

Estimating regression parameters: a mosaic of estimation strategies

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In this talk, I address the problem of estimating a vector of regression parameters in a partially linear model. My main objective is to provide natural adaptive estimators that significantly improve upon the classical procedures in the situation where some of the predictors are inactive that may not affect the association between the response and the main predictors.

In the context of two competing regression models (full and sub-models), we consider shrinkage estimation strategy. The shrinkage estimators are shown to have higher efficiency than the classical estimators for a wide class of models. We develop the properties of these estimators using the notion of asymptotic distributional risk. Further, we proposed absolute penalty type estimator (APE) for the regression parameters which is an extension of the LASSO method for linear models. The relative dominance picture of the estimators are established. Monte Carlo simulation experiments are conducted and the non-parametric component is estimated based on kernel smoothing and B-spline. Further, the performance of each procedure is evaluated in terms of simulated mean squared error. The comparison reveals that the shrinkage strategy performs better than the APE/LASSO strategy when, and only when, there are many nuisance variables in the model. I plan to conclude this talk by applying the suggested estimation strategies on a real data set which illustrates the usefulness of procedures in practice.