

## Goodness-of-Fit Test Using Confidence Intervals of L-Moment Ratio Diagram

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Hydrological frequency analysis is an essential task in hydrological design. The first step in hydrological frequency analysis using a set of annual maximum data is to identify the probability distribution of these annual maxima. Goodness-of-Fit techniques are routinely applied for selection of distributions for hydrological data. Chi-square test and the Kolmogorov-Smirnov Test are two most commonly used methods for goodness-of-fit test. A more recent method proposed by Hosking is the L-moment method. Similar to conventional moment-ratio diagram, the L-moment ratio diagram has been constructed for various types of probability distributions commonly used in hydrological frequency analysis. However, estimates of L-moments using annual maxima involve uncertainties and are dependent on sample size. Theoretical curves in L-moment ratio diagram for various probability distributions do not accommodate for uncertainties induced by parameter estimation using random samples. In this paper we present a method of establishing confidence intervals for L-moment ratio diagram using stochastic simulation. The established confidence intervals are dependent on both sample size and distribution type. Notably, the confidence interval of L-moment ratio for normal distribution takes the shape of ellipses which can be expressed as a function of sample size alone. The derived confidence intervals for various distributions can be used not only for goodness-of-fit test but also for selection of the best-fit distribution.