Salzburg Mathematics Colloquium

Summer 2015

Stefan Van Aelst (Ghent)

"Robust inference in the seemingly unrelated regressions model"

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Extended Abstract:

The seemingly unrelated regressions (SUR) model is a popular model in econometrics. It consists of a collection of regression equations of which the error terms are possibly correlated due to exogenous factors. For example, if one studies the yearly profits of companies from different sectors based on a number of relevant covariates, then in a given year the error terms of companies in different sectors may be correlated due to the effects of the general economic situation. The SUR model can be formulated as a type of multivariate regression. The two most popular methods to estimate the model parameters are least squares estimation and Bayesian estimation. Both methods assume a multivariate normal distribution for the correlated errors and are very sensitive to any model deviations that may appear in the data, such as longtailed errors or outliers. In this talk we discuss robust inference for the parameters in the SUR model which is less influenced by model deviations in the data.

We will discuss two robust inference methods. The first approach is a frequentist robust estimation approach with corresponding inference based on bootstrap. We make use of MM-estimators which are highly robust estimators with a high-breakdown point. Robust inference for these estimators is obtained by applying a bootstrap procedure that is fast to compute and guarantees robustness at the same time. The second approach is a Bayesian inference approach which is adapted to obtain full likelihood robustness. By using a longtailed error distribution in the likelihood as is common in robust Bayesian inference, we can easily handle deviations in the response variables. In particular, we use the multivariate Laplace distribution for this purpose. Moreover, we use an adaptive weighting procedure to downweight the effect of possible leverage points in the data. This makes the resulting Bayesian inference procedure fully robust.

Thursday, 15:15-16:00
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