Model checking using Parameterised Boolean Equation Systems

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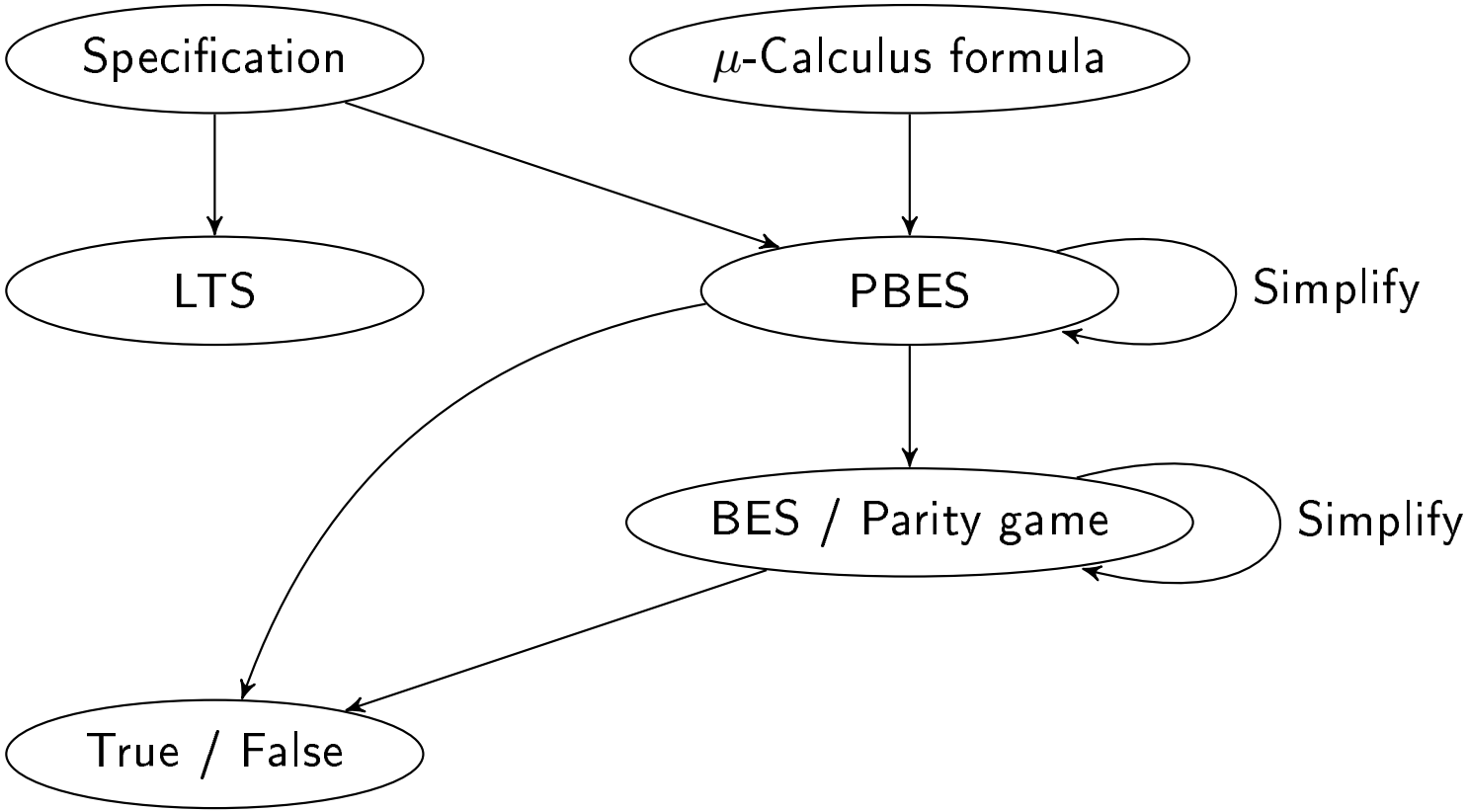
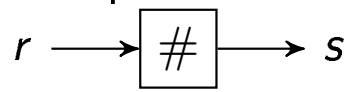
Methodology



Example: Specification

One place buffer



sort $Message$;
map $m_0 : Message$;
act $r, s : Message$;
proc $P(read : Bool, m : Message) =$
$\Sigma m' : Message.read \rightarrow r(m').P(\neg read, m')$
$\neg read \rightarrow s(m).P(\neg read, m_0)$;
init $P(true, m_0)$;

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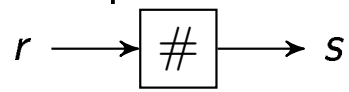

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"The buffer does not contain any deadlocks"

$$\nu X.[true]X \wedge \langle true \rangle true$$

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sort $Message$;
map $m_0 : Message$;
pbes $\nu X(read : Bool, m : Message) =$
$(\forall m' : Message.read \implies X(\neg read, m'))$
$\wedge (\neg read \implies X(\neg read, m_0))$
init $X(true, m_0)$

How to continue?

- Instantiate all data to obtain BES/parity game
  - Reduce modulo equivalences
  - Solve BES/parity game ($NP \cap co - NP$)
- Simplify PBES on a symbolic level

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Current PBES related research:

- Allow equivalence reductions on PBES level
- Improve static simplification techniques
- Simplify correctness proofs of simplification techniques

Thank you!

Want to know more? Come talk to me!