Problem #20 (Solved !)

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Summary: What is the best bound on the length of a derivation for a one-rule length-preserving string-rewriting system?

What is the best bound on the length of a derivation for a one-rule length-preserving string-rewriting (semi-Thue) system? Is it $O(n^2)$ ($n$ is the size of the initial term) as conjectured in [Méti85], or $O(n^k)$ ($k$ is the size of the rule) as proved there.

Remark

The upper bound is $n^2/4$ where $n$ denotes the length of the initiating string [Ber94]. The bound is reached by the derivation from $b^{n/2}a^{n/2}$ for the string rewriting system $\{ba \rightarrow ab\}$.

More about the history of this problem in the context of the question of one-rule termination can be found in [Der05].

http://www.cs.tau.ac.il/~nachum/rtaloop/
Bibliography

