Problem #86

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Summary: Is the union of two totally terminating rewrite systems, which do not share any symbols, totally terminating?

When there exists a monotonic well-ordering (*monotonic* means that replacing a subterm with a smaller one decreases the whole term) of ground terms that shows termination of a rewrite system, the system is called *totally terminating*. The union of two totally terminating rewrite systems which do not share any symbols is totally terminating if at least one of them does not contain a rule that has more occurrences of some variable on the right than on the left [FZ93, FZ96]. What if variables are duplicated?

Bibliography

[FZ93] M. C. F. Ferreira and Hans Zantema. Total termination of term rewriting. In Claude Kirchner, editor, *5th International Conference on Rewriting Techniques and Applications*, volume 690 of *Lecture Notes in Computer Science*, pages 213–227, Montreal, Canada, June 1993. Springer-Verlag. Extended version as [FZ96].

[FZ96] M. C. F. Ferreira and Hans Zantema. Total termination of term rewriting. *Applicable Algebra in Engineering, Communication and Computing*, 7(2):133–162, 1996.