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# NONLINEAR REGRESSION MODELING USING REGULARIZED LOCAL LIKELIHOOD METHOD

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**Abstract.** We introduce a nonlinear regression modeling strategy, using a regularized local likelihood method. The local likelihood method is effective for analyzing data with complex structure. It might be, however, pointed out that the stability of the local likelihood estimator is not necessarily guaranteed in the case that the structure of system is quite complex. In order to overcome this difficulty, we propose a regularized local likelihood method with a polynomial function which unites local likelihood and regularization. A crucial issue in constructing nonlinear regression models is the choice of a smoothing parameter, the degree of polynomial and a regularization parameter. In order to evaluate models estimated by the regularized local likelihood method, we derive a model selection criterion from an information-theoretic point of view. Real data analysis and Monte Carlo experiments are conducted to examine the performance of our modeling strategy.

*Key words and phrases*: Information criteria, local maximum likelihood estimates, model selection, generalized linear models, regularization.

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