Comparison of some smoothing parameter selection methods in generalized estimating equation-smoothing spline

ABSTRACT

This paper considers performance of some smoothing parameter selection methods in Generalized Estimating Equation-Smoothing Spline for nonparametric regression with binary data. We evaluated eight methods, GCV given by Green and Silverman, GCV and AIC given by Ruppert et al, ACV and GACV given by Xiang and Wahba, AIC given by Chiou and Tsai, SCVD given by WU and Zhang and the last method is AIC*, modification of AlC given by Chiou and Tsai. Using simulation we found that for nonlinear systematic component (sinusoidal) AlC and AIC* of Chiou and Tsai are the best methods and the worst method is GCV of Green and Silverman. For linear systematic component, GCV of Green and Silverman is the best, while AlC and AlC* are the worst. Since in practical situation we do not know the form of the systematic component, hence we suggest the use of ACV and GACV of Xiang and Wahba or AIC of Ruppert et al, which give moderate results.

Keyword: Smoothing parameter; Smoothing spline; GEE; Nonparametric regression; Longitudinal data; Correlated data