

- Diploma / Master / Bachelor Thesis -

Model Checking Queueing Networks

What is it all about?

Queueing networks consist of interconnected queueing stations (see Figure 1) where jobs of different type are processed. The analysis and model checking of such networks is a challenging task; the underlying semantical models are of infinite size. However, they are highly structured and thus provide a target for reduction techniques such as abstraction. Lately, it has been successfully shown how to analyse queueing stations by applying abstraction. The goal of this thesis is to extend this work into several directions.

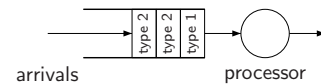


Figure 1: Queueing station

What is to be done?

Goals of this thesis are:

1. Implementation and automation of abstraction for queueing networks (an algorithm for the analysis of the abstract model is already implemented in MRMC¹; exemplary results are shown in Figure 2).
2. Integration into a graphical frontend.
3. Answering theoretical questions that arise in the context of the implementation.

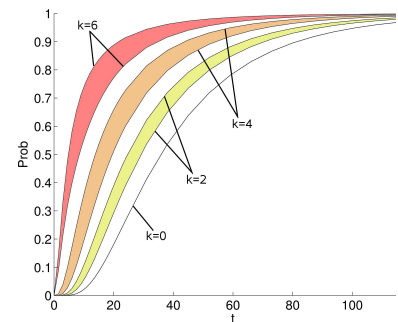


Figure 2: Probability bounds for serving all but k jobs within t time units.

The extent and emphases of the thesis can be easily adjusted with respect to the degree aimed at (Diploma, Master, Bachelor).

Requirements

- Programming experience (in the language of your choice).
- Basic knowledge in modelling probabilistic systems and on model checking are helpful.

Contact

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¹MRMC stands for [Markov Reward Model Checker](#); it is developed, among others, at I2.