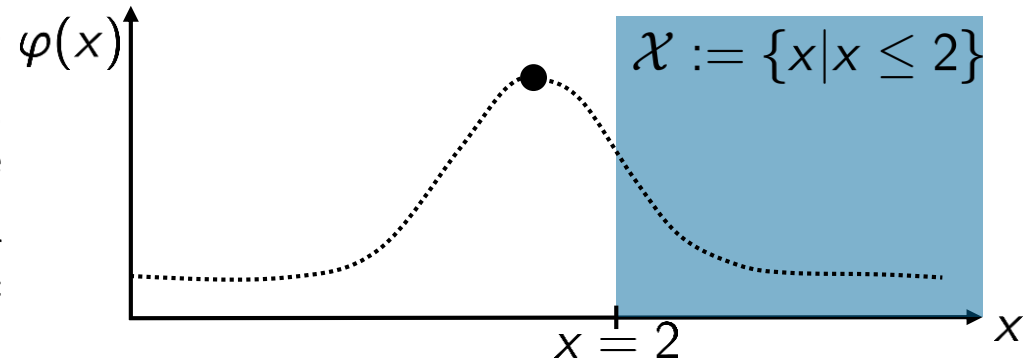


Machine learning under constraints

Projektseminar (2-4 Personen, Homeoffice)

Gaussian processes are a stochastic machine learning technique which can be used for regression tasks. Instead of providing a deterministic approximation of a test function, they provide stochastic predictions. The posterior distribution of a GP can be described by a posterior mean function and posterior variance. Often, the variance is used as a measure of the certainty or quality of the predictions. However, this is not a deterministic error bound.



The goal of this work is to setup a Gaussian process with finite support. I.e. the idea is to include deterministic constraints in Gaussian processes by using truncated Gaussian distributions. This setup should build the basis for the use of truncated Gaussian processes for controller design with deterministic constraints such as robust MPC. The work has a strong theoretical focus with simulation tasks for visualization of the results. Furthermore, a robust controller design (e.g. a tube-based MPC) might be part of the work (depending on the number of participants and the progress during the project). The work includes a literature research, building a solid understanding of truncated normal distributions and the transfer of this knowledge to Gaussian processes.

The following prerequisites will be useful for the project

Experience with / knowledge about:	Strong background in stochastics
Programming skills:	Matlab or Python
Language:	German or English

Dr.-Ing. Janine Matschek

E-Mail: janine.matschek@iat.tu-darmstadt.de

