ABOUT NONPARAMETRIC ESTIMATION OF THE BERNOULLI REGRESSION FUNCTION

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Let is given sample Y_i, $P(Y_i = 1 \mid x_i) = p(x_i)$, $P(Y_i = 0 \mid x_i) = 1 - p(x_i)$, $i = \overline{1,n}$, $x_i \in [0,1]$, are certain type division points and $p(x)$, $x \in [0,1]$, is unknown Bernoulli regression function. For estimating $p(x)$ is considered kernel type nonparametric estimator analogue of Nadaraya-Watson:

$$\hat{p}_n(x) = \sum_{i=1}^{n} Y_i K\left(\frac{x - x_i}{h_n}\right) \Big/ \sum_{i=1}^{n} K\left(\frac{x - x_i}{h_n}\right),$$

where $K(x)$ satisfies certain conditions and $h_n > 0$, $h_n \to 0$. The question of consistency and asymptotic normality of $\hat{p}_n(x)$ is studied. **P r o v e n**, with probability one $\sup\limits_{0 \le x \le 1} |\hat{p}_n(x) - p(x)| \to 0$. Is introduced the new integral type random process

$$T_n(t) = \sqrt{n} \int_0^t (\hat{p}_n(x) - p(x)) \psi(x) dx.$$

Is shown, that the finite-dimensional distributions of process $T_n(t)$ converge to the finite-dimensional distributions of the Wiener $w(t)$ process, with

$$E|T_n(t_1) - T_n(t_2)|^s \le c|t_1 - t_2|^{s/2}, \quad s > 2.$$

from this by the theorem of Gikhman-Skorokhod follows the important

T h e o r e m . Distribution of $f(T_n)$ for all continuous functionals $f(\cdot)$ defined on $C[0,1]$ converge to the distribution of $f(w)$. In particular, explicitly stated limiting distribution of $\sup T_n(t)$, which is used for construct a criterion for testing Hypothesis.