

**SMOOTHING PARAMETER SELECTION METHODS FOR
NONPARAMETRIC REGRESSION WITH SPATIALLY
CORRELATED ERRORS**

by

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ABSTRACT

Nonparametric regression makes it possible to visualize and describe spatial trends without requiring the specification of a parametric model, but appropriate choice of smoothing parameters is important to avoid misinterpreting the nonparametric fits. Because spatial data are often correlated, currently available data-driven smoothing parameter selection methods often fail to provide useful results. We propose to adjust the generalized cross-validation (GCV) criterion for the effect of the spatial correlation, and develop an approach to do so in the case of bivariate local polynomial regression. The adjustment uses a pilot fit to the data and the estimation of a parametric covariance model. The method is easy to implement, and we show that it leads to improved smoothing parameter selection results, even when the covariance model is misspecified. The method is illustrated using water chemistry data collected in a survey of lakes in the Northeastern U.S.