Invited Talk: Deciding Satisfiability of Quantified Bitvector Formulae with BDDs

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Abstract

At the beginning, the talk recapitulated some facts about binary decision diagrams (BDDs) and recalled the asymptotic complexity of the satisfiability problem for quantified bitvector formulae. Next, we explained a naive approach to deciding the satisfiability problem using BDDs. Further, we described the techniques and improvements that make this approach competitive, namely

- simplifications of formulas with unconstrained variables,
- approximations based on effective bit-width reduction, and
- operation abstraction.

All these techniques are implemented in the SMT solver Q3B. We showed an experimental comparison of this tool with its competitors. Finally, we presented some future research directions.

The talk was based on joint work with Martin Jonáš [1, 2, 3, 4, 5].

Declaration on Generative AI

During the preparation of this work, the author used Grammarly for grammar and spelling check.

References

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