

Configuration Reports for the Solver PbO-CCSAT-Generic on the Instance Sset PTN in *Sparkle*

Automatically generated by *Sparkle* (version: 1.0.0)

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1 Introduction

Sparkle [2] is a multi-agent problem-solving platform based on Programming by Optimisation (PbO) [1], and would provide a number of effective algorithm optimisation techniques (such as automated algorithm configuration, portfolio-based algorithm selection, etc) to accelerate the existing solvers.

This experimental report is automatically generated by *Sparkle*. This report presents experimental results on the scenario of configuring the solver PbO-CCSAT-Generic on the instance set PTN.

2 Information about the Instance Set

The whole instance set is PTN, and there are 23 instances in the whole instance set. First of all, *Sparkle* selected two subsets from the whole instance set as the training set and the testing set. The information about the training set and the testing set is presented as follows.

- Training set: 11 instances
- Testing set: 12 instances

3 Information about the Configuration Protocol

The configurator used in *Sparkle* is SMAC (*Sequential Model-based Algorithm Configuration*) [3], and the version of SMAC used in *Sparkle* is 2.10.03.

During the configuration process, *Sparkle* performs 25 independent SMAC runs for configuring the solver PbO-CCSAT-Generic on the instance set PTN; the configuration objective is RUNTIME; the whole configuration time budget is 300 seconds; the cutoff time for each run is 60 seconds.

Each independent run of SMAC would result in one optimised configuration. As a result, *Sparkle* would obtain 25 optimised configurations. Each of these was then evaluated on the entire training set, with one solver run per instance and a cutoff time of 60 seconds, and the configuration with the lowest PAR10 value was selected as the result of the configuration process.

4 Information about the Optimised Configuration

After the configuration process mentioned above, *Sparkle* obtained the optimised configuration. The details of the optimised configuration are described as below.

```
-gamma_hscore2 '351' -init_solution '1' -p_swt '0.20423712003341465' -perform_aspiration '1' -
perform_clause_weight '1' -perform_double_cc '0' -perform_first_div '0' -perform_pac '1' -prob_pac
'0.005730374136488115' -q_swt '0.6807207179674418' -sel_clause_div '1' -sel_clause_weight_scheme
'1' -sel_var_break_tie_greedy '4' -sel_var_div '2' -threshold_swt '32'
```

5 Comparison between Configured Version and Default Version on the Testing Instance Set

After specifying the optimised configuration, *Sparkle* would run the configured version of PbO-CCSAT-Generic and the default version of PbO-CCSAT-Generic on the testing instance set. During this phase, each version was performed one run per instance with a cutoff time of 60 seconds. The results are reported as follows.

- **PbO-CCSAT-Generic (configured)**, PAR10: 5.770833
- **PbO-CCSAT-Generic (default)**, PAR10: 451.110000

The empirical comparison between the PbO-CCSAT-Generic (configured) and PbO-CCSAT-Generic (default) on the testing set of PTN is presented in Figure 1.

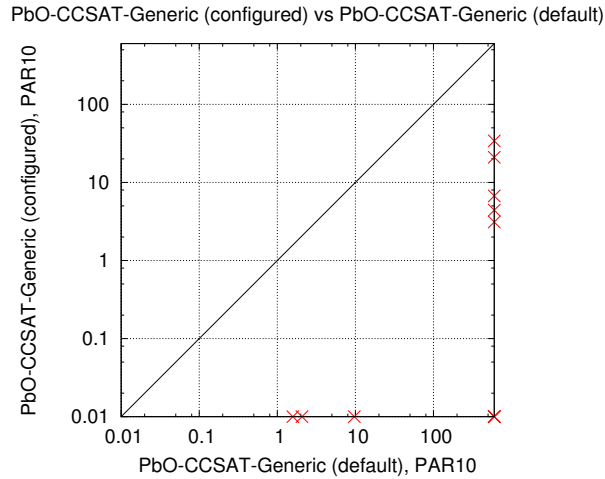


Figure 1: Empirical comparison between the PbO-CCSAT-Generic (configured) and PbO-CCSAT-Generic (default) on the testing set of PTN.

6 Comparison between Configured Version and Default Version on the Training Instance Set

In order to investigate the performance on the training instance set, *Sparkle* would run the configured version of PbO-CCSAT-Generic and the default version of PbO-CCSAT-Generic on the training instance set. During this phase, each version was performed one run per instance with a cutoff time of 60 seconds. The results are reported as follows.

- **PbO-CCSAT-Generic (configured)**, PAR10: 8.500000
- **PbO-CCSAT-Generic (default)**, PAR10: 287.646364

The empirical comparison between the PbO-CCSAT-Generic (configured) and PbO-CCSAT-Generic (default) on the training set of PTN is presented in Figure 2.

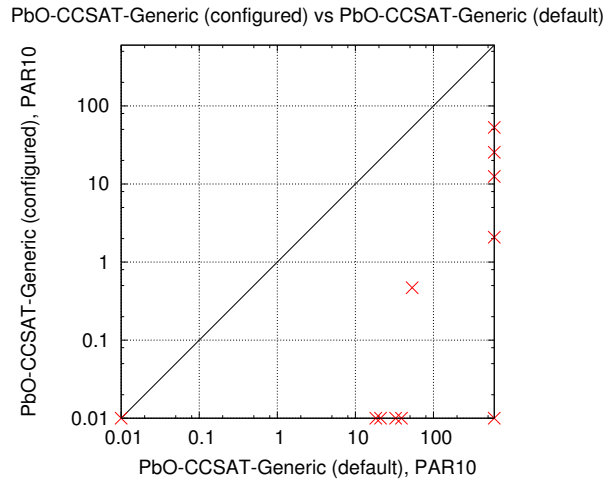


Figure 2: Empirical comparison between the PbO-CCSAT-Generic (configured) and PbO-CCSAT-Generic (default) on the training set of PTN.

References

- [1] Holger H. Hoos. Programming by optimization. *Communications of the ACM*, 55(2):70–80, 2012.
- [2] Holger H. Hoos. Sparkle: A pbo-based multi-agent problem-solving platform. Technical report, Department of Computer Science, University of British Columbia, 2015.
- [3] Frank Hutter, Holger H. Hoos, and Kevin Leyton-Brown. Sequential model-based optimization for general algorithm configuration. In *Proceedings of the 5th International Conference on Learning and Intelligent Optimization (LION 5)*, pages 507–523, 2011.