

**NORMAL APPROXIMATIONS FOR COMPUTING CONFIDENCE
INTERVALS FOR LOG-LOCATION-SCALE DISTRIBUTION
PROBABILITIES**

by

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June 2006

ABSTRACT

Normal approximation confidence intervals are used in most commercial statistical package because they are easy to compute. However, the performance of such procedures could be poor when the sample size is not large or when there is heavy censoring. A transformation can be applied to avoid having confidence interval endpoints fall outside the parameter space and otherwise improves performance, but the degree of improvement (if any) depends on the chosen function. Some seemingly useful transformation functions will cause the estimated variance blow-up in extrapolation, which makes the performance poor. This article reviews statistical methods to construct confidence intervals for distribution probabilities based on a normal distribution approximation and studies the properties of these confidence interval procedures. Our results suggest that a normal approximation confidence interval procedure based on a studentized statistic, which we call the z-hat procedure, has desirable properties. We also illustrate how to apply the z-hat procedure to other functions of the parameters and in more general situations.