Observer-based Automatic Verification of DC Properties for TA

Contents & Goals

Last Lecture:

• Undecidability Results for TA

This Lecture:

• Educational Objectives:
  - Capabilities for following tasks/questions.
  - How can we relate TA and DC formulae? What's a bit tricky about that?
  - Can we use Uppaal to check whether TA satisfies a DC formula?

Content:

• An evolution-of-observables semantics of TA
• A satisfaction relation between TA and DC
• Model-checking DC properties with Uppaal

Observer-based Automatic Verification of DC Properties for TA

Recap

Designs

Programs

PLC-Automata

Timed Automata

Networks of Timed Automata

Region/Zone-Abstraction

Extended Timed Automata

Undecidability Results

• Automatic Verification... whether TA satisfies DC formula, observer-based...
Observing Timed Automata

Example: Let’s Start With Single Runs

Example 2: Another Single Run

Model-Checking DC Properties with Uppaal
The observables $\text{Obs}(N)$ of $N$ are $\{\ell_1, \ldots, \ell_n\} \cup \bigcup_{1 \leq i \leq n} V_i$ with

- $D(\ell_i) = L_i$,
- $D(v) = v$ as given, $v \in V_i$.

References