

An Improved Estimator for Removing Boundary Bias in Kernel Cumulative Distribution Function Estimation

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Abstract. In this paper we focus on kernel estimates of cumulative distribution functions in case that random variables X_1, \dots, X_n are nonnegative. It is well known that kernel distribution estimators are not consistent when estimating a distribution function near the point $x = 0$. This fact is regrettable in many applications, for example in kernel ROC curve estimation (Koláček and Karunamuni (2007)). In order to avoid this problem we propose a bias reducing technique which is a kind of generalized reflection method. Our method is based on ideas of Karunamuni and Alberts (2005) and Zhang et al. (1999) developed for boundary correction in kernel density estimation. Finally, the proposed estimator is compared with the traditional kernel estimator and with the estimator based on “classical” reflection method using simulation studies.

Keywords: kernel estimation, reflection, distribution estimation.

References

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