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**Bounded reachability problems are decidable in FIFO machines.** (English) Zbl 07471708


Summary: The undecidability of basic decision problems for general FIFO machines such as reachability and unboundedness is well-known. In this paper, we provide an underapproximation for the general model by considering only runs that are input-bounded (i.e. the sequence of messages sent through a particular channel belongs to a given bounded language). We prove, by reducing this model to a counter machine with restricted zero tests, that the rational-reachability problem (and by extension, control-state reachability, unboundedness, deadlock, etc.) is decidable. This class of machines subsumes input-letter-bounded machines, flat machines, linear FIFO nets, and monogeneous machines, for which some of these problems were already shown to be decidable. These theoretical results can form the foundations to build a tool to verify general FIFO machines based on the analysis of input-bounded machines.

**MSC:**

- 03B70 Logic in computer science
- 68-XX Computer science

**Keywords:**

- FIFO machines; reachability; underapproximation; counter machines

**Full Text:** arXiv Link

**References:**


