A Practitioner's Guide to MDP Model Checking Algorithms —Experimental Results—

January 2, 2023

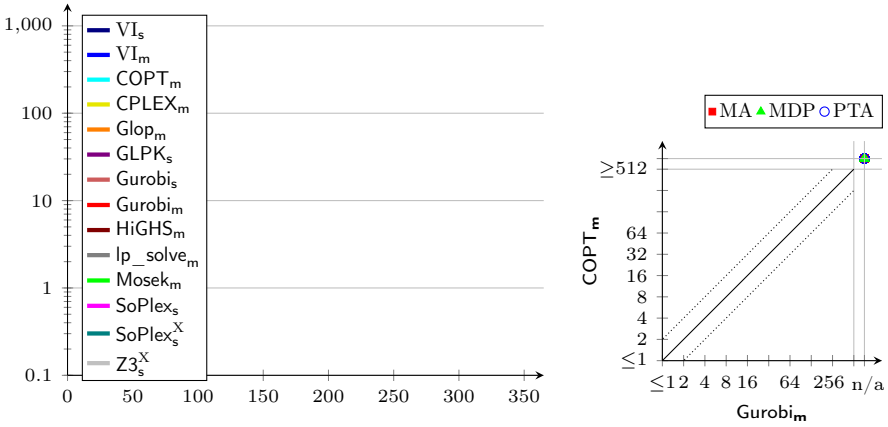


Figure 3: Comparison of LP solver runtime on the *qvbs* set

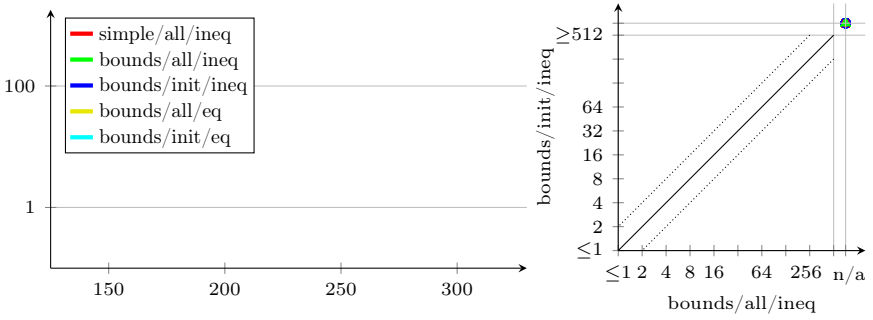
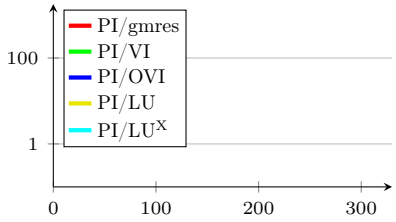


Figure 4: Performance impact of LP problem formulation variants (using Gurobi$_s$)



PI methods comparison

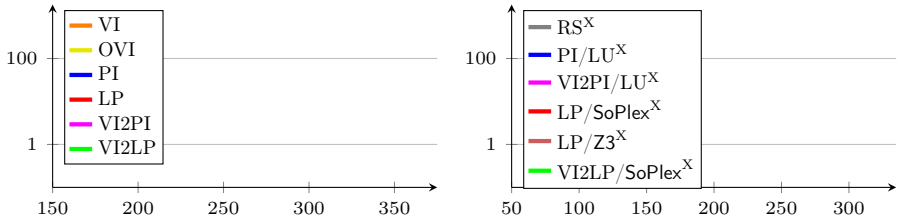
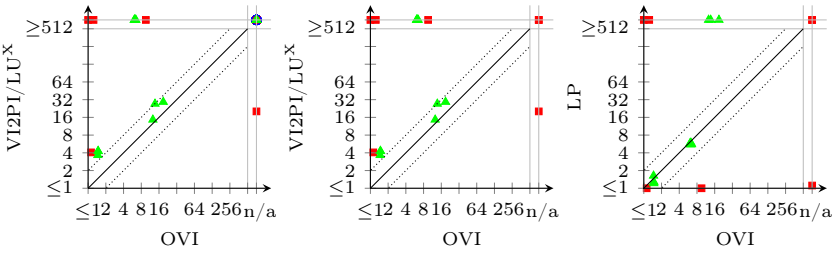


Figure 5: Comparison of MDP model checking algorithms on the *qvbs* set



(a) *qvbs* OVI vs. VI2PI^{X} (b) *hard* OVI vs. VI2PI^{X} (c) *hard* OVI vs. LP

Figure 6: Additional direct performance comparisons

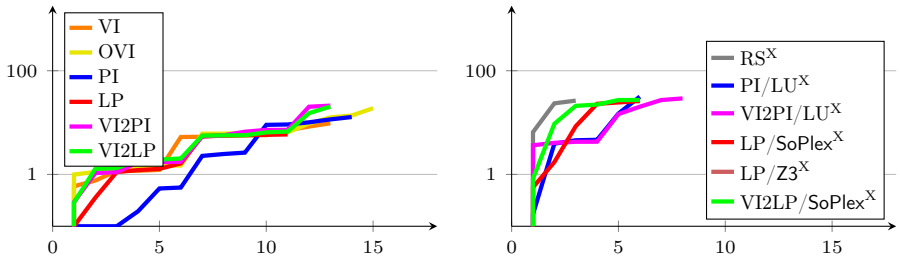


Figure 7: Comparison of MDP model checking algorithms on the *hard* subset

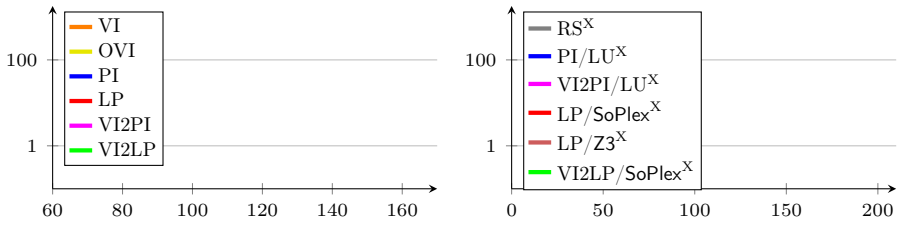


Figure 8: Comparison of MDP model checking algorithms on the *premise* set

A The QVBS Benchmarks: LP solver tweaking

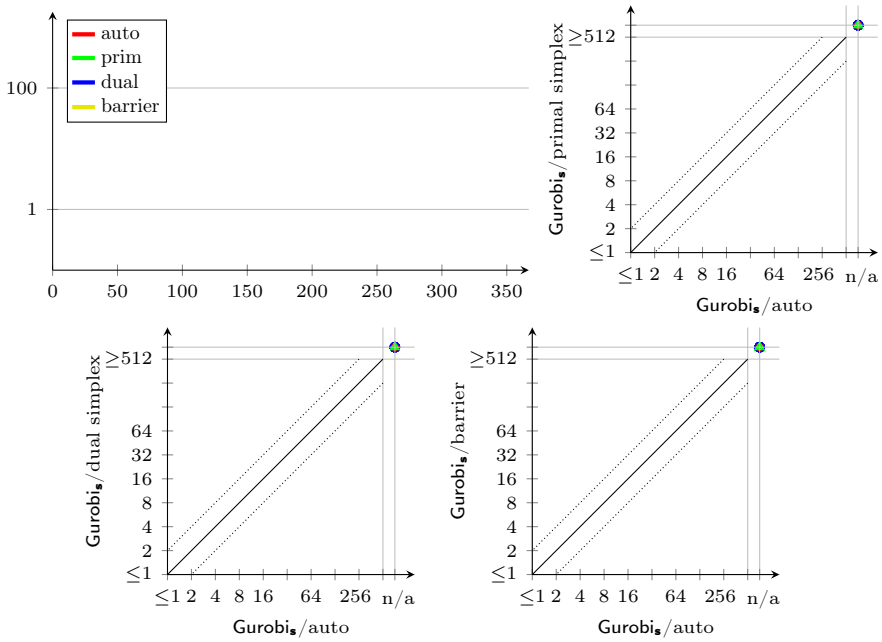


Figure 9: Comparison of Gurobi's configurations.

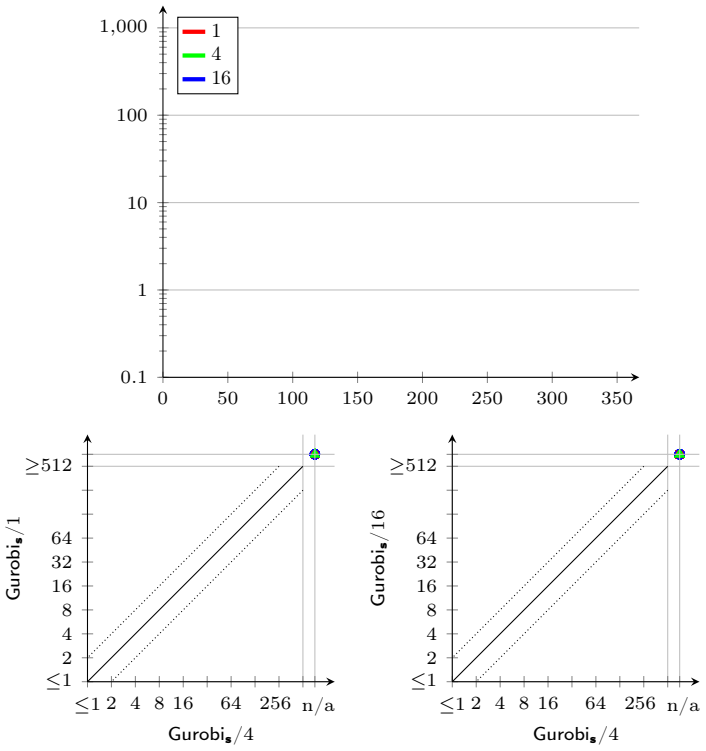


Figure 10: Comparison of how the number of threads affect the performance of Gurobi's auto method.

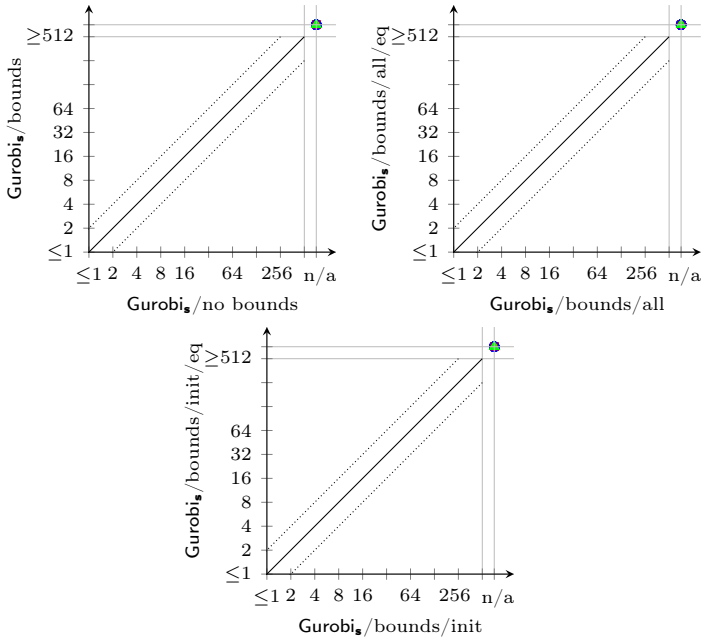


Figure 11: Comparison of further LP problem formulation variants.

B QVBS Benchmarks: MEC collapsing and topological decomposition

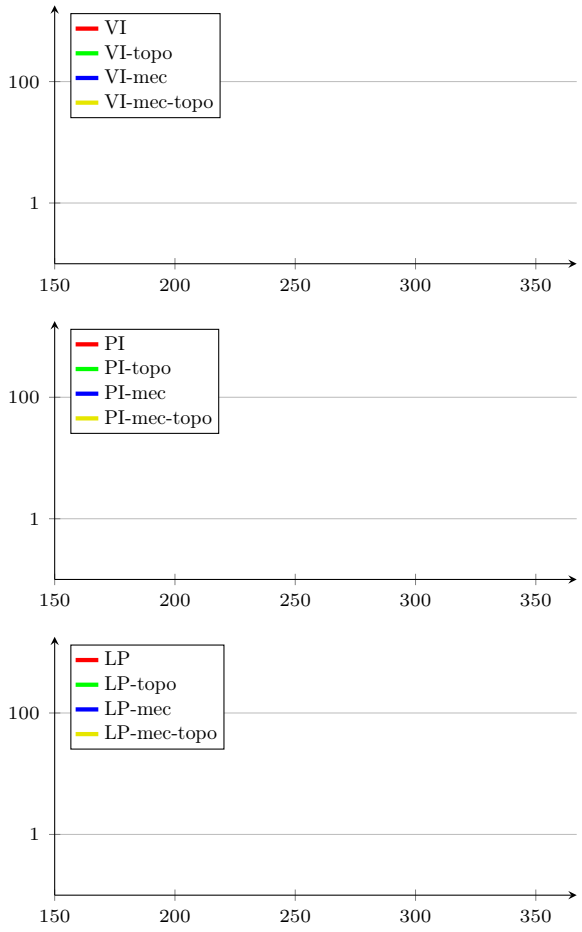


Figure 12: Comparison of the vanilla algorithms VI, PI and LP and their variants using MEC collapsing and topological decomposition.

C Hard benchmarks: LP solver runtime

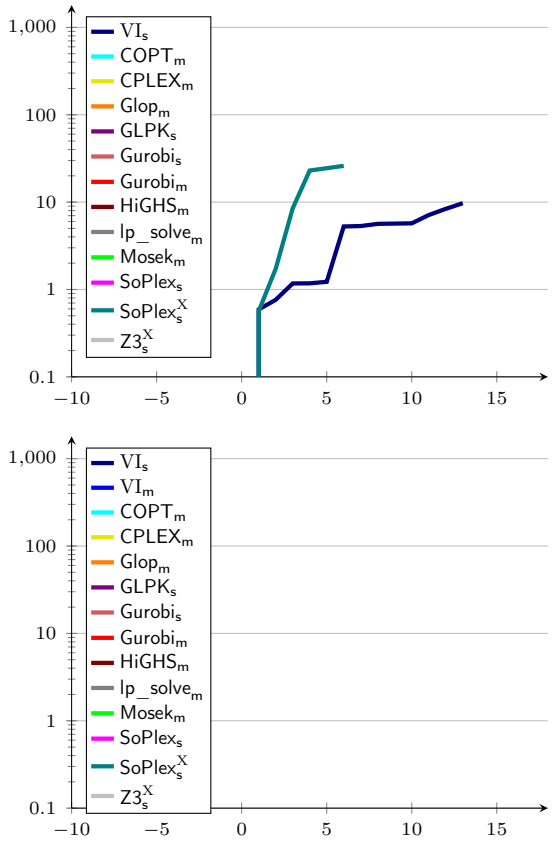


Figure 13: Comparison of LP solver runtime on the *hard* subset. The upper plot uses the topological optimization, the lower does not.