Convergence results for Bayesian inversion

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In this talk, convergence results for regularized solutions of linear inverse problems obtained by the Bayesian approach are derived in the Ky Fan metric. It is shown that the convergence rates are order optimal in finite dimensional spaces. Both the conditional mean estimate and the posterior distribution obtain convergence rates with the same order as the noise when measured in the Ky Fan metric under the assumption that the prior and the noise distributions are normal and independent.

Furthermore, convergence issues when a linear inverse problem between real separable Hilbert spaces is discretized via projection are studied. It is shown that the finite dimensional conditional mean estimate cannot converge in the Ky Fan metric to the least squares minimum norm solution as the dimension tends to infinity. A weighted Bayesian approach is proposed which can be obtained by changing the norm in the underlying space. It is proven that both the weighted conditional mean estimate and the weighted posterior distribution obtain order optimal convergence rates when measured in the Ky Fan metric.

The results were obtained in collaboration with Prof. Andreas Neubauer, Johannes Kepler University Linz, Austria.