

Problem #89

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Summary: Is the satisfiability of ordering constraints (lpo) in conjunction with predicates like irreducibility by a fixed rewrite system or membership in a regular tree language decidable?

Satisfiability of ordering constraints (lpo) for total precedences has been shown decidable in [Com90, Nie93]. Is the satisfiability of total lpo ordering constraints together with the constraint $Irr(x)$, expressing that x is not reducible by some fixed rewrite system, decidable? This would imply decidability of the confluence of ordered rewriting (see Problem #64).

Besides the irreducibility predicate the following related predicates are of interest:

- membership in a fixed regular tree language
- a predicate expressing that a fixed symbol does not occur in a term.

Bibliography

- [Com90] Hubert Comon. Solving inequations in term algebras (Preliminary version). In John C. Mitchell, editor, *Fifth Symposium on Logic in Computer Science*, pages 62–69, Philadelphia, PA, June 1990. IEEE.
- [Nie93] Robert Nieuwenhuis. Simple LPO constraint solving methods. *Information Processing Letters*, 47:65–69, 1993.