Optimal estimation of functions of high-dimensional mean and covariance matrix

Haolei Weng
Department of Statistics and Probability
Michigan State University

Abstract

We consider estimating a functional involving both mean vector and covariance matrix. The functional carries important information across a sequel of multivariate statistics problems. We study the minimax estimation of the functional in the high-dimensional setting. Akin to past works on functional estimation, we reveal that the minimax rate of the functional undergoes a phase transition between regular parametric rate and some form of high-dimensional rate. In addition, we show that the optimal rate is attained by a carefully designed plug-in estimator based on de-biasing. On the contrary, a family of naive plug-in estimators are proved to fall short.