

# STP in the SMTCOMP 2020

Various

## 1 Introduction

STP[1] is an open-source solver for QF\_BV and arrays without extensionality. STP recursively simplifies bit-vector constraints, solves linear bit-vector equations, and then eagerly encodes them to CNF for solving. Array axioms are added as needed during an abstraction-refinement phase.

## 2 Development history

STP was originally developed by Vijay Ganesh under the supervision of Professor David Dill. Later releases were developed by Trevor Hansen under the supervision of Peter Schachte and Harald Søndergaard. STP handles arbitrary precision integers using Steffen Beyer's library. STP encodes into CNF via the and-inverter graph package ABC of Alan Mishchenko [2]. STP supports different SAT backends: MiniSat [3], CryptoMiniSat [4] and Riss [5].

## 3 Recent Developments to STP

In the last year:

Andrew V. Jones, Mate Soos, Christian Cadar, Brian Foley, Ryan Govostes, Gleb Popov, and Ondřej Šukup have improved build system.

Trevor Hansen has improved how speculative simplifications are applied.

## 4 Recent Developments to the Underlying SAT Solvers

CryptoMinisat (*CMS*) has been augmented with the Stochastic Local Search (SLS) [6] solver CCAnr. CryptoMiniSat aims to be a modern, open-source SAT solver using inprocessing techniques, optimized data structures and finely-tuned timeouts to have good control over both memory and time usage of inprocessing steps. It also supports, when compiled as such, to recover XOR constraints and perform Gauss-Jordan elimination on them at every decision level. CryptoMiniSat is authored by Mate Soos. CCAnr [6] is a stochastic local search (SLS) solver for SAT, which is based on the configuration checking strategy and has good performance on non-random SAT instances.

The SAT solver MergeSAT is a fork of the winner of the SAT Competition 2018, MapleL-CMDistChronoBT. MergeSAT is authored by Norbert Manthey. MergeSAT ports features that have been proposed in other solvers into that solver, enables incremental solving again, as well as makes the solver behavior reproducible again.

## Acknowledgements

Vijay Ganesh, Dan Liew, Mate Soos and Ryan Govostes contributed substantially to the STP code base.

## References

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- [6] Cai, S., Luo, C., Su, K.: Ccanr: A configuration checking based local search solver for non-random satisfiability. In: SAT 2015. (2015)