Antom – Solver Description*

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Overview

This note briefly describes our first prototype of antom, a DPLL-like parallel SAT solver based on the algorithm portfolio principle. Up to eight copies of antom's sequential SAT solving unit are running in parallel, each of them having an individual set of parameters. The following parts of the core engine were used to differentiate between the threads:

– Decision heuristic
– Restart strategy
– Conflict clause deletion
– Lazy hyper binary resolution [1]
– On-the-fly unit propagation lookahead [2]

Additionally, all threads include efficient unit propagation based on two-watched-literals, conflict analysis with non-chronological backtracking, and a simple conflict clause minimization mechanism. To increase the overall performance of the parallel system, conflict clause sharing between the threads has been realized, too. Finally, to preprocess the original CNF formula we make use of SatELite [3].

Antom has been written in C++ using openMP. It has been submitted to the SAT Race 2010 as a 32 bit binary. To avoid running out of memory the number of threads acting in parallel varies from one to eight, depending on the size of the input formula.

References

1. A. Biere: PrecoSAT – Solver Description. (2009)
2. S. Kottler: SApperloT – Solver Description. (2009)
3. Eén, N., Biere, A.: Effective Preprocessing in SAT through Variable and Clause Elimination. In: 8th International Conference on Theory and Applications of Satisfiability Testing. (2005) 61–75