This work involves interquantile identification and variable selection in two semi-parametric quantile regression models, an additive model and an additive coefficient model.

In the first part, we investigate the commonality of non-parametric component functions among different quantile levels in additive regression models with fixed dimension. We propose two fused adaptive group LASSO penalties to shrink the difference of functions between neighbouring quantile levels. The proposed methodology is able to simultaneously estimate the non-parametric functions and identify the quantile regions where functions are unvarying, and thus is expected to perform better than standard additive quantile regression when there exists a region of quantile levels on which the functions are unvarying.

In the second part, we consider variable selection in quantile additive coefficient models (ACM) with high dimensionality under a sparsity assumption. First, we consider the oracle estimator for quantile ACM when the number of additive coefficient functions is diverging. Then we adopt the SCAD penalty and investigate the non-convex penalized estimator for model estimation and variable selection. Under some regularity conditions, we prove the oracle estimator is a local solution of the SCAD penalized quantile regression problem.

Simulation studies and real data applications illustrate that the proposed methods in this thesis yield better numerical results than some existing methods.

Date: 30 August 2017
Time: 10.00 AM
Venue: Conference Room, SPMS Level 2
Research & Graduate Studies Office
Supervisor: Assoc Prof Xiang Liming