

Abstract

"In high-dimensional and nonparametric statistical models, optimal estimators typically require a model selection or regularisation step, and as a consequence using them for inference is a non-obvious task. Particularly, the construction of 'honest' confidence regions that are valid uniformly in the parameter space may not be possible. I will explain the main ideas of a decision-theoretic framework (that has emerged in the last 10 years or so) that gives general information-theoretic conditions which allow to check whether honest confidence sets exist or not in a given statistical model. These conditions involve the minimax solution of certain composite high-dimensional testing problems, somewhat related to the minimax 'signal detection' problem. I will show how the general theory can be applied to several examples, such as sparse or nonparametric regression, density estimation, low rank matrix recovery and matrix completion."