A monotone scheme for sparsity optimization in ℓ^p with $p \in (0, 1]$

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Nonsmooth nonconvex optimization problems are considered in infinite dimensional sequence spaces ℓ^p with $p \in (0, 1]$. Our starting points are necessary optimality conditions in the form of a complementary system and a monotonically convergent algorithm for a regularized version of the original problem. We propose an algorithm for solving the necessary optimality condition based on a combination of the monotone scheme and an active-set strategy. Numerical results for different test cases are provided, in particular, an application to compressed sensing analysis for super-resolution imaging in microscopy is presented.