On the convergence speed of iterative methods for linear inverse problems with sparsity constraints

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Abstract:

In this talk we report on different iterative algorithms for the minimization of Tikhonov type functionals which involve sparsity constraints in form of ℓ^p-penalties.

One part is devoted to generalized gradient methods and their connection the well known iterative shrinkage methods. We establish convergence rates of $\mathcal{O}(n^{-1/2})$ and $\mathcal{O}(\lambda^n)$ for $p = 1$ and $1 < p \leq 2$ respectively.

Another part shows the applicability of semismooth Newton methods to the non-smooth problem with $p = 1$. This results in a locally superlinear convergent algorithm.

Numerical experiments are given and illustrate the established convergence rates.