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Sample Size and the Accuracy of the Generalized Lambda Distribution

George S. Ford & Sarah J. Skinner

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Abstract

The Generalized Lambda Distribution is a popular tool for generating random numbers following a wide range of non normal, asymmetric distributions. In this article, we assess the accuracy of the technique in replicating moments across a range of “sample sizes.” We find that accuracy is highly dependent on sample size, particularly with respect to the third and fourth moments. Generally, acceptable accuracy is accomplished with no less than 2,500 observations, but this finding depends critically on the size of the fourth moment.

Keywords:

Generalized bootstrap | Monte Carlo | Non normal distribution | Non normality | Simulation

Mathematics Subject Classification:

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Notes

[1]Table values focus on the skewness and kurtosis (with mean 0 and standard deviation 1). The λ_1 and λ_2 parameters determine the location and spread of the data, and can be adjusted to different values without affecting the λ_3 and λ_4 parameters. The tables also consider positive skew, and negative skew is accomplished by flipping the λ_3 and λ_4 values.

[2]We are grateful to an anonymous referee for these insights.

[3]The tables in Karian and Dudewicz (2000) are based on ($m_1 = 0$, $m_2 = 1$), but changing m_1 to 1.0 requires nothing more than substituting λ_1 from the table with ($\lambda_1 + 1$). We use $m_1 = 1$ to avoid division by zero.

[4]The random seed is unique to each simulation but identical across each case. Results were computed using other random number generators with little effect on the findings.