**Procedures for Data Transformation**

**Converting from Trapezoidal into Crisp Form**

Using Centroid method of defuzzification approach as adopted by Maheswari *et al* (2019) to transform the variables characterized by trapezoidal fuzzy numbers into crisp data across all sample sizes. These samples are classified sub-sample B1 with 16 observations and sub-sample B2 with 50 observations respectively. The defuzzification formula for transforming trapezoidal fuzzy number, = (a,b,c,d) to crisp form is given by:

**Centroid (A) =**

Where: a = left spread, d = right spread, b = left core and c = right core respectively.

**Converting from Trapezoidal into Triangular Form**

Computing the arithmetic mean on the interval between both the left core and right core of the trapezoidal fuzzy number to obtain the average as its core or center value in order to transform it into a triangular fuzzy number with its left spread and right spread across all sample sizes with 16 observations as sub-sample C1 and for transformed triangular fuzzy numbers with 50 observations as sub-sample C2 respectively.

**Procedures for Data Analysis**

1. Obtain the scatter plot for crisp data across all sample sizes as well as displaying the line-of-best fit (regression line).
2. Obtain the scatter plots for transformed data characterized by symmetric and non-symmetric triangular fuzzy numbers across all sample sizes as well as displaying the line-of-best fit (regression line).
3. Obtain the scatter plots for transformed data characterized by symmetric and non-symmetric trapezoidal fuzzy numbers across all sample sizes as well as displaying the line-of-best fit (regression line).
4. Use the three graphs above to assess forecasts errors and interpret their different results based on model performance statistics.

**Procedures for Triangular Fuzzy Regression Line Plots**

1. Isolate the left spread, right spread and center values from the sample dataset characterized by symmetric and non-symmetric triangular fuzzy numbers respectively.
2. Obtain the intercept and slope parameters for each of the isolated values from the sample dataset characterized by symmetric and non-symmetric triangular fuzzy numbers respectively.
3. Defuzzify the sample dataset characterized by symmetric and non-symmetric triangular fuzzy numbers using Centroid method of defuzzification respectively.
4. Obtain the scatterplot of the defuzzified sample dataset for both sample dataset characterized by symmetric and non-symmetric triangular fuzzy numbers respectively.
5. Apply the intercept and slope parameters obtained in step 2 onto the satterplot diagram for sample dataset characterized by symmetric and non-symmetric triangular fuzzy numbers respectively.

**Procedures for Trapezoidal Fuzzy Regression Line Plots**

1. Isolate the left spreads, right spreads and center values from the sample dataset characterized by

both symmetric and non-symmetric trapezoidal fuzzy numbers respectively.

1. Obtain the intercept and slope parameters for each of the isolated left spreads, right spreads and

center values from the sample dataset characterized by symmetric and non-symmetric trapezoidal

fuzzy numbers respectively.

1. Defuzzify the sample dataset characterized by both symmetric and non-symmetric triangular and

trapezoidal fuzzy numbers using Centroid method of defuzzification, respectively.

1. Obtain the scatterplot diagram of the defuzzified sample dataset for both sample dataset

characterized by symmetric and non-symmetric triangular and trapezoidal fuzzy

numbers respectively.

1. Apply the intercept and slope parameters obtained in step 2 onto the satterplot diagram for sample

dataset characterized by symmetric and non-symmetric triangular and trapezoidal fuzzy numbers

respectively.