

Oracle inequalities in inverse problems

Prof. Laurent Cavalier - Université Aix-Marseille 1

We consider a statistical linear inverse problems where we need to estimate a function f from indirect noisy observations. Let a finite set Λ of linear estimators be given. Our aim is to mimic the estimator in Λ that has the smallest risk on the true f . Under general conditions, we show that this can be achieved by simple minimization of unbiased risk estimator, provided the singular values of the operator of the inverse problem decrease as a power law. The main result is a nonasymptotic oracle inequality. This inequality can be also used to obtain sharp minimax adaptive results. Another method called Risk Hull Minimization is also quickly discussed and an oracle inequality is also given.