

On the complexity of the universality and inclusion problems for unambiguous context-free grammars (Invited Talk)

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We study the computational complexity of universality and inclusion problems for unambiguous finite automata and context-free grammars. We observe that several such problems can be reduced to the universality problem for unambiguous context-free grammars. The latter problem has long been known to be decidable and we propose a PSPACE algorithm that works by reduction to the zeroness problem of recurrence equations with convolution. We are not aware of any non-trivial complexity lower bounds. However, we show that computing the coin-flip measure of an unambiguous context-free language, a quantitative generalisation of universality, is hard for the long-standing open problem SQRTSUM.

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