Einladung

zu einem Vortrag von

Andrej Srakar, PhD, PhDc

Institute for Economic Research (IER) and Faculty of Economics
University of Ljubljana, Slovenia, srakara@ier.si

zum Thema

Wavelet regressions for compositional data

Montag, 25. März 2019, 15.00 Uhr

Sem.R. DB gelb 04, Freihaus, Turm B (gelb), 4. Stock
TU Wien, Wiedner Hauptstraße 8, 1040 Wien

Abstract:

Regression for compositional data has so far been largely considered only from a parametric point of view. Recently, some work adapted non-parametric regression to non-Euclidean manifolds. For example, Di Marzio et al. (2013) pursue the circular case, and Di Marzio et al. (2014) the spherical one. In a recent article, Di Marzio, Panzera and Venieri (2015) extended this to nonparametric situations, introducing local constant and local linear smoothing for regression with compositional data. Also, Barientos et al. (2015) propose a Bayesian nonparametric procedure for density estimation for data in a d-dimensional simplex. In our analysis, we extend the work of Di Marzio, Panzera and Venieri to locally adaptive estimators, in particular discrete and continuous wavelets. We rely on the work of Dey and Wang (2004), modeling the priors on triangles by use of wavelets constructed specifically for triangles. We transfer their methodology of deriving father and motherwavelets using a special type of Taylor series expansion with C-differentiability and a sequential approach to orthogonalization to derive the motherwavelets. Our new estimator is derived for three cases: simplicial-real; simplicial-simplicial; and real-simplicial regression. We present a detailed statistical elaboration and analysis, simulation results to compare the performance with some existing parametric estimators for compositional data regression, and an application to the results to two case studies from economics–inference for inequality indices and international trade.

This is based on joint work with Prof. Tim R.L. Fry (RMIT University, Melbourne).

References

Barrientos, A.F., A. Jara and F.A. Quintana (2015). Bayesian density estimation for compositional data using random Bernstein polynomials. *Journal of Statistical Planning and Inference*, 166, 116-125.

Dey, D.K. and Y. Wang (2004). Wavelet modeling of priors on triangles. *Journal of Multivariate Analysis*, 89(2), 338-350.

Di Marzio, M., A. Panzera and C.C. Taylor (2013). Non-parametric regression for circular responses. *Scandinavian Journal of Statistics*, 40, 238-255.

Di Marzio, M., A. Panzera and C.C. Taylor (2014). Nonparametric regression for spherical data. *Journal of the American Statistical Association*, 109, 748-763.

Di Marzio, M., A. Panzera and C. Venieri (2015). Non-parametric regression for compositional data. *Statistical Modelling*, 15(2), 113-133.

Andrej Srakar, PhD (Economics), University of Ljubljana. Research Associate, Institute for Economic Research (IER) and Assistant Professor, Faculty of Economics, University of Ljubljana. Main research interests: cultural economics, mathematical statistics, econometric theory, macroeconomics, economics of ageing.