BEN ADCOCK, Simon Fraser University

Robustness to unknown error in sparse regularization

Sparse regularization has become increasingly popular in the last decade with the advent of techniques such compressed sensing and matrix completion. Most theoretical guarantees for sparse regularization assume that a bound for the noise is known in advance. Yet there are many practical scenarios where such a bound may not be known *a priori*. While estimation of this bound may be possible, e.g. via cross validation, there are few theoretical results in practical settings which explain the effect of such unknown noise on the overall reconstruction. In this talk I will present new results on the performance of several popular sparse regularization techniques under unknown noise. These results cover both Gaussian random matrices, and large classes of structured random matrices corresponding to random sampling with orthonormal systems. Time permitting, I will give several applications of this work, including high-dimensional function approximation, infinite-dimensional sparse regularization for inverse problems, and fast algorithms for non-Cartesian Magnetic Resonance Imaging.