

Nonparametric estimation of quadratic regression functionals

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Quadratic regression functionals are important for bandwidth selection of nonparametric regression techniques and for nonparametric goodness-of-fit test. Based on local polynomial regression, we propose estimators for weighted integrals of squared derivatives of regression functions. The rates of convergence in mean square error are calculated under various degrees of smoothness and appropriate values of the smoothing parameter. Asymptotic distributions of the proposed quadratic estimators are considered with the Gaussian noise assumption. It is shown that when the estimators are pseudo-quadratic (linear components dominate quadratic components), asymptotic normality with rate $n^{-1/2}$ can be achieved.

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