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The mise and the Hellinger distance of the kernel distribution estimator of functions of observations

Let $X_1, \ldots, X_m$ be identically and independently distributed (i.i.d.) having unknown distribution function F. In this investigation, we propose a kernel method to estimate the distribution function of the function $g(X_1, \ldots, X_m)$. We derived the asymptotic mean square error for the estimator and the asymptotic mean Hellinger distance for the estimator. In addition, we propose a data-based method to obtain the bandwidth based on both the mean square error and the mean Hellinger distance.