner. Solving equations in abstract algebras: A rule-based survey of unification. In Jean-Louis Lassez and Gordon Plotkin, editors, *Computational Logic: Essays in Honor of Alan Robinson*. The MIT Press, Cambridge, MA, 1991.