Generalized linear models (GLMs) are widely used for data analysis. However, one limitation of the existing estimation methods for GLMs is that the link functions are usually restricted to the canonical links as otherwise constraints must be imposed on the model parameters. For example, for Poisson distributed response data, the log-link (canonical) will guarantee that mean of the response data is non-negative. In practice, however, examples exist where the identity-link is preferred over the log-link for Poisson response data.

When a non-canonical link is allowed, another challenge is that number of constraints is at least the sample size. That is, we potentially have a large amount of constraints, and this fact excludes the conventional constrained optimization algorithms.

In this talk, we will discuss a new fitting algorithm for the GLMs where any link function can be selected. Our algorithm is developed from the augmented Lagrange method and it is capable to handle large amount of constraints. We will report results from a simulation study which is aimed to compare the results from the proposed method and other approaches.