

Nondeterminism does not make regular separability harder

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We investigate the regular separability problem for languages of finite words. For a family of languages \mathcal{F} , the *regular separability problem for \mathcal{F}* asks for two given languages $L, K \in \mathcal{F}$ whether there is a regular language S such that $L \subseteq S$ and $K \cap S = \emptyset$. It is well known that the problem is undecidable for context-free languages [6, 4]; undecidability has been shown even for visibly pushdown languages [5] and one-counter languages [2]. On the other hand, a number of decidability results has been obtained recently, including languages of one-counter nets [2], languages of Parikh automata [1], or coverability languages of Petri nets [3].

The purpose of the talk is to announce an easy but extremely useful observation: under mild assumptions on the class \mathcal{F} , the regular separability problem for the class of homomorphic images of languages from \mathcal{F} reduces to the same problem for \mathcal{F} itself. In particular, this observation allows to derive a generic reduction of the regular separability problem for the class of languages recognized by nondeterministic automata of some kind to the same problem for the subclass of languages recognized by deterministic automata of the same kind. As another illustration of applicability, we reprove undecidability of the regular separability problem for visibly pushdown languages [5], by a direct reduction from the same problem for context-free languages.

References

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