3-5سلسلة تمارين الفصل الثالث

تمرين1:

لتكن لدينا السلسلة الزمنية الموضحة في الجدول

حلل دالة الارتباط الذاتي البسيط عند درجة تأخير 2.

n	y_t	y_{t-1}
1	205	239
2	415	205
3	189	415
4	206	189
5	211	206
6	393	211
7	213	393
8	245	213
9	222	245
10	409	222

تمرين 2 :

لتكن البيانات التالية الموضحة في الجدول

الزمن t	1	2	3	4	5	6	7	8	9
y_t	223	230	225	238	245	242	241	246	247

المطلوب: -حساب معاملات الارتباط الذاتي (FAC)عند درجة تأخير 4 و (FAP) عند درجة تأخير 3، ثم اختبر معنويتها واحسب مجال الثقة.

-مثل هذه المعاملات في رسم بياني (correlogram).

تمرين 3

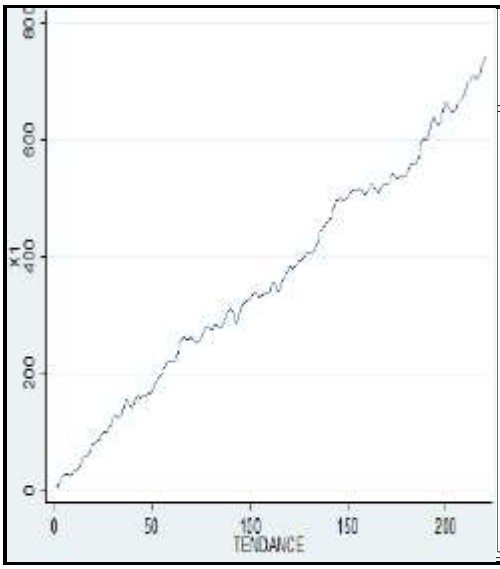
حدد نوع السلاسل الزمنية مع التبرير؟

. corrgram LAR, lag(15)

LAG	AC	PAC	Q	Prob>Q	[Autocorrelation]	[Partial autocor]
1	0.9267	1.0041	48.137	0.0000		
2	0.8362	-0.3528	88.103	0.0000		
3	0.7538	0.2066	121.23	0.0000		
4	0.6858	-0.0333	149.21	0.0000		
5	0.6021	-0.2026	171.23	0.0000		
6	0.5080	-0.2214	187.24	0.0000		
7	0.4113	-0.1297	197.96	0.0000		
8	0.3252	-0.0006	204.81	0.0000		
9	0.2314	-0.3149	208.36	0.0000		
10	0.1283	-0.0438	209.47	0.0000		
11	0.0176	0.0051	209.49	0.0000		
12	-0.0867	-0.2007	210.03	0.0000		
13	-0.1714	-0.2181	212.17	0.0000		
14	-0.2358	-0.1777	216.33	0.0000		
15	-0.2867	-0.0841	222.63	0.0000		

. corrgram DLAR, lag(15)

LAG	AC	PAC	Q	Prob>Q	[Autocorrelation]	[Partial autocor]
1	0.3289	0.3311	5.9572	0.0147		
2	-0.0755	-0.2117	6.2777	0.0433		
3	-0.0835	0.0262	6.6771	0.0829		
4	0.1306	0.1735	7.6742	0.1043		
5	0.2674	0.1793	11.948	0.0355		
6	0.2002	0.0793	14.393	0.0255		
7	-0.0086	-0.0483	14.398	0.0445		
8	0.1019	0.2319	15.061	0.0580		
9	0.1128	-0.0551	15.892	0.0692		
10	-0.0088	-0.1171	15.897	0.1026		
11	-0.0050	0.0494	15.899	0.1449		
12	0.0959	0.0865	16.544	0.1676		
13	0.1410	0.0431	17.977	0.1584		
14	0.0424	-0.0374	18.109	0.2018		
15	-0.2402	-0.2903	22.487	0.0957		



Sample: 1 220
Included observations: 220

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.986	0.986	216.83	0.000
		2	0.972	0.002	428.65	0.000
		3	0.959	-0.001	635.55	0.000
		4	0.945	-0.007	837.56	0.000
		5	0.932	-0.002	1034.8	0.000
		6	0.918	-0.008	1227.2	0.000
		7	0.905	-0.017	1414.9	0.000
		8	0.891	-0.005	1597.7	0.000
		9	0.878	0.005	1775.9	0.000
		10	0.864	-0.019	1949.5	0.000
		11	0.850	-0.005	2118.4	0.000
		12	0.836	-0.016	2282.6	0.000
		13	0.823	0.009	2442.4	0.000
		14	0.810	-0.008	2597.8	0.000
		15	0.796	-0.014	2748.7	0.000

Augmented Dickey-Fuller Unit Root Test on Y2

Null Hypothesis: Y2 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 4 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.769087	0.0000
Test critical values:	1% level	-4.001311	
	5% level	-3.430864	
	10% level	-3.139056	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(Y2)
Method: Least Squares
Date: 04/12/24 Time: 15:57
Sample (adjusted): 6 220
Included observations: 215 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Y2(-1)	-1.050479	0.155188	-6.769087	0.0000
D(Y2(-1))	0.023750	0.138368	0.171647	0.8639
D(Y2(-2))	0.031460	0.120791	0.260450	0.7948
D(Y2(-3))	0.069375	0.098502	0.704302	0.4820
D(Y2(-4))	0.029699	0.068939	0.430796	0.6671
C	9.954823	0.807644	12.32576	0.0000
@TREND("1")	3.148663	0.465018	6.771056	0.0000

R-squared	0.516224	Mean dependent var	2.989953
Adjusted R-squared	0.502269	S.D. dependent var	4.353081
S.E. of regression	3.071101	Akaike info criterion	5.113965
Sum squared resid	1961.785	Schwarz criterion	5.223707
Log likelihood	-542.7513	Hannan-Quinn criter.	5.158306
F-statistic	36.99187	Durbin-Watson stat	2.005274
Prob(F-statistic)	0.000000		

$$\hat{y}_{2t} = 2.99663150767t + 10.1686169171$$

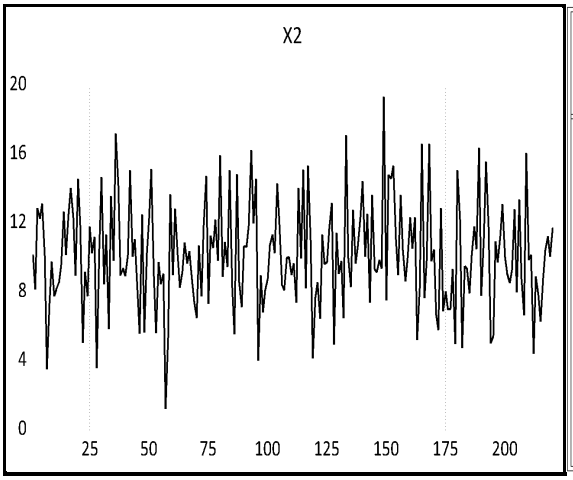
$$[932,73] \qquad [25]$$

$$(0,000) \qquad (0,000)$$

$$y_{2t} = \hat{y}_{2t} + \varepsilon_t = 2.99663150767t + 10.1686169171 + \varepsilon_t$$

$$x_{2t} = y_{2t} - 2.99663150767t = 10.1686169171 + \varepsilon_t$$

Correlogram of X2



Date: 04/12/24 Time: 16:23
Sample: 1 220
Included observations: 220

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.023	-0.023	0.1187	0.730
		2	0.008	0.008	0.1334	0.935
		3	0.035	0.035	0.4059	0.939
		4	-0.041	-0.039	0.7818	0.941
		5	-0.027	-0.030	0.9489	0.967
		6	-0.100	-0.103	3.2516	0.777
		7	0.010	0.009	3.2750	0.858
		8	-0.050	-0.048	3.8454	0.871
		9	0.032	0.035	4.0861	0.906
		10	-0.022	-0.030	4.1972	0.938
		11	0.065	0.063	5.1742	0.922
		12	0.063	0.050	6.0943	0.911
		13	0.117	0.127	9.3258	0.748
		14	-0.124	-0.138	12.948	0.531
		15	-0.013	-0.011	12.989	0.603

حل التمرين 1:

$\mathbf{y_{t-1}}$ $\quad$ $\boldsymbol{y_t - 267,91}$ $\quad$ $\mathbf{y_{t-1} - 151,09}$

n	y_t			
1	239	224	-28,91	-27,09
2	205	239	-62,91	-12,09
3	415	205	147,09	-46,09
4	189	415	-78,91	163,91
5	206	189	-61,91	-62,09
6	211	206	-56,91	-45,09
7	393	211	125,09	-40,09
8	213	393	-54,91	141,91
9	245	213	-22,91	-38,09
10	222	245	-45,91	-6,09
11	409	222	141,09	-29,09
	$\bar{y}_t = 267,91$	$\bar{y}_{t-1} = 251,09$		

$(y_t - 267,91)^2$	$(y_t - 267,91)*(y_{t-1} - 251,09)$	$(y_{t-1} - 251,09)^2$
835,79	783,17	733,87
3957,67	760,58	146,17
21635,47	-6779,38	2124,29
6226,79	-12934,14	26866,49
3832,85	3843,99	3855,17
3238,75	2566,07	2033,11
15647,51	-5014,86	1607,21
3015,11	-7792,28	20138,45
524,87	872,64	1450,85
2107,73	279,59	37,09
19906,39	-4104,31	846,23
$\sum = 80928,91$	$\Sigma = -23414,60$	$\sum = 59838,91$
	r_1= -0,34	

	y_t	y_{t-2}	$y_t - 270,8$	$y_{t-2} - 254$
1	205	224	-65,8	-30
2	415	239	144,2	-15
3	189	205	-81,8	-49
4	206	415	-64,8	161
5	211	189	-59,8	-65
6	393	206	122,2	-48
7	213	211	-57,8	-43
8	245	393	-25,8	139
9	222	213	-48,8	-41
10	409	245	138,2	-9
	$\bar{y}_t = 270,8$	$\bar{y}_{t-2} = 254$		

$(y_t - 270,8)^2$	$(y_t - 270,8)*(y_{t-2} - 254)$	$(y_{t-2} - 254)^2$
4329,64	1974	900
20793,64	-2163	225
6691,24	4008,2	2401
4199,04	-10432,8	25921
3576,04	3887	4225
14932,84	-5865,6	2304
3340,84	2485,4	1849
665,64	-3586,2	19321
2381,44	2000,8	1681
19099,24	-1243,8	81
$\sum (y_t - 270,8)^2 = 80009,6$	$\sum$ =-8936	$\sum (y_{t-2} - 254)^2 = 58908$
	r_2=-0,13	

$$t_c = \frac{|\hat{r}_k|}{\sqrt{1 - r_k^2}}\sqrt{n-2}$$

k التأخيرات	$\hat{r}_k$	n	$\lvert t_c \rvert$	ddl	t_{tab}
0	1	12	-	-	-
1	-0,34	11	1,29	9	2,262
2	-0,13	10	0,38	8	2,306