Contribution ID: **154** Type: **not specified**

Botond Szabo- Linear methods for nonlinear inverse problems

Wednesday, October 5, 2022 10:00 AM (1 hour)

We consider recovering an unknown function f from a noisy observation of the solution u to a partial differential equation, where for the elliptic differential operator L, the map L(u) can be written as a function of u and f, under Dirichlet boundary condition. A particular example is the time-independent Schrödinger equation. We transform this problem into the linear inverse problem of recovering L(u), and show that Bayesian methods for this problem may yield optimal recovery rates not only for u, but also for f. The prior distribution may be placed on u or its elliptic operator. Adaptive priors are shown to yield adaptive contraction rates for f, thus eliminating the need to know the smoothness of this function. Known results on uncertainty quantification for the linear problem transfer to f as well. The results are illustrated by several numerical simulations.
This is a joint work with Geerten Koers and Aad van der Vaart.