MATH 3424 Tutorial

October 23, 2020

1 Review

Chapter 1 Sec 5-7.

2 Exercises

Using the following data set

x_1	x_2	y	x_1	x_2	y
1	-1	-3	7	3	15
2	2	7	8	4	15
2	2	8	8	4	16
3	2	5	9	5	18
3	2	9	9	6	22
4	7	20	10	9	32
5	7	19	11	10	31
5	8	19	11	10	34
5	8	18	11	11	33
6	8	20	12	12	37

with summary statistics:

$n = 20$, $\sum_{i=1}^{20} x_{i1} = 132$, $\sum_{i=1}^{20} x_{i2} = 119$, $\sum_{i=1}^{20} y_i = 375$,

$\sum_{i=1}^{20} x_{i1}^2 = 1100$, $\sum_{i=1}^{20} x_{i1}x_{i2} = 969$, $\sum_{i=1}^{20} x_{i2}^2 = 955$, $\sum_{i=1}^{20} x_{i1}y_i = 3104$,

$\sum_{i=1}^{20} x_{i2}y_i = 2926$, $\sum_{i=1}^{20} y_i^2 = 9187$,

$S_{x_1x_1} = 228.8000$, $S_{x_1x_2} = 183.6000$, $S_{x_2x_2} = 246.9500$, $S_{x_1y} = 629.0000$,

$S_{x_2y} = 694.7500$, $S_{yy} = 2155.7500$.

and

$$\begin{pmatrix} 228.8000 & 183.6000 \\ 183.6000 & 246.9500 \end{pmatrix}^{-1} = \begin{pmatrix} 0.010834 & -0.008055 \\ -0.008055 & 0.010038 \end{pmatrix},$$

to fit the following model

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + e_i, \quad e_i \sim_{iid} N(0, \sigma^2)$$

(a) Fill the following table.

Source	Sum of Squares	D.F.	Mean Squares	F value
Regression				
Residual				–
Lack of fit				
Pure error				–
Total			–	–

(b) Conduct a lack of fit test at $\alpha = 0.05$.