قسم الاحصاء وبحوث العمليات

المقرر: 436 إحص: تحليل السلاسل الزمنية

Tutorial set #4

Question 1:

The following data represent the monthly sales (in thousand riyals) for a particular electrical appliance (read the data across from left to right).

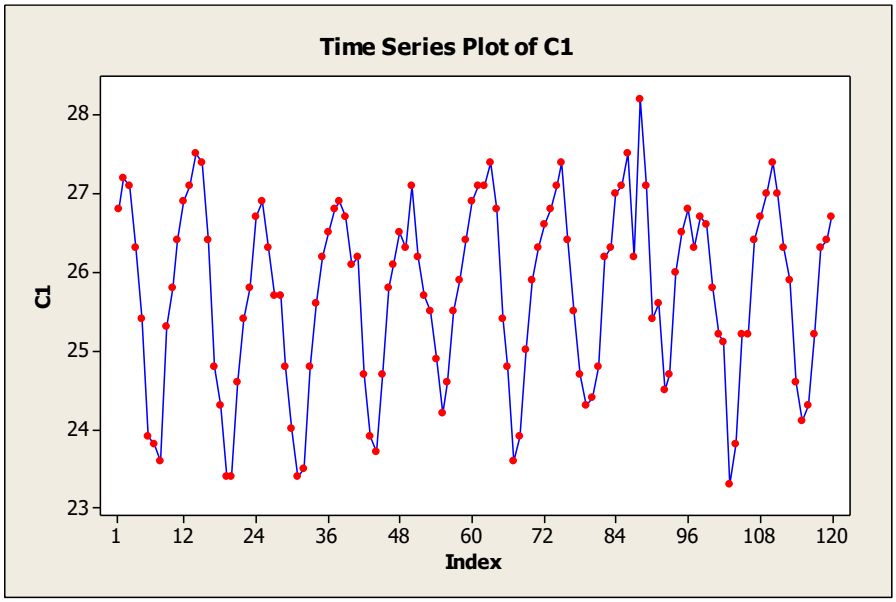
53	43	66	52	42	44	56	44
41	54	51	56	38	56	49	52
32	59	34	57	39	60	40	52
44	65	43					

1- Plot the data, and comment on the stationarity of the data.
2- Based on the figure, can you say anything about the approximate value of the autocorrelation coefficient ρ_1?
3- Plot y_t against y_{t-1}, try to guess the value of ρ_1.
4- Find and plot the sample autocorrelation function r_k for $k = 0,1,2,3,4,5$. Comment on the shape of this function.
5- Find and plot the sample partial autocorrelation function r_{kk} for $k = 0,1,2,3,4,5$. Comment on the shape of this function.

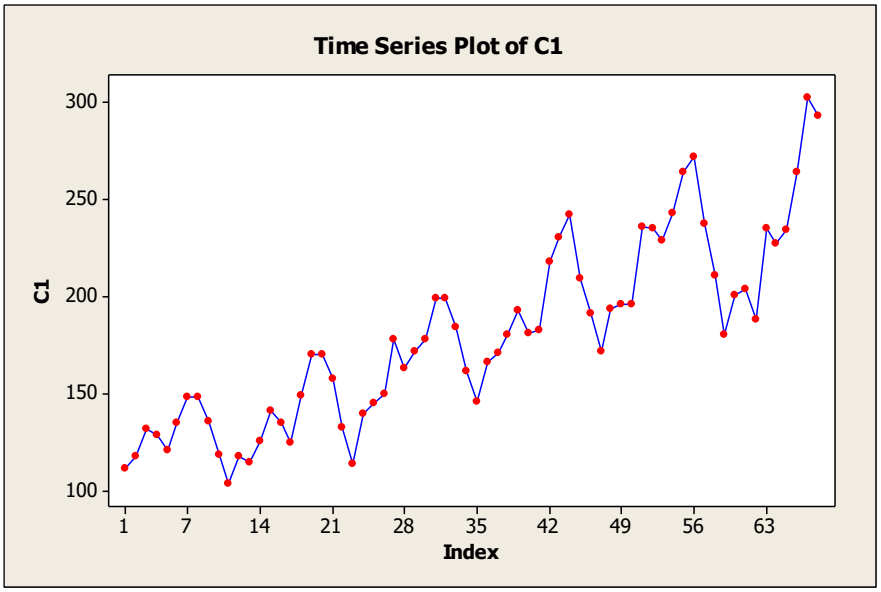
Question 2:

In the following cases, comment on the stationarity of the time series, and in case of non-stationarity, briefly explain how you will deal with the problem:

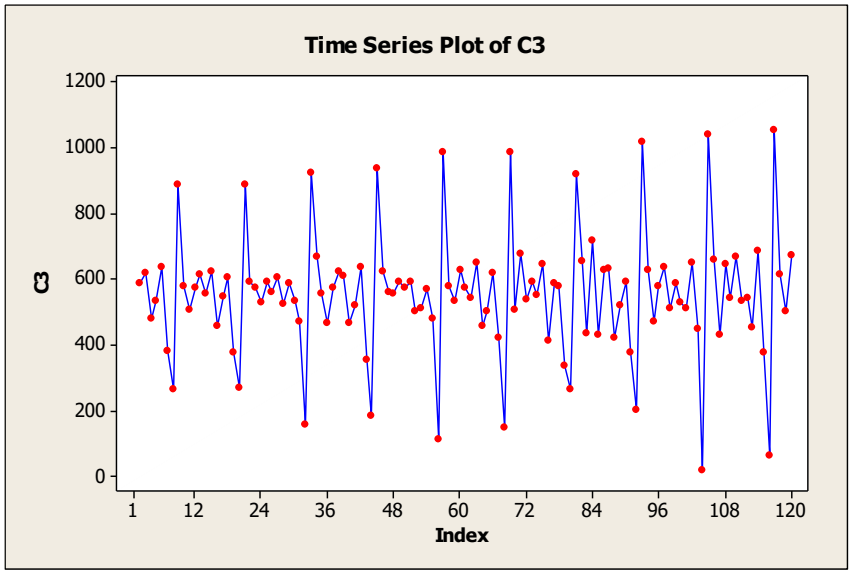
1- The following series represent average monthly temperatures for a period of 10 years:



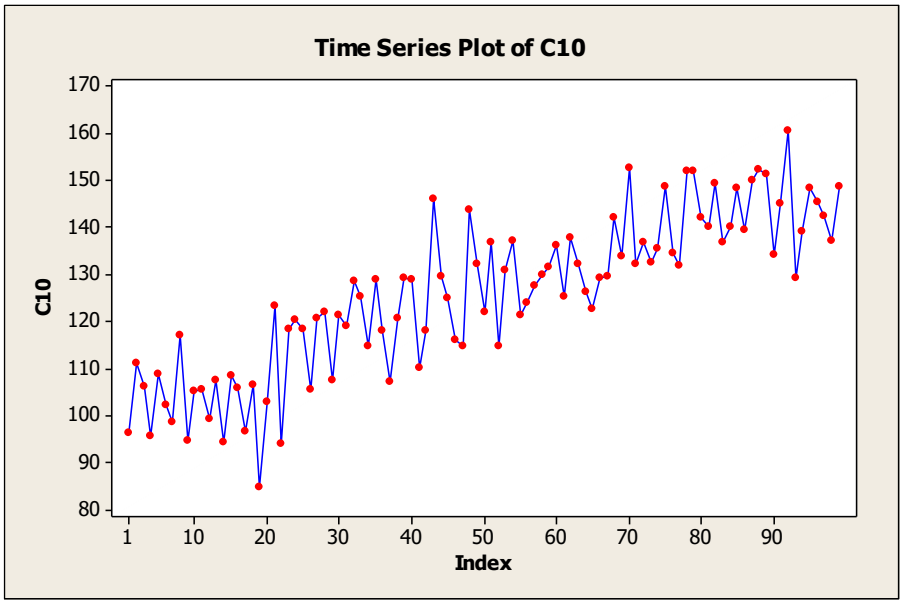
2- The following series represent monthly numbers (in thousands) of international travelers for a period of 10 years:



3- A time series representing the monthly demand of a particular item:



4- A time series representing the weekly sales of a large company:



Question 3:

In the general linear process, $Y_t = \mu_Y + \sum_{j=0}^{\infty} \psi_j a_{t-j}$, we used the following ψ_j weights:

1- $\psi_j = \phi^j$ for j=1,2,..., where $|\phi| < 1$. What is the form of the resulting process, and derive its autocorrelation function.
2- $\psi_1 = -\theta_1, \psi_j = 0$, for $j = 2,3, ...$, where, $|\theta| < 1$. What is the form of the resulting process, and derive its autocorrelation function.