

The application of fractional polynomials and support vector machines in transportation analysis

E. Moons¹, M. Aerts² and G. Wets¹

¹ *Data analysis and Modeling Group,*

² *Center for Statistics,*

Limburgs Universitair Centrum, Universitaire Campus Gebouw D, B - 3590 Diepenbeek, Belgium

ABSTRACT

Transportation analysis has gone through some major changes over the last decade. Activity-based models became more and more important when modeling travel demand. Up till now, these activity-based models have mostly been linear in nature. Though, over the last decennia, flexible linear and nonlinear statistical models became popular in other fields such as medicine (pharmakokinetics, survival analysis, ...) while also in the field of machine learning, some nonlinear models have become standard, consider e.g. classification and regression trees, support vector machines. The idea of this paper is to investigate what flexible linear and nonlinear models, such as fractional polynomial models and support vector machines can add in a logistic regression setting in transportation analysis. Do they perform worse than the widely used logit model or do they yield better results? Are the parameters as interpretable as in linear regression models? We will apply these models to an important aspect of the activity-based process, i.e. to the selection of the transport mode for work-related trips. A comparison in goodness-of-fit among models will be illustrated on real-world activity-diary data.

KEYWORDS: Fractional Polynomial Models; Support Vector Machines; Logistic regression; Goodness-of-Fit.