

The Parametric Complexity of Bisimulation Equivalence of Normed Pushdown Automata

Wenbo ZHANG

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Problems & Ideas

- The parametric complexity of bisimulation equivalence of normed PDA with fixed number of control states is an important open problem in the area of formal verification.
- Ideas:
 - By a reduction from 'hit-or-run' game, we can give a lower bound when the number of control states is fixed as 2.
 - By a further analysis on previous work by Jancar, we can improve the upper bounds when the number of control states is fixed as d in normed case.

Main Contributions

- The parametric complexity of bisimilarity problem for (n)PDA. (Results colored in red are contributed by this paper)

	$d = 1$	$d = 2$	$d = 3$	$d \geq 4$
nPDA	P P-hard	F₅ EXPTIME-hard	F₆ EXPTIME-hard	F_{d+3} F_{d-1}-hard
PDA	2EXPTIME EXPTIME-hard	F₆ EXPTIME-hard	F₇ EXPTIME-hard	F_{d+4} F_{d-1}-hard