Edgeworth expansion for the kernel quantile estimator

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Abstract   Using the kernel estimator of the pth quantile of a distribution brings about an improvement in comparison to the sample quantile estimator. The size and order of this improvement is revealed when studying the Edgeworth expansion of the kernel estimator. Using one more term beyond the normal approximation significantly improves the accuracy for small to moderate samples. The investigation is non-standard since the influence function of the resulting L-statistic explicitly depends on the sample size. We obtain the expansion, justify its validity and demonstrate the numerical gains in using it.

Keywords   Edgeworth expansion · Kernel quantile estimator · Quantile · Validity