

Symbolic Computation Techniques in SMT Solving: Mathematical Beauty meets Efficient Heuristics

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Checking the satisfiability of quantifier-free real-arithmetic formulas is a practically highly relevant but computationally hard problem. Some beautiful mathematical decision procedures implemented in computer algebra systems are capable of solving such problems, however, they were developed for more general tasks like quantifier elimination, therefore their applicability to satisfiability checking is often restricted.

In computer science, recent advances in satisfiability-modulo-theories (SMT) solving led to elegant embeddings of such decision procedures in SMT solvers in a way that combines the strengths of symbolic computation methods and heuristic-driven search techniques. In this talk we discuss such embeddings and show that they might be quite challenging but can lead to powerful synergies and open new lines of research.