

PROMP - PRe-projected Orthogonal Matching Pursuit

The philosophy of Compressed Sensing is that it is possible to recover a sparse signal $x_0 \in \mathbb{R}^d$ from linear measurements $b = Ax_0$, where $A \in \mathbb{R}^{m,d}$, even if $m \ll d$. Two of the many algorithms used to perform such recovery are *Basis Pursuit* (ℓ_1 -minimization) and *Orthogonal Matching Pursuit* (*OMP*). An empirical truth is that *OMP* is faster, at least when the sparsity is low, but has worse recovery probabilities. Can we modify *OMP* in such a way that its recovery performance and/or speed increases, maybe just for some special class of signals?

This talk will present the new algorithm *PROMP*, which uses an ℓ_2 -minimization step (a pre-projection) to just this. The method works particularly well for signals having integer entries but is by no means confined to this setting. The talk will provide a theoretical performance analysis, with a pleasing geometrical intuition, for the case that the measurement matrix is Gaussian. Additionally, some small numerical results will be presented.

Axel Flinth

E-mail: flinth@tu-berlin.de

References

- [1] A. Flinth. Discrete compressed sensing and geometry. Master's thesis, Technische Universität Berlin, 2015.
- [2] A. Flinth and G. Kutyniok. PROMP - combining ℓ_2 -minimization, thresholding and orthogonal matching pursuit for sparse recovery of integer signals. 2015. In preparation.