PRACTICAL 3

Serial AutoCorrelation Test

We'll use the same simulated dataset in PRACTICAL 2 for simplicity.

Example 1

### **Explanation of the Code**

1. **Loading Libraries:**
   * We load the necessary libraries: forecast, ggplot2, and car. If the packages are not already installed, the code will install them first.
2. **Simulating Data:**
   * We simulate monthly temperature data for 10 years (120 months) using an AR(1) process.
3. **Creating Data Frame:**
   * We create a data frame data with the simulated time and temperature.
4. **Plotting Data:**
   * We plot the simulated data using ggplot2 to visualize the temperature trend over time.
5. **Fitting Linear Regression Model:**
   * We fit a linear regression model using temperature as the response variable and time as the predictor.
6. **Performing Durbin-Watson Test:**
   * We use the durbinWatsonTest function from the car package to perform the Durbin-Watson test on the residuals of the linear regression model. This test checks for the presence of autocorrelation in the residuals.

We'll continue with the same simulated temperature data and use the Breusch-Godfrey test to check for serial correlation.

### **Explanation of the Code**

1. **Loading Libraries:**
   * We load the necessary libraries: forecast, ggplot2, and lmtest. If the packages are not already installed, the code will install them first.
2. **Simulating Data:**
   * We simulate monthly temperature data for 10 years (120 months) using an AR(1) process.
3. **Creating Data Frame:**
   * We create a data frame data with the simulated time and temperature.
4. **Plotting Data:**
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5. **Fitting Linear Regression Model:**
   * We fit a linear regression model model using temperature as the response variable and time as

### **Interpreting the Results**

The Durbin-Watson test results will provide a test statistic value (usually between 0 and 4):

* A value close to 2 suggests no autocorrelation.
* A value less than 2 suggests positive autocorrelation.
* A value greater than 2 suggests negative autocorrelation.