SMTInterpol

Version 2.0pre

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Description

SMTInterpol is a proof-producing SMT-solver written in Java. It stores resolution proof trees to compute interpolants [McM05] used by different model checking tools [HHP09, HHP10].

The solver reads input in SMTLIB format. It includes a parser for version 1.2, and for the current version. All required and some optional commands of the SMTLIB standard are supported.

All formulas are stored in a central term repository. The repository typechecks the formulas and does some simple boolean optimizations. Asserted formulas are converted to CNF using Plaisted–Greenbaum encoding [PG86]. The core of the solver is a CDCL engine that is connected to multiple theories. The engine uses these theories during constraint propagation, backtracking, and consistency checking.

For uninterpreted functions and predicates, we use a theory solver based on the congruence closure algorithm. An extension to arrays and quantifiers via e-matching is under development. For linear arithmetic, we use a theory solver based on the Simplex algorithm [DdM06]. It always computes the strongest bounds that can be derived for a variable and uses them during satisfiability checks. If a conflict cannot be explained using known literals, the solver derives new literals and uses them in conflict explanation. Disequalities are resolved if they can be used to strengthen a bound. Otherwise, they are delayed until final checks. The solver supports integer arithmetic using a variant of the cuts from proof technique [DDA09] together with a branch-and-bound engine.

SMTInterpol uses a variant of model-based theory combination [dMB08]. The linear arithmetic solver does not propagate equalities between shared variables but introduces them as decision points. The model mutation algorithm resolves disequalities and tries to create as many distinct equivalence classes as possible.

Competition Version

The version submitted to the SMT-COMP 2011 is a preliminary version. Some major features of the new SMTLIB standard are still under development or test. Future versions will include extensions to quantifiers, arrays, models, and a more flexible interpolation scheme.

This version is yet to be released, but the previous version of the solver can be downloaded from

`http://swt.informatik.uni-freiburg.de/research/tools/smtinterpol`

Magic Number: 6649887

References

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