SEMIPARAMETRIC COMPOSITE LIKELIHOOD INFERENCE IN SPATIAL GENERALIZED LINEAR MIXED MODELS

T.V. Apanasovich[†]

Cornell University, Ithaca, USA

[†] E-mail: *tanya@orie.cornell.edu*

Spatial GLMMs (Diggle, et al. 1998) are flexible models for a variety of applications where we have observations of spatially dependent and non-Gaussian random variables. As in a standard GLMM (Breslow and Clayton, 1993) given the random effects, which they model by a Gaussian random field, the observations are conditionally independent and follow a generalized linear model. The mean is modeled in a general way using regression splines. In a number of applications, neither Bayesian nor maximum likelihood approaches appear practical for large sets of correlated data. To gain computational efficiency, one may approximate the objective function. Instead of the likelihood, we consider a composite likelihood (Lindsay, 1988), which is the product of likelihoods for subsets of data, and estimate parameters by maximizing this product. The asymptotic properties of such estimators will be outlined. The splines have penalty parameters that must converge to zero asymptotically: we derive rates for these parameters that do and do not lead to an asymptotic bias, and we derive the optimal rate of convergence for them. Moreover, we develop a data-driven method for selecting the penalty parameter. The application of the methods to the Modeling Electric Power Distribution System Outages in Hurricanes will be presented.