Jančar, Petr; **Kučera, Antonín**; **Moller, Faron**; **Sawa, Zdeněk**

Equivalence-checking with one-counter automata: A generic method for proving lower bounds. (English) Zbl 1077.68653

Nielsen, Mogens (ed.) et al., Foundations of software science and computation structures. 5th international conference, FOSSACS 2002, held as part of the joint European conferences on theory and practice of software, ETAPS 2002, Grenoble, France, April 8–12, 2002. Proceedings. Berlin: Springer (ISBN 3-540-43366-X). Lect. Notes Comput. Sci. 2303, 172-186 (2002).

Summary: We present a general method for proving DP-hardness of equivalence-checking problems on one-counter automata. For this we show a reduction of the SAT-UNSAT problem to the truth problem for a fragment of (Presburger) arithmetic. The fragment contains only special formulas with one free variable, and is particularly apt for transforming to simulation-like equivalences on one-counter automata. In this way we show that the membership problem for any relation subsuming bisimilarity and subsumed by simulation preorder is DP-hard (even) for one-counter nets (where the counter cannot be tested for zero). We also show DP-hardness for deciding simulation between one-counter automata and finite-state systems (in both directions).

For the entire collection see [Zbl 0989.00051].

MSC:

68Q17 Computational difficulty of problems (lower bounds, completeness, difficulty of approximation, etc.)
68Q45 Formal languages and automata
68Q85 Models and methods for concurrent and distributed computing (process algebras, bisimulation, transition nets, etc.)

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