Towards Using Multiple Counterexamples for Abstraction Refinement

Ákos Hajdu\textsuperscript{1,2}, Zoltán Micskei\textsuperscript{1}

\textsuperscript{1}Budapest University of Technology and Economics
Department of Measurement and Information Systems

\textsuperscript{2}MTA-BME Lendület Cyber-Physical Systems Research Group

Abstraction refinement-based model checking

Research question: considering multiple counterexamples
  - Overhead, but possibly better refinements

Preliminary experiments
  - Theta framework, [github.com/FTSRG/theta](https://github.com/FTSRG/theta) (presented at FMCAD, Thursday)
  - HWMCC, SV-COMP, PLC models
Counterexample Structures

- Multiple paths to a single erroneous state

Refinement ideas
- Prefix/suffix: no benefit
- Middle: refine all counterexamples at once
  - Fewer but larger iterations
  - Explore $k$ counterexamples $\rightarrow$ configurable
Countereexample Structures

- Multiple paths to multiple erroneous states

- Refinement ideas
  - Prefer *early pruning* strategy
  - Determine (coarsest) *common* precision
Summary

- Preliminary results are interesting

- Plans
  - Develop and implement refinement ideas
  - More inputs, more thorough experiments

inf.mit.bme.hu/en/members/hajdua

github.com/FTSRG/theta