

# FORT<sup>issimo</sup>

## Automating the First-Order Theory of Rewriting

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PhD project supervised by Prof. Dr. Aart Middeldorp

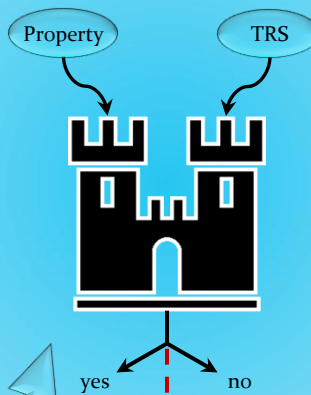
### FORT

#### Property

- arbitrary first-order formula over rewrite relations as predicates
- E.g.  $\forall s \exists t (s \rightarrow^* t \wedge \neg \exists u (t \rightarrow u))$

#### Goals

- Formalizing underlying theory [1]
- Improving expressiveness of FORT [2]
  - combinations of TRSs
  - witness generation
- Improving performance of FORT
  - formula normalization
  - parallel programming techniques



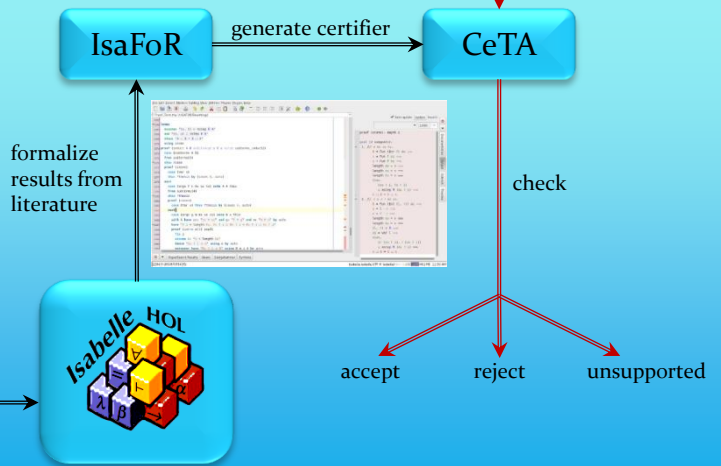
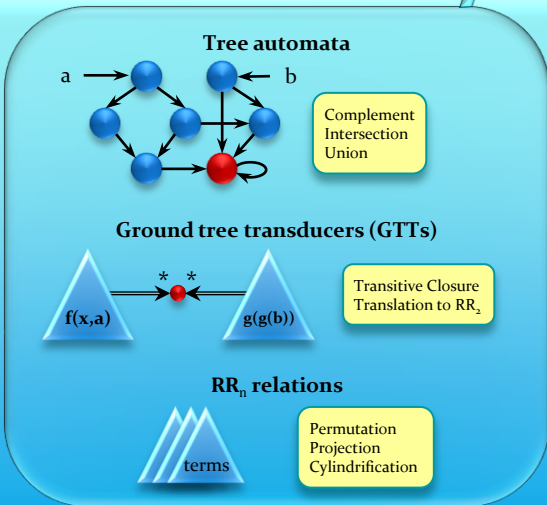
#### Restriction

- left-linear right-ground TRSs
- decidable theory

#### Synthesis mode

- **input:** property
- **output:** TRS satisfying the given property
- options to restrict infinite search space

### Formalization



[1] M. Dauchet and S. Tison.  
The theory of ground rewrite systems is decidable.  
*Proc. 5th LICS*, pages 242–248, 1990.



[2] F. Rapp and A. Middeldorp.  
Automating the First-Order Theory of Left-Linear  
Right-Ground Term Rewrite Systems.  
*Proc. 1st FSCD, LIPIcs 52*, pages 36:1–36:12, 2016.



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