A Two Step Perspective for Kripke Structure Reduction

Arpit Sharma

RWTH Aachen University, Germany

SOFSEM, 2013
Motivation - Model checking

\[ \omega, \text{LTL} \rightarrow \text{Model Checker} \rightarrow \text{KS} \rightarrow \text{Yes}, \text{Out of memory}, \text{No + CE} \]
Motivation - Model checking

Problem = State Space Explosion
Motivation - Behavioral Equivalence
Motivation - Behavioral Equivalence

Do they possess the same behavioral properties?
Kripke Minimization Equivalence (KME)

Main Results

- Structural definition of KME.
- Quotient system under KME.
- Strictly coarser than bisimulation.
- Preservation of linear-time ($\omega$-regular) properties.
- Compositional w.r.t. synchronous composition.
Weak Kripke Minimization Equivalence (WKME)

Main Results

- Structural definition of WKME.
- Quotient system under WKME.
- Strictly coarser than divergence-sensitive stutter bisimulation.
- Preservation of stutter-insensitive linear-time ($\omega$-regular) properties.
Thank You