

YicesQS, an extension of Yices2 for quantifiers (SMT-comp 2024)

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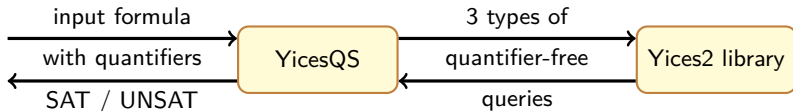
YicesQS implements a variant of the QSMA algorithm presented at CADE'2023:

<https://www.csl.sri.com/users/sgl/Work/Reports/CADE2023.pdf>

Lazy algorithm related to quantifier elimination and targeting complete theories with procedures for answering 3 types of quantifier-free queries:

- Satisfiability modulo assignment / modulo a model,
- **M**odel-**B**ased **O**ver-approximations (MBO)
- and **M**odel-**B**ased **U**nder-approximations (MBU)

YicesQS is written in OCaml, using Yices2 as a library via its OCaml bindings:



2024: YicesQS entered *NRA*, *NIA*, *LRA*, *LIA*, and *BV* (single-track), as in 2023.

- **Arithmetic:** YicesQS relies on MCSAT, with MBO and MBU relying on *Cylindrical Algebraic Decomposition (CAD)* mechanisms.

We expect it to perform similarly to 2023, with a performance highlight in LRA.

- **BV:** YicesQS uses bitblasting since 2024 (not just MCSAT-BV), leveraging *invertibility conditions* for MBU. Bitblasting should greatly improve the performance.