



KATHOLIEKE UNIVERSITEIT LEUVEN

## **Statistics Seminar**

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

**Dr. Melanie Birke**

University of Bochum, Germany

### **Shape restricted estimation for convolution type inverse regression**

**Thursday April 23, 2009**

**12:00—13:00**

**Location:** Room HOG 03.101, Naamsestraat 69, Leuven.

Supporting research project: GOA-project 2007/04

**Abstract:**

The problem of estimating a function under shape restrictions such as monotonicity or convexity has much been considered in the direct regression setting. Especially the methods based on monotone rearrangements can be easily transferred to inverse regression problems. For the setting of inverse regression with convolution type operator, all estimating procedures start with an unconstrained kernel deconvolution estimate which is in a second step modified with respect to the shape constraints. It can be shown, that under some additional assumptions, the asymptotic distribution of the unconstrained estimate is preserved by those methods. Such estimators have for example an application in estimating the luminosity profile of an elliptical galaxy or in many other settings where the regression function is known to be monotone on a part of its domain. Another application of monotone rearrangements is to test for monotonicity. To this end the rearranged estimator can be compared to the unconstrained one by an  $L_2$ -distance. Asymptotic normality can be derived as long as a central limit theorem for the integrated squared error of derivatives of the unconstrained estimator is available.