A sharp bound on RIC in generalized orthogonal matching pursuit
Wengu Chen and Huanmin Ge

Abstract. Generalized orthogonal matching pursuit (gOMP) algorithm has received much attention in recent years as a natural extension of orthogonal matching pursuit (OMP). It is used to recover sparse signals in compressive sensing. In this paper, a new bound is obtained for the exact reconstruction of every \( K \)-sparse signal via the gOMP algorithm in the noiseless case. That is, if the restricted isometry constant (RIC) \( \delta_{NK+1} \) of the sensing matrix \( A \) satisfies \( \delta_{NK+1} < \frac{1}{\sqrt{\frac{K}{N}+1}} \), then the gOMP can perfectly recover every \( K \)-sparse signal \( x \) from \( y = Ax \). Furthermore, the bound is proved to be sharp. In the noisy case, the above bound on RIC combining with an extra condition on the minimum magnitude of the nonzero components of \( K \)-sparse signals can guarantee that the gOMP selects all of support indices of the \( K \)-sparse signals.