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**The complexity of bisimilarity-checking for one-counter processes.** (English) Zbl 1044.68099  
*Theor. Comput. Sci.* 304, No. 1-3, 157-183 (2003).

Summary: We study the problem of bisimilarity-checking between processes of one-counter automata and finite-state processes. We show that deciding weak bisimilarity between processes of one-counter nets (which are 'restricted' one-counter automata where the counter cannot be tested for zero) and finite-state processes is **DP**-hard. In particular, this means that the problem is both **NP** and **co - NP** hard. The same technique is used to demonstrate **co - NP**-hardness of strong bisimilarity between processes of one-counter nets. Then we design an algorithm which decides weak bisimilarity between processes of one-counter automata and finite-state processes in time which is polynomial for a large subclass of instances, giving a kind of characterization of all hard instances as a byproduct. Moreover, we show how to efficiently estimate the time which is needed to solve a given instance. Finally, we prove that the problem of strong bisimilarity between processes of one-counter automata and finite-state processes is in **P**.

**MSC:**

[68Q45](#) Formal languages and automata

Cited in 1 Document

[68Q85](#) Models and methods for concurrent and distributed computing (process algebras, bisimulation, transition nets, etc.)

**Keywords:**

[One-counter automata](#); [One-counter nets](#); [Bisimilarity](#)

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