

*Talk by*

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## A variational approach to path estimation and parameter inference of hidden diffusion processes

### Abstract

We consider a hidden Markov model, where the signal process, given by a diffusion, is only indirectly observed through some noisy measurements. In this talk, we present a variational method for approximating the hidden states of the signal process given the full set of observations that leads to an optimal control problem. This, in particular, leads to systematic approximations of the smoothing densities of the signal process. We then demonstrate how an efficient inference scheme, based on this variational approach to the approximation of the hidden states, can be designed to estimate the unknown parameters of stochastic differential equations. An example at the end illustrates the efficacy and the accuracy of the presented method.

### Speaker Bio

Tobias Sutter is a PhD student in the Automatic Control Laboratory, Dept, ETH Zurich, Switzerland, where his advisor is Prof. John Lygeros. Tobias received a B.Sc. degree in Mechanical Engineering in 2010 and an M.Sc. degree in Robotics, Systems and Control in 2012, both from ETH Zurich. His research interests include approximate dynamic programming, control under communication constraints and information theory.