Generalized Gaussian Process Regression Model for Non-Gaussian Functional Data

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In this talk we discuss a concurrent generalized Gaussian process regression model for functional data where the functional response variable has a binomial, Poisson or other non-Gaussian distribution from an exponential family while the covariates are mixed functional and scalar variables. The proposed model offers a nonparametric concurrent generalized functional regression method for functional data with multi-dimensional covariates, and provides a natural framework on modeling common mean structure and covariance structure simultaneously for repeatedly observed functional data. The mean structure provides an overall information about the observations, while the covariance structure can be used to catch up the characteristic of each individual batch. The prior specification of covariance kernel enables us to accommodate a wide class of nonlinear models. The definition of the model, the inference and the implementation as well as its asymptotic properties are discussed. Several numerical examples with different non-Gaussian response variables are presented.

Keywords: Covariance kernel, Exponential family, Functional regression analysis, Nonparametric regression.