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Title: Model free Multiple Testing using Mirror Statistics (MMM)

Abstract: We consider the multiple testing of the general regression framework aiming at studying the relationship between a univariate response and a p -dimensional predictor. To test the hypothesis of the effect of each predictor, we construct a mirror statistic based on the estimator of the sliced inverse regression without assuming a model of the conditional distribution of the response. According to the newly developed limiting distribution results in this paper, we have shown that the mirror statistic is asymptotically symmetric with respect to zero under the null hypothesis. We then propose the Model-free Multiple testing procedure using Mirror statistics which is shown theoretically that the false discovery rate of this method is less than or equal to a designated level asymptotically. Numerical evidence has shown that the proposed method is much more powerful than alternatives, subject to the control of the false discovery rate.