



Minisymposium 25 - Inverse Probleme und Inkorrektheits-Phänomene

Some new results on approximate source conditions

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This talk presents research which was in various combinations partly done in collaboration with Dana Düvelmeyer (TU Chemnitz), Peter Mathé (WIAS Berlin) and Masahiro Yamamoto (Univ. Tokyo). There are given some new ideas and results for finding convergence rates in regularization for ill-posed linear inverse problems with compact and non-compact forward operators based on the consideration of approximate source conditions. In this context, we exploit distance functions measuring the violation of a source condition that works as a benchmark. Under specific range inclusions the decay rate of distance functions is verified explicitly. Applications to non-compact multiplication operators are given. An important new result is that we can show for compact operators a one-to-one correspondence between the maximal power type decay rates for the distance functions and maximal exponents of Hölder rates in Tikhonov regularization linked by the specific singular value expansion of the solution element. Some numerical studies on simple integration illustrate the compact operator case and the specific situation of discretized problems.