A Generalized Krylov Subspace Method for $\ell_p$-$\ell_q$ Minimization

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We present a new efficient approach for the solution of the $\ell_p$-$\ell_q$ minimization problem based on the application of successive orthogonal projections onto generalized Krylov subspaces of increasing dimension. The subspaces are generated according to the iteratively reweighted least-squares strategy for the approximation of $\ell_p/\ell_q$-norms by weighted $\ell_2$-norms. Computed image restoration examples illustrate that it suffices to carry out only a few iterations to achieve high-quality restorations. The combination of a low iteration count and a modest storage requirement makes the proposed method attractive.