

Bias reduction and efficiency in estimation of smooth functionals of high-dimensional parameters.

Vladimir Koltchinskii
School of Mathematics, Georgia Tech

The problem of estimation of smooth functionals of high-dimensional parameters of statistical models will be discussed. The main focus will be on a new method of bias reduction based on approximate solutions of integral equations on the parameter space with respect to certain Markov kernels. In the case of high-dimensional normal models, this approach yields estimators with minimax optimal mean squared error rates (in particular, asymptotically efficient estimators) for all sufficiently smooth functionals. The proofs of these results rely on a variety of probabilistic tools, including Gaussian concentration, representations of Markov chains as superpositions of independent smooth random maps and information-theoretic lower bounds. Time permitting, we will also discuss similar results for some log-concave models (based on high-dimensional normal approximation).