

Quantile Estimation for Discrete Data via Empirical Likelihood

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Abstract: Quantile estimation for discrete distributions has not been well studied, although discrete data are common in practice. Under the assumption that data are drawn from a discrete distribution, we examine the consistency of the maximum empirical likelihood estimator (MELE) of the p th population quantile θ_p , with the assistance of a jittering method and results for continuous distributions. The MELE and the sample quantile estimator are closely related, and they may or may not be consistent for θ_p , depending on whether or not the underlying distribution has a plateau at the level of p . We propose an empirical likelihood-based categorization procedure which not only helps in determining the shape of the true distribution at level p , but also provides a way of formulating a new estimator that is consistent in any case. Analogous to confidence intervals in the continuous case, the probability of a correct estimate (PCE) accompanies the point estimator. Simulation results show that PCE can be estimated using the simple bootstrap method.