

SELECTION OF SMOOTHING PARAMETERS IN B -SPLINE NONPARAMETRIC REGRESSION MODELS USING INFORMATION CRITERIA

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Abstract. We consider the use of B -spline nonparametric regression models estimated by the maximum penalized likelihood method for extracting information from data with complex nonlinear structure. Crucial points in B -spline smoothing are the choices of a smoothing parameter and the number of basis functions, for which several selectors have been proposed based on cross-validation and Akaike information criterion known as AIC. It might be however noticed that AIC is a criterion for evaluating models estimated by the maximum likelihood method, and it was derived under the assumption that the true distribution belongs to the specified parametric model. In this paper we derive information criteria for evaluating B -spline nonparametric regression models estimated by the maximum penalized likelihood method in the context of generalized linear models under model misspecification. We use Monte Carlo experiments and real data examples to examine the properties of our criteria including various selectors proposed previously.

Key words and phrases: B -spline smoothing, generalized linear model, information criteria, smoothing parameter selection.