Asymptotic Optimality of ARM

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Abstract

Model combining has been an alternative to model selection, when a set of candidate models is present, with the intention to produce a model close to the best one rather than selecting the best. The ARM (adaptive regression by mixing) was proposed by Yang (2001) to conduct a model combining algorithm for the regression model with additive noise. A modified ARM with a risk bound was also obtained in Yang (2003). In order to eliminate the influence affected by poor models in the candidate set, a screening procedure can be adopted along with model combing (e.g. Yuan and Yang 2005).

In this talk, we will discuss the asymptotic optimality by investigating the improved risk bound for the modified ARM (Theorem 1) and some screening steps. The improved risk bound explains more on the benefit of the modified ARM. In addition, a risk bound for the modified ARM proceeding from model screening is also found. This risk bound shows the modifed ARM brings a new model with risk bound close to the best one, when a good candidate is used in model screening (Theorem 2). Simulation study will be shown for the illustration purpose.