



TECHNISCHE  
UNIVERSITÄT  
DARMSTADT

## Master thesis

### Neural Variational Inference for Markov Jump Processes

This thesis investigates the latent state inference and parameter learning of Markov Jump Processes from noisy observations. Markov Jump Processes are continuous-time stochastic processes with applications in many fields such as biology, queuing theory and finance. However, for large Markov Jump Processes exact inference of the latent state and parameter learning is intractable. The goal of this thesis is to apply variational inference, a deterministic approximation to the inference problem. Therefore, we want to approximate the posterior process with neural networks and learn a good parametrization with stochastic gradient methods.

Some of the following may help:

- Knowledge of stochastic processes
- Good Python skills, preferably in pyTorch
- Deep Learning Expertise

For further information, please contact Yannick Eich.

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