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The linear algebra of Gaussian processes

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Gaussian processes are a versatile tool in statistics and machine learning. They are suitable candidates to generate surrogate models that come with integrated uncertainty quantification of the reduced model. The quality of the model heavily depends on the choice of the hyperparameters and to train these on the given data many linear algebra challenges arise. In this talk we will briefly recall the basics of Gaussian processes and then explain the NLA challenges. We will discuss several strategies to handle these and will show how in the case of multi-output GPs we obtain a Stein equation that we then solve using low-rank techniques. We will also discuss the possibility of using mixed precision methods to speed up the training process.

Primary author: STOLL, Martin (TU Chemnitz)

Presenter: STOLL, Martin (TU Chemnitz)

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