

**Simultaneous Confidence Bands and Regions for Log-Location-Scale
Distributions with Censored Data**

by

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ABSTRACT

In many areas of application, especially life testing and reliability, it is often of interest to estimate an unknown cumulative distribution (cdf). A simultaneous confidence band (SCB) of the cdf can be used to assess the statistical uncertainty of the estimated cdf over the entire range of the distribution. Cheng and Iles (1983) presented a general approach of constructing an SCB for the cdf of a continuous random variable. For the log-location-scale family of distributions, there are explicit forms for the upper and lower boundaries of the SCB. In this article, we extend the work of Cheng and Iles (1983). We study the SCBs based on local information, expected information, and estimated expected information for both the “cdf method” and the “quantile method.” We also study the effects of exceptional cases where a simple SCB does not exist. We describe calibration of the bands to provide exact coverage for complete data and type II censoring and better approximate coverage for other kinds of censoring. We also extend these procedures to regression analysis.