

Problem #97

Originator: Henk Barendregt [Bar75]

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Summary: Is the word problem for the S -combinator decidable?

The word problem for the S -combinator is: Given two ground terms build only of the constant S in combinatory logic (that is with an application operator written as juxtaposition, and parantheses), are they convertible in the system consisting only of the definition of the S -combinator

$$Sxyz \rightarrow (xz)(yz)$$

Is the word-problem for the S -combinator decidable? See also [Wal98b] and [Wal98a] for more background.

A related problem is the word problem for proper combinators of order smaller than 3 (S is of order 3), see Problem #96.

Bibliography

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- [Wal98a] Johannes Waldmann. *The Combinator S*. PhD thesis, Fakultät für Mathematik und Informatik of the Friedrich-Schiller-Universität Jena, Jena, Germany, 1998.
- [Wal98b] Johannes Waldmann. Normalisation of s -terms is decidable. In Tobias Nipkow, editor, *9th International Conference on Rewriting Techniques and Applications*, volume 1379 of *Lecture Notes in Computer Science*, pages 138–150, Tsukuba, Japan, April 1998. Springer-Verlag.