Abstract

In this paper, we introduce a new framework for interpreting the existing theoretical stability results of sparse signal recovery algorithms in practical terms. Our framework is built on the theory of constrained minimal singular values of Gaussian sensing matrices. Adopting our framework, we study the stability of two algorithms, namely LASSO and Dantzig selector. We demonstrate that for a given stability parameter (noise sensitivity), there exists a minimum undersampling ratio above which the recovery algorithms are guaranteed to be stable.
Statistics. SIAM, Philadelphia.

**Index Terms**

Computer Science  
Information Sciences

**Keywords**

Compressed Sensing  
Constrained Minimal Singular Value  
Stability Analysis  
Convex Algorithms  

Undersampling Analysis