

**Praveen, M.**

**Small vertex cover makes Petri net coverability and boundedness easier.** (English)

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Summary: The coverability and boundedness problems for Petri nets are known to be EXPSPACE-complete. Given a Petri net, we associate a graph with it. With the vertex cover number  $k$  of this graph and the maximum arc weight  $W$  as parameters, we show that coverability and boundedness are in PARAPSPACE. This means that these problems can be solved in space  $\mathcal{O}(\text{ef}(k, W)\text{poly}(n))$ , where  $\text{ef}(k, W)$  is some super-polynomial function and  $\text{poly}(n)$  is some polynomial in the size of the input  $n$ . We then extend the PARAPSPACE result to model checking a logic that can express some generalizations of coverability and boundedness.

#### MSC:

- 68Q85 Models and methods for concurrent and distributed computing (process algebras, bisimulation, transition nets, etc.)
- 05C70 Edge subsets with special properties (factorization, matching, partitioning, covering and packing, etc.)
- 68Q17 Computational difficulty of problems (lower bounds, completeness, difficulty of approximation, etc.)
- 68Q25 Analysis of algorithms and problem complexity
- 68Q60 Specification and verification (program logics, model checking, etc.)

#### Keywords:

Petri nets; vertex cover; parameterized complexity; PARAPSPACE

**Full Text:** [DOI](#)

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