

Bayesian Inverse Problems (L16)

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Inverse problems arise from the need to gain information about an unknown object of interest from given indirect measurements. Inverse problems have several applications varying from medical imaging and industrial process monitoring to ozone layer tomography and modelling of financial markets. The common feature for inverse problems is the need to understand indirect measurements and to overcome extreme sensitivity to noise and modelling inaccuracies. In this course we employ statistical approach to inverse problems to find stable and meaningful solutions that allow us quantify how uncertainty in the data or model affects the obtained estimate.

Pre-requisites

This course assumes basic knowledge in analysis and probability theory (e.g. Linear Analysis, and Probability and Measure).

Literature

1. M. Dashti and A.M. Stuart, *The Bayesian approach to inverse problems, Handbook of Uncertainty Quantification*. Springer, 2017.
2. A.M. Stuart, *Inverse problems: a Bayesian perspective*. Acta Numerica, 2010.
3. T.J. Sullivan, *Introduction to Uncertainty Quantification*. Springer, 2015.

Additional support

Three examples sheets will be provided and three associated examples classes will be given. There will be a one-hour revision class in the Easter Term.