

Cadence MiniSat v1.14

The Cadence version of MINISAT v1.14 [1, 2] is a minor modification of the web version (google “minisat solver”) shown to be more effective on internal BMC problems. The differences are as follows:

- Periodically, the solver backtracks half of the assignment stack and starts picking variables at random until a conflict is reached. The idea is to prevent the solver from getting stuck in an unproductive part of the search tree.
- Variables are leveled from outputs to inputs (as much as can be done on CNF). Initially, and at each restart, variable activities are increased for the variables close to the outputs (currently by 0.99^{level}). This will bias the search towards the outputs, which seems to be effective for BMC problems.
- In the variable decision, if any of the last 20 conflict-clauses is binary under the current partial assignment, one of the two unassigned variables of that clause is selected for branching. This focuses the variable order even more on variables of recently derived clauses than the aggressively decaying VSIDS of MINISAT.
- For small and moderately sized problems, variables are fixed at top-level by asymmetric branching: For each clause, all literals but one are assumed to be false. If propagation yields a conflict, the remaining literal is removed. After the procedure is finished, pure literals are also fixed.

References

- [1] N. Eén and N. Sörensson. **An Extensible SAT Solver**. In *Proc. SAT'03*, volume 2919 of *LNCS*.
- [2] N. Eén and N. Sörensson. **MiniSat – A SAT Solver with Conflict-Clause Minimization**. http://www.cs.chalmers.se/Cs/Research/FormalMethods/MiniSat/cgi/MiniSat_v1.13_short.ps.gz.cgi.