

raSAT 0.2 for SMT-COMP 2015

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raSAT is an SMT solver for polynomial constraints. It consists of a simple iterative approximation refinement, called **raSAT** loop [2], which is an extension of the standard ICP (Interval Constraint Propagation) with Testing. Two approximation schemes consist of Interval Arithmetic (IA) and Testing, to accelerate SAT detection. If both fails, input intervals are refined by decomposition.

raSAT loop is extended with the use of the Intermediate Value Theorem to show the satisfiability of equations.

To avoid soundless bugs due to round-off error of floating arithmetic operations, **raSAT** applies outward rounding in Interval Arithmetic and implements SAT confirmation step by an error-bound guaranteed floating point package **iRRAM**³.

raSAT takes advantages from the following packages/libraries.

- **miniSAT**⁴ as the back-end SAT solver.
- **iRRAM** for confirmation of SAT instances.
- The library in [1] for round-down/up in each Interval Arithmetics.
- The OCaml parser for SMT-LIB 2.0 scripts from <http://smtlib.cs.uiowa.edu/utilities.shtml>.

Package Distribution:

Source code and a precompiled version of **raSAT** can be downloaded from <http://www.jaist.ac.jp/~s1310007/raSAT/>.

References

- [1] Alliot, J.M., Gotteland, J.B., Vanaret, C., Durand, N., Gianazza, D.: Implementing an interval computation library for OCaml on x86/amd64 architectures. In: ICFP. ACM (2012)
- [2] Khanh, T.V., Ogawa, M.: {SMT} for polynomial constraints on real numbers. Electronic Notes in Theoretical Computer Science 289(0), 27 – 40 (2012), third Workshop on Tools for Automatic Program Analysis (TAPAS' 2012)

³ <http://irram.uni-trier.de>

⁴ <http://minisat.se/>