

Only Close, But Still Cigar Soft Recovery in the Context of General Atomic Norms

Compressed Sensing has been successfully used to recover signals v_0 having sparse decompositions in many different kinds of dictionaries $(\varphi_x)_{x \in I}$, both finite and infinite. Most approaches relying on norm-minimization can be thought of as *atomic norm minimizations*. For many special instances, exact recovery guarantees have been proven.

In some contexts, it might not be necessary to provide guarantees for the ground truth signals v_0 to be *exactly recovered*. Instead, it might only be relevant to approximately recover the components of the sparse decomposition of it. One can think about a musician trying to write down the notes of a musical piece – if an algorithm tells him or her that a tone has a frequency of about 439.7 Hz the musician will be able to identify it as an A in the first octave (having a frequency of 440 Hz).

Up until now, there has existed no way of proving such an approximate recovery statement, with the exception of a small study by the speaker concerning the special case of $\ell_{1,2}$ -minimization. In this talk, we will present a general framework for *soft recovery* which applies to very general atomic norms. It allows to consider uncountably infinite dictionaries, also in infinite-dimensional spaces.

If time admits, we will also have a look at an application of the framework in the context of thermal source estimation. This part of the talk is joint work with Ali Hashemi.

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