Integrating epistemically uncertain dynamical systems

Steffen Ridderbusch

Department of Engineering Science, University of Oxford

Monday 19 February
1300hrs
LR7, IEB

Abstract:

In the context of machine learning and non-parametric models for system identification we consider a dynamical system model expressed by a Gaussian Process, that is a distribution over the space of differential equation models. This distribution expresses epistemic uncertainty, resulting from measurement noise, which reduces when additional measurements are added. This contrasts with the far more common setting of aleatory uncertainty expressed by stochastic differential equations, which capture the irreducible randomness of a system.

In this talk, we introduce the setting and how to compute trajectories for these models. We show the novel methods we developed to compute approximate solutions to capture the distribution of trajectories arising from the distribution of models, which comes with interesting challenges and pitfalls.