

A new criterion for design matrices in the LASSO

Stéphane Chrétien (Besançon)

Time **Thursday, Febr 26, 2015 at 16:00**

Place **Campus Kirchberg, room B04**

The LASSO estimator is an ℓ_1 -norm penalized least-squares estimator, which was introduced for variable selection in the linear model. When the design matrix satisfies, e.g. the Restricted Isometry Property, or has a small coherence index, the LASSO estimator has been proved to recover, with high probability, the support and sign pattern of sufficiently sparse regression vectors. Under similar assumptions, the LASSO satisfies adaptive prediction bounds in various norms. The present note provides a prediction bound based on a new index for measuring how favorable is a design matrix for the LASSO estimator. We study the behavior of our new index for matrices with independent random columns uniformly drawn on the unit sphere. Using the simple trick of appending such a random matrix (with the right number of columns) to a given design matrix, we show that a prediction bound similar to the one in the work of Candès Plan (Annals of Statistics 2009) holds without any constraint on the design matrix, other than restricted non-singularity.