**Tutorial set #2**

**Question 1:**

1. What is the difference between strict and weak stationarity? When we can say that weak stationarity leads to strict stationarity?
2. An analyst has a time series data representing number of daily car accidents in a major road at Riyadh city. He applied the techniques of regression analysis to analyze the data set, by considering the dependent variable as the number of daily car accidents, and the independent variable the time indices t=1,2,3,4,… representing days. So he applied the following simple linear regression model, comment on what he have done, do you think his analysis is always valid, discuss.

**Question 2:**

1. Assume the model:

where is a sequence of independent and identically distributed random variables with mean zero, and variance . Find the autocorrelation function for the process , plot it and comment on the graph.

1. Find the autocorrelation function for the process, , plot it and compare it with the ACF in part (1).

**Question 3:**

If the series ca n be expressed in the form:

where as defined as in Q.2.

1. Find the expectation, the variance and the autocorrelation function of the series.
2. Does this series fulfill the stationarity conditions? Discuss.

**Question 4:**

The following data represent the total profit (in million riyals) for a company:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1430 | 1431 | 1432 | 1433 | 1434 | 1435 | 1436 | 1437 |
| Profit | 3 | 2 | 2 | 4 | 5 | 6.1 | 4.4 | 5.5 |

1. Calculate the coefficients of the sample autocorrelation function (SACF) , and plot it.
2. Calculate the standard errors for these estimates.