Ongoing work Paco@Unicam

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What we have done

WP3: Characterizing fairness, liveness and distribution in timed models

- Flavio Corradini, Maria Rita Di Berardini, and Walter Vogler. Liveness of a Mutex Algorithm in a Fair Process Algebra. *Acta Informatica* 46(3):209-235 (2009).
- Flavio Corradini, Maria Rita Di Berardini, and Walter Vogler. Time and Fairness in a Process Algebra with Non-blocking Reading. In Proceedings of 35th Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2009), LNCS 5404:193-204 (2009).

What we have almost done

WP4: asymptotic performance measures for timed systems

Project evaluation: development or improvement of software tools

FASE: a tool for worst case evaluation. In submission.

What we are working on

WP4: asymptotic performance measures for timed systems

- A refined notion of the qualitative preorder for comparing the WCE of asynchronous processes
- Motivation: Why Fifo $\not\sqsupseteq$ Pipe and Pipe $\not\sqsupseteq$ Fifo but quantitatively Fifo is faster than Pipe?
- Counterexamples show that the problem is in the too much general class of tests considered for $\sqsupseteq$
- 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"

What we are working on

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

What we are working on

WP4: rephrasing of performance measures for timed probabilistic systems

Definition

Let φ a property expressed in a given property language $\mathbb{L}$, 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 φ, written $A_1 \sqsupseteq_\varphi A_2$, iff, for each $n \in \mathbb{N}$,

$$\text{Stop}^n(A_2) \models \varphi \text{ implies } \text{Stop}^n(A_1) \models \varphi$$

- A_1 is *more efficient* than A_2 iff, for each property $\varphi \in \mathbb{L}$, $A_1 \sqsupseteq_\varphi A_2$.

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
- à la: Luca Aceto, Patricia Bouyer, Augusto Burgueño, Kim Guldstrand Larsen. The power of reachability testing for timed automata. Theor. Comput. Sci. 300(1-3): 411-475 (2003)
- Decidable characterization of $\sqsupseteq_\varphi$ by calculating minimum and maximum delays for reaching a set of states in a TA
- Decidable characterization of $\sqsupseteq$: 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 probabilistic/stochastic Process Algebras setting
- Porting the qualitative and quantitative preorder for comparing the WCE in the Probabilistic Timed Automata setting
- Find decidable characterizations
- Analysis of suitable case studies in these settings

What we are thinking on

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


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Thanks!