北京理工大學

数学与统计学院学术报告

Statistical inference after model averaging based on information criterion scores

基于信息准则评分的模型平均方法的统计推断

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摘要： Model averaging has emerged as an important tool for statistical estimation and forecasting. A crucial challenge in model averaging is the selection of model weights. Among the various weight choice methods available, the smoothed-AIC (S-AIC) and smoothed-BIC (S-BIC) methods, which weigh the different models based on their AIC or BIC scores, are arguably the most widely used. One significant advantage of these methods is their ease of use and applicability in all situations where the AIC and BIC can be calculated. However, inference after model averaging based on these methods has only been explored under the local-to-zero asymptotic framework. This framework assumes that all candidate models are in the vicinity of the smallest model, and all parameters, except those in the smallest model, shrink to zero as the sample size increases. In this paper, we present an asymptotic theory for the S-AIC and S-BIC model average estimators without invoking the local-to-zero asymptotic setup. Under a fixed parameter setup, we derive the limiting distributions of the S-AIC and S-BIC model weights and the corresponding model average estimators. We also develop a method for constructing confidence intervals based on these estimators for the parameters of interest. Our asymptotic theory provides a basis for a theoretical examination of the ad-hoc method of post-model averaging inference introduced by Burnham and Anderson (2002). We evaluate the properties of our methods through a simulation study and two real data examples.

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