MIKE DAVIES, University of Edninburgh

Rank Aware Algorithms for Joint Sparse Recovery

This talk will revisit the sparse multiple measurement vector (MMV) problem, where the aim is to recover a set of jointly sparse multichannel vectors from incomplete measurements. This problem has received increasing interest as an extension of single channel sparse recovery, which lies at the heart of the emerging field of compressed sensing. However, MMV approximation also has links with work on direction of arrival estimation in the field of array signal. Inspired by these links, we consider a new family of MMV algorithms based on the well-know MUSIC method in array processing highlighting the role of the rank of the unknown signal matrix in determining the difficulty of the recovery problem. We will show that the recovery conditions for our new algorithms take into account the observed rank of the signal matrix. This is in contrast to previously proposed techniques such as Simultaneous Orthogonal Matching Pursuit (SOMP) and mixed norm minimization techniques which we show to be effectively blind to the rank information. Numerical simulations demonstrate that our new rank aware techniques are significantly better than existing methods in dealing with multiple measurements.