Einladung zum Oberseminar Wissenschaftliches Rechnen

Julius-Maximilians-Universität Würzburg
Lehrstuhl für Wissenschaftliches Rechnen IX

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Adaptive minimax optimality in statistical inverse problems

We consider statistical linear inverse problems in separable Hilbert spaces and filter-based reconstruction methods. Whenever such a method is used in practice, the regularization parameter has to be chosen appropriately. Typically, the aim is to find or at least approximate the best possible choice of parameter in the sense that mean squared error (MSE) with respect to the true solution is minimized.

In this talk, we introduce the Sharp Optimal Lepskii-Inspired Tuning (SOLIT) method, which yields an a posteriori parameter choice rule ensuring adaptive minimax rates of convergence. It depends only on the noisy data, the noise level, the forward operator and the filter. But it does not require any problem-dependent tuning of further parameters. We obtain an oracle inequality for the corresponding MSE in a general setting and derive the rates of convergence in different scenarios. By a careful analysis we show that no other a posteriori parameter choice rule can yield a better performance in terms of the convergence rate of the MSE.

In particular, our results reveal that the typical understanding of Lepskii-type methods in inverse problems leading to a loss of a log factor is wrong. In addition, the empirical performance of SOLIT is examined in simulations.

This is a joint work with Frank Werner.

Ort: Raum **SE 41.00.006 (Forschungsbau Emil-Fischer-Str. 41)**

Zeit: Montag, 19.06.2023, 14:15 Uhr

Zu diesem Vortrag laden wir Sie herzlich ein.
You are cordially invited to this lecture.

gez. Prof. Dr. Alfio Borzì
gez. Prof. Dr. Frank Werner