



Minisymposium 25 - Inverse Probleme und Inkorrektheits-Phänomene

The potential of descriptive multi-parameter regularization approaches

TORSTEN HEIN (TU CHEMNITZ)

Tikhonov-Phillips regularization is probably one of the most popular and best-understood regularization methods. Besides the regularization parameter which can be chosen for example by the discrepancy principle the choice of the penalty functional seems to be very crucial. In particular, if the solution which has to be determined has inhomogeneous properties or the noise-level is known only partially there probably does not exist an 'optimal' penalty term. We can overcome such problems with multi-parameter regularization. Instead a single regularization parameter and penalty we introduce a vector of regularization parameters with corresponding penalty functionals. The applications are various. So we can combine (partial) Tikhonov regularization with (partial) descriptive regularization approaches if we know a priori information about our solution. We present a discrepancy-like parameter choice based on Lagrangian techniques. An algorithm for solving the corresponding problem is proposed and illustrated by a numerical example.