

DD2552 - Seminars on Theoretical Computer Science, Programming Languages and Formal Methods, Seminar 11

Karl Palmskog (palmskog@kth.se)

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Last Seminar and Today

Last seminar:

- tools for PTAs
- general hybrid systems with ODEs

Today:

- Bayesian estimation and hypothesis testing
- Bayesian modeling of systems
 - hybrid systems
 - biological systems

When do we need statistical model checking?

- state spaces $> 10^9$
- hybrid systems
- biological systems
- ...

- modeling package for Matlab
- used for embedded systems analysis
- “dataflow programming”
- can be used to generate traces

Bayesian statistics

- focuses on **beliefs** and **belief revision**
- Bayes theorem is central
- based on using **priors**

Bayesian estimation and intervals

- Bayesian approach can be used instead of frequentist approach and Chernoff bounds
- different performance characteristics and tradeoffs

Bayesian hypothesis testing

- analogous to sequential probability ratio test
- takes “Bayes threshold” T as input
- no need for indifference region (half-interval δ)