



Restricted normal cones and sparsity optimization with affine constraints

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The problem of finding a vector with the fewest nonzero elements that satisfies an underdetermined system of linear equations is an NP-complete problem that is typically solved numerically via convex heuristics or nicely-behaved non convex relaxations. In this paper we consider the elementary method of alternating projections (MAP) for solving the sparsity optimization problem without employing convex heuristics. In a parallel paper we recently introduced the restricted normal cone which generalizes the classical Mordukhovich normal cone and reconciles some fundamental gaps in the theory of sufficient conditions for local linear convergence of the MAP algorithm. We use the restricted normal cone together with the notion of superregularity, which is naturally satisfied for the affine sparse optimization problem, to obtain local linear convergence results with estimates for the radius of convergence of the MAP algorithm applied to sparsity optimization with an affine constraint.

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