KATHOLIEKE UNIVERSITEIT LEUVEN

Doctoral Seminar

Joint organization by
ORSTAT, Faculty of Business and Economics and the Statistics Research Group, Faculty of Science
Leuven Statistics Research Center

Kukatharmini Tharmaratnam

ORSTAT, K.U.Leuven.

Penalized regression splines and model selection with the S-estimation method

Thursday June 11, 2009
13:00—14:00 !

Location: Room HOG 03,101, Naamsestraat 69, Leuven.
Supporting research project: GOA-project 2007/04

Abstract:
Penalized regression splines are one of the currently most used methods for smoothing noisy data. We define and study S-estimators for penalized regression spline models that take outlying observations into account. Hereby we replace the least squares estimation method for penalized regression splines by a suitable S-estimation method. In this way, we arrive at an estimation method that is both robust and °exible enough to capture non-linear trends in the data. We compare three penalized estimation methods in study: the non-robust method for penalized regression spline estimation, penalized M-estimators and the proposed method using penalized S-estimators. In a second part we derive a model selection criterion in the style of the AIC (Akaike's information criterion) for use with S-estimators. Model selection is a key component in any statistical analysis. We compare three AIC methods, the classical AIC, AIC with M-estimators and AIC with S-estimators. In a simulation study we observe that the proposed AIC with S-estimators selects more appropriate regression models for data sets with a large contamination level of outliers on the response variable.