

STP-Parti-Bitwuzla at SMT-COMP 2024

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1 Introduction

STP-Parti-Bitwuzla is a portfolio SMT solver based on STP [1] (commit SHA 0510509) and Bitwuzla [2] (v0.4.0). It participates in the Parallel Track and Cloud Track of QF_BV logic. For SMT-COMP 2024, you can find the solver, experimental scripts, and Docker files we have prepared at [GitHub-STP-Parti-Bitwuzla-at-SMT-COMP-2024](#).

STP-Parti-Bitwuzla comprises three primary components: the master, the partitioner, and the base solvers.

1. The master is implemented by Python for task management and scheduling in distributed solving.
2. We have customized STP to function as our partitioner, aiding in the partitioning of subproblems.
3. Our tool does not restrict the choice of the base solver used in solving subtasks; it simply requires the executable binary file. For the SMT-COMP 2024, we have selected Bitwuzla as our base solver.

STP-Parti-Bitwuzla is the practical implementation of our innovative concept of variable-level partitioning, which is applied to the Bit-Vectors theory. This technique was introduced for the first time in our recently published paper at CAV 2024, titled “Distributed SMT Solving Based on Dynamic Variable-level Partitioning” [3]. In this paper, we investigated variable-level partitioning for arithmetic theories with our proposed tool AriParti, which is available on [GitHub-AriParti](#). STP-Parti-Bitwuzla represents expanding and exploring the variable-level partitioning concept in the Bit-Vectors (BV) theory.

Our proposed variable-level partitioning permits robust, comprehensive partitioning. Regardless of the Boolean structure of any given instance, our partitioning algorithm can keep partitioning to the last moment of the solving process.

Compared to STP and Bitwuzla, STP-Parti-Bitwuzla innovates in the following aspects:

1. Dynamic distributed framework.

2. Integration of term-level and variable-level partitioning.
3. Enhanced preprocessing and constraint propagation technologies for the Bit-Vectors theory.

References

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