Semiparametric Generalized Linear Models with Varying Dispersion

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Abstract

A class of heteroscedastic generalized linear regression models is developed in which a subset of the regression parameters may be scaled nonparametrically, or else the model includes a semiparametric regression in the scale component. Efficient semiparametric inferences are derived for the parametric components of the models. Bootstrap tests for scale heterogeneity are also developed. The models provide an approach to adapt for heterogeneity in the data due factors such as to varying exposures and varying levels of aggregation. The methodology is illustrated in simulations and in the analysis of data from collaborative research on ultrasound bioeffects.