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What we have done

WP3: Characterizing fairness, liveness and distribution in timed models


WP4: asymptotic performance measures for timed systems

Project evaluation: development or improvement of software tools

FASE: a tool for worst case evaluation. In submission.
WP4: asymptotic performance measures for timed systems

- A refined notion of the qualitative preorder for comparing the WCE of asynchronous processes
- Motivation: Why Fifo $\not\sqsubseteq$ Pipe and Pipe $\not\sqsubseteq$ Fifo but quantitatively Fifo is faster than Pipe?
- Counterexamples show that the problem is in the too much general class of tests considered for $\sqsubseteq$
- Use suitable subclasses of tests (e.g. i/o response tests)
- Find a decidable characterization by inclusion of (properly-defined) refusal trace sets
- “Complete the picture, validate the framework”
WP4: rephrasing of performance measures for timed probabilistic systems

- Porting the qualitative and quantitative preorder for comparing the WCE in the Timed Automata setting
- Find a decidable characterization
- Comparing the results of the case study in this setting
WP4: rephrasing of performance measures for timed probabilistic systems

**Definition**

Let \( \varphi \) a property expressed in a given property language \( \mathcal{L} \), let \( A_1, A_2 \) be two timed automata with \( A_1 \models \varphi \). We say that:

- \( A_1 \) is *more efficient* than \( A_2 \) when satisfying the property expressed by \( \varphi \), written \( A_1 \sqsupseteq \varphi \ A_2 \), iff, for each \( n \in \mathbb{N} \),
  \[
  \text{Stop}^n(A_2) \models \varphi \implies \text{Stop}^n(A_1) \models \varphi
  \]

- \( A_1 \) is *more efficient* than \( A_2 \) iff, for each property \( \varphi \in \mathcal{L} \),
  \( A_1 \sqsupseteq \varphi \ A_2 \).
What we are working on

WP4: rephrasing of performance measures for timed probabilistic systems

- The role of the class of tests is played by the property language $\mathbb{L}$
- We restrict ourselves on using only reachability properties
- Decidable characterization of $\sqsupseteq \varphi$ by calculating minimum and maximum delays for reaching a set of states in a TA
- Decidable characterization of $\sqsubseteq$: could be found for certain $\mathbb{L}$, e.g. i/o response properties
What we could do together

WP4: rephrasing of performance measures for timed probabilistic systems

- Porting the qualitative and quantitative preorder for comparing the WCE in the \textit{probabilistic/stochastic} Process Algebras setting
- Porting the qualitative and quantitative preorder for comparing the WCE in the \textit{Probabilistic Timed Automata} setting
- Find decidable characterizations
- Analysis of suitable case studies in these settings
WP5: new transformation (and backpropagation) functions between models of performability

- Find a suitable way to represent general “flat” queueing networks with a lts-like (formal) object
- Abstract the network to identify repeating templates, define equivalences, find hierarchical structures
- Reason about properties and structures of the abstract model and relate the results with the original flat model
Thanks!

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