

Practical No # 1

The hypothetical data on family expenditure (Y) and weekly incomes (X) is given below

Y(\$)	X(\$)
70	20
65	100
90	120
95	140
110	160
115	180
120	200
140	220
155	240
150	260

- Fit a linear regression model.
- Estimate the variance of residual.
- Predict the family consumption expenditure when V_3 family income is 300(\$).
- Coefficient of determination (r^2) test $H_0 = \beta_1 = 0$ using T-Test and make the ANOVA table

Practical No # 2

Consider the following data imports(Y) National income (X_1) and wealth (X_2) the data given below:

Y	X_1	X_2
11	55	110
12	60	120
13	65	130
14	70	140
16	81	162
17	99	200
20	101	204

Practical No # 3

The following results were obtained from the sample size "n=12" from their output "Y" and label X_2 and capital income X_3 measure in arbitrary units.

The data given below:

$$\sum Y = 753, \quad \sum Y^2 = 48139, \quad \sum X_2 Y = 40830, \quad \sum X_2 = 643, \quad \sum X_2^2 = 34843, \\ \sum X_3 Y = 6796, \quad \sum X_3 = 106, \quad \sum X_3^2 = 976, \quad \sum X_2 X_3 = 5779$$

- Find the least square equation of Y on X_2 and X_3 .
- Find the standard Error of estimation.
- Find the multiple-coefficient correlation and unexplained variable in output.

Practical No # 4

The following data consist of personal consumption expenditure and personal disposable income in US (1956 to 1970) Billion of 1958\$

Y = personal consumption income

X_2 = personal disposable income

X_3 = time measure in years

- Estimate the following model $\hat{Y} = \hat{\beta}_1 + \hat{\beta}_2 X_2 + \hat{\beta}_3 X_3 + e_i$ this model is pest less that personal consumption expenditure is linear related to personal disposable income are time or current variable
- Compute R^2 and \bar{R}^2

Y	X_2	X_3
281.4	309.3	1
288.1	316.1	2
290.0	318.8	3
307.3	333	4
316.1	340.3	5
322.5	350.5	6
338.4	367.2	7
353.3	381.2	8
373.3	408.1	9
397.7	434.1	10
418.1	458.9	11
430.1	477.5	12
452.7	499	13
969.1	515.5	14
476.9	533.2	15

Practical No # 5

The following data consist of quantity demand (Y_i) of certain commodity. Its price (X_1) and consumer Income (X_2)

Y	X_1	X_2
100	5	100
75	7	600
80	6	1200
70	6	500
50	8	300
65	7	400
90	5	1300
100	4	1100
110	3	1300
160	9	300

- Fit a multilinear regression model
- Estimate the variance of residual
- Calculation coefficient of determination
- $H_0: \beta = 0$ At the level of significance
- Compute 95% confidence interval for β .

Practical No # 6

The following table shows the annual consumption and disposable of Sweden

Estimate the saving function $S(t) = f[y_d(t)]$

Test for heterosecdascity using Spearman's rank correlation coefficient

years	C_t	$Y_{dt}(X)$
1953	26.1	38.3
1954	29.3	43.5
1955	35.6	53.5
1956	39.4	60.8
1957	42.7	66.4
1958	46.3	71.2
1959	50.1	77.2
1960	54.5	86.1
1961	60.1	94.6
1962	74.9	102.4
1963	69.2	109.9
1964	73.1	115.6

Practical No # 7

Find severity location and pattern of multicollinearity where:

$$\sum x_1^2 = 869.90, \quad \sum x_1x_2 = 436.46, \quad \sum x_2^2 = 258.78, \quad \sum x_1x_3 = -151.06, \\ \sum x_3^2 = 218.07, \quad \sum x_3x_2 = -77.89, \quad n = 10$$

➤ Apply T-Test for multicollinearity.

Practical No # 8

The data given below the income of the person “Y” and consumption is “X”

- Fit the regression line $\hat{Y} = \hat{\alpha} + \hat{\beta}X_i$
- Test for heterosecdascity using Spearman’s rank correlation coefficient and apply T-Test

X	Y
9355	3396
8584	3787
7962	4013
8275	4014
8389	4146
9418	4241
9795	4387
10281	4538
11750	4843

Practical No # 9

The following data contain on consumption, expenditure (Y\$) and income (X\$) for a cross section of thirty families.

X	Y
80	55
100	65
85	70
110	80
120	79
115	84
130	98
140	95
125	90
90	75
105	74
160	110
150	113
165	125
145	108
180	115
225	140
200	120
240	145
185	130
220	152
210	144
245	175
260	180
190	135
205	140
265	178
270	191
230	137
250	189

Test whether the income and expenditure relationship is heteroscedasticity by using Gold-Feld-Quinnad test for detection of heteroscedasticity.

FINAL TERM

Practical No# 1

A sample of "15" observations given below:

X	Y
1	2
2	2
3	2
4	1
5	3
6	5
7	6
8	6
9	10
10	10
11	10
12	12
13	15
14	10
15	11

Test the " ρ " by using Durbin Watson Test and test the auto-correlation of the data.

Practical No# 2

Test $H_0: \rho = 0$ by using Durbin Watson Test where:

CND = Consumer expenditure of goods.

Y_i = Disposable Income.

Years	CND	Income
1951	116.50	255.70
1952	120.80	260.30
1953	124.40	275.40
1954	125.50	278.30
1955	131.70	296.70
1956	136.20	309.30
1957	138.70	315.20
1958	140.20	318.80
1959	146.20	333.00
1960	149.60	340.2
1961	153.00	350.7
1962	158.20	367.3
1963	162.20	381.3
1964	170.50	406.5
1965	178.20	430.8
1966	185.90	451.5

Practical No# 3

The hypothetical data on salaries of college professor in relation of two year of teaching experience & sex.

- “0” For “male”
- “1” For “Female”

X_i	Y_i	D_i
1	23	1
1	195	0
2	24	1
2	21	0
3	25	1
3	22	0
4	26.5	1
4	23.1	0
5	25	0
5	28	1
6	29.5	1
6	26	0
7	27.5	0
7	31.5	1
8	29	0

- Find the mean salary of female college professor
- Find the mean salary of male college professor

Practical No# 4

Run Kyock model taking a hypothetical problem on estimation of consumption of the following data:

Years	Consumption Expenditures	Disposable Income
	32	34
1965	33	36
1966	35	38
1967	37	40
1968	40	44
1969	43	47
1970	47	51
1971	49	55
1972	54	59
1973	58	63
1974		

Practical No# 5

A data according to expenditure function given as

Years	C_t	C_{t-1}	Y_t
1965	32	-	34
1966	33	32	36
1967	35	33	38
1968	37	35	40
1969	40	37	44

Apply the Kyock model on the above data.

Question

Find Saverity location
and Pattern of multicolinearity,
when....

$$\sum x^2_1 = 869.90, \quad \sum x_1 x_2 = 436.46$$

$$\sum x^2_2 = 258.78, \quad \sum x_1 x_3 = -151.06$$

$$\sum x^2_3 = 220.07, \quad \sum x_2 x_3 = -77.89$$

$$n = 10$$

Statement :

Test $H_0: \rho = 0$ by
applying Durban Watson d-test
where;

Cnd = Consumer expenditure of
goods.

y_i = Disposable income.

y^2	Years	Cnd	Income	$Cnd = 20.74 + 0.35y_i$	e_i	e_i^2	$(e_i - \bar{e})^2$
	1951	116.50	255.70	110.294	-1.794	3.218	-
	1952	120.80	260.30	119.905	0.495	0.245	5.24
	1953	124.40	275.40	125.196	-0.793	0.629	
	1954	125.50	278.30	126.208	-0.708	0.501	
	1955	131.70	296.70	132.653	-0.952		
	1956	136.20	309.30	137.065	-0.865		
	1957	138.70	315.20	139.341	-0.641		
	1958	140.20	318.80	140.392	-0.192		
	1959	146.20	333.0	145.365	1.345		
	1960	149.60	340.2	147.886	1.714		
	1961	153.00	350.7	151.503	1.436		
	1962	158.20	367.3	157.376	0.823		
	1963	162.20	381.3	162.279	-0.079		
	1964	170.50	406.5	171.104	-0.604		
	1965	178.20	430.8	179.614	-1.414		
	1966	185.90	451.5	186.863	-0.963		

Statement:

Hypothetical data
on salaries of college professors
in relation to year of teaching
experience & sex.

x_i : Year of experience;

D = Dummy

sex: 1 = male

0 = female

Dy	y_i	x_i	D_i	Dx	Dx	D^2	xy	x^2
	23	1	1					
	19.5	1	0					
	24	2	1					
	21	2	0					
	25	3	1					
	22	3	0					
	26.5	4	1					
	23.1	4	0					
	25	5	0					
	28	5	1					
	29.5	6	1					
	26	6	0					
	27.5	7	0					
	31.5	7	1					
	29	8	0					

a) Find the mean salary of female college Professor.

b) Find the mean salary of male college Professor.

c) Find the co-efficient of determination adjusted & unadjusted.

The following data shows that Personal Saving and personal Income of Country over a 31 Years Period.

Period	Saving	Income
1	264	8777
2	105	9210
3	90	9954
4	131	10508
5	122	10979
6	107	11912
7	406	12747
8	503	13499
9	431	14261
10	588	15522
11	598	16730
12	950	17663
13	779	18575
14	819	19635
15	1222	21163
16	1702	22880
17	1578	24127
18	1654	25604
19	1400	26500
20	1829	27670

21	2200	28300
22	2017	27430
23	2105	29560
24	1600	28150
25	2250	32100
26	2420	32500
27	2570	35250
28	1720	33500
29	1900	36000
30	2100	36200
31	2300	38200

Test the heteroscedasticity by

using :-

(i) : Gold field Quandt Test.

Assignment No : 1

The following results were obtained from a sample of 12 farms on their output Y , Labour output x_2 and Capital Income x_3 , measure in arbitrary units.

$$\sum Y = 753, \quad \sum x_2 Y = 40830, \quad \sum x_3 Y = 6796$$

$$\sum Y^2 = 48139, \quad \sum x_2 = 643, \quad \sum x_3 = 106$$

$$\sum x_2 x_3 = 5779, \quad \sum x_2^2 = 34843, \quad \sum x_3^2 = 976$$

- (a):- Find the Least Square equation on Y on x_2 and x_3 .
- (b):- Compute the S.E of the estimate.
- (c):- Find the multiple correlation coefficient and unexplained variation in output.

Assignment No: 2

The Following data shows that Personal Saving and personal Income of Country over a 31 Year period

Period	Saving	Income e_i	Period	Saving	Income e_i
1	264	8777	16	1702	22880
2	105	9210	17	1578	24127
3	90	9954	18	1654	25604
4	131	10508	19	1400	26500
5	122	10979	20	1829	27670
6	107	11912	21	2200	28300
7	406	12747	22	2017	27430
8	503	13499	23	2105	29560
9	431	14261	24	1600	28150
10	588	15522	25	2250	32100
11	598	16730	26	2420	32500
12	950	17663	27	2570	35250
13	779	18575	28	1720	33500
14	819	19635	29	1900	36000
15	1222	21163	30	2100	36200
			31	2300	38200

Test the heteroscedasticity by using

(a) Spearman Rank Correlation Method.

(b) Goldfield Quandt Test.

$$\text{Where } (a) = r = 1 - 6 \sum d^2 / n(n^2 - 1)$$

$$t = r \sqrt{n-2} / \sqrt{1-r^2}$$

and Where (b)

$$F = \frac{\sum e_1^2 / v_1}{\sum e_2^2 / v_2}$$

Statement:-

The demand of the chicken in the United States 1960 - 1974. To study per capita consumption of chicken in U.S.A are given in the following data.

Year	Y	X_1	X_2
1960	27.8	42.2	50.7
1961	29.9	38.1	52
1962	29.8	40.3	54
1963	30.8	39.5	55.3
1964	31.2	37.3	54.7
1965	33.3	38.1	63.7
1966	35.6	39.3	69.8
1967	36.4	37.8	65.9
1968	36.7	38.4	64.5
1969	38.4	40.1	70.0
1970	40.4	38.6	73.2
1971	40.3	39.8	67.8
1972	41.8	39.7	79.1
1973	40.4	52.1	95.4
1974	40.7	48.9	94.2

Fit a multiple regression model and G.C.M.
Estimates its variance and covariance
Compute unadjusted co-efficient of determination
as well as adjusted co-efficient of determination
How can we profit total sum of square into two parts
unexplained and explained variation?

Statement :-

Y	X_1	X_2	X_3
49	35	53	200
40	35	58	212
41	38	50	214
46	40	64	212
52	40	70	203
59	42	63	194
53	44	59	194
61	46	73	188
55	50	59	196
64	50	71	190

Using the following data

- i) Estimate the multiple regression model under GLM.
- ii) Estimate the variances and covariances
- iii) Estimate the unadjusted and adjusted co-efficients of determination
- iv) Make the ANOVA table and interpret your results.

Statement:-

The quantity supplied of sugar Q_s is quantity supplied is assume to be linear function of price of sugar P_s is the price of sugar and the wages of labour w_L is wages rate of used wage table in production of the population. The supply labour equation is

$$Q_s = \beta_1 + \beta_2 P_s + \beta_3 w_L + \epsilon$$

Q_s	P_s	w_L	Q_s	P_s	w_L
20	10	12	100	30	7
35	15	10	105	38	5
30	21	9	130	60	3
47	26	8	140	65	4
60	40	5	125	50	3
68	39	7	120	35	1
72	48	4	135	42	2
90	33	5			

Fit a multiple linear regression model

Perform testing of hypothesis joint and individual testing of hypothesis

Estimate the relation between T and F

Set anova table make interpretation along with variance & covariance

With the help of graph display the partitioning of total sum of square along with its interpretation

The following table shows time series data on three variables

Y_i	X_{1i}	X_{2i}
6	40.1	5.5
6	40.3	4.7
6.5	47.5	5.2
7.1	49.2	6.8
7.2	52.3	7.37
7.6	58	8.7
8	61.3	10.2
9	62.5	14.1
9	64.7	17.1
9.3	66.8	21.3

- Find parameter estimate using GLM point estimator.
- Detect multicollinearity using Farrer and Glaubox method.
- Find the adjusted and unadjusted co-efficient of determination.