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Biased Estimation in Generalized Linear Models

In this talk, we consider the estimation problem for the parameters of generalized linear models which may have a large collection of potential predictor variables and some of them may not have influence on the response of interest. In this situation, selecting the statistical model is always a challenging problem. In the context of two competing models, we demonstrate the relative performances of shrinkage and classical estimators based on the asymptotic analysis of quadratic risk functions. We demonstrate that the shrinkage estimator outperforms the maximum likelihood estimator uniformly. For comparison purpose, we also consider an absolute penalty estimation (APE) approach. This comparison shows that shrinkage method performs better than the APE type method when the dimension of the restricted parameter space is large. This talk ends with real-life example showing the value of the suggested method in practice. We consider South African heart disease data, which was collected on males in a heart disease high-risk region of Western Cape, South Africa.