

## QUANTILE PROCESS FOR LEFT TRUNCATED AND RIGHT CENSORED DATA\*

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**Abstract.** In this paper, we consider the product-limit quantile estimator of an unknown quantile function when the data are subject to random left truncation and right censorship. This is a parallel problem to the estimation of the unknown distribution function by the product-limit estimator under the same model. Simultaneous strong Gaussian approximations of the product-limit process and product-limit quantile process are constructed with rate  $O\left(\frac{(\log n)^{3/2}}{n^{1/8}}\right)$ . A functional law of the iterated logarithm for the maximal deviation of the estimator from the estimand is derived from the construction.

*Key words and phrases:* Left truncation, right censorship, product-limit, quantile process, Gaussian approximations.

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