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CONFIDENCE INTERVAL FOR RATIO OF PERCENTILES OF TWO INDEPENDENT AND SMALL SAMPLES**Abstract:**

In the wood industry, it is common practice to compare in terms of the ratio of two different strength properties for lumber of the same dimension, grade and species or the same strength property for lumber of two different dimensions, grades or species. Because United States lumber standards are given in terms of population fifth percentile, and strength problems arise from the weaker fifth percentile rather than the stronger mean, the ratio should be expressed in terms of the fifth percentiles of two strength distributions rather than the mean.

If n is the sample size, then $n(n+1)/2$ averages of sample points can be created by Hodges-Lehmann method which is utilized to construct the confidence interval for the mean. If $n(n+1)/2$ percentiles are directly found by adjusting Hodges-Lehmann method, then the resulting distribution is highly skewed. Therefore, $n(n+1)/2$ percentiles are suggested to be found by shifting some proper amount from those averages. The distribution of $[n(n+1)/2]^2$ ratios of percentiles has large kurtosis and hence is not normal, so traditional approximation methods do not work in this case. The empirical confidence interval should be selected to give inference about the ratio of percentiles. Small samples are considered to prevent extremely large $[n(n+1)/2]^2$.

Keywords:

Strength of lumber, Independent and small samples, Simulation of percentiles, Simulation of ratio of percentiles, Empirical confidence interval.

JEL Classification: C00, C14, C15