Convergence rates for Morozov's discrepancy principle

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Abstract

In this talk we discuss convergence rates for convex, variational regularization methods of non-linear ill-posed problems in Banach spaces. Using variational inequalities, which generalize classical source and nonlinearity conditions, together with Morozov's discrepancy principle – an a-posteriori parameter choice rule – we obtain rates with respect to the Bregman distance and a Taylor-type distance. Then these results are combined to derive rates in norm and in the penalty term topology.

In the framework of sparse recovery, where the penalty terms are chosen to be weighted ℓ_p-norms, $p \in [1, 2)$, in order to recover sparse solutions, the convergence rates we obtain are of up to linear order in norm.