Exercises:

7. The following estimated regression equation based on ten observation

$$\hat{y} = 29.127 + 0.5906 x_1 + 0.4980 x_2$$

$$SST = 6724.125$$

$$SSR = 6216.375$$

a. Find the SSE:

$$SSE = SST - SSR$$

$$= 6724.125 - 6216.375$$

$$= 507.75.$$

b. Compute R^2:

$$R^2 = \frac{SSR}{SST} = \frac{6216.375}{6724.125} = 0.92.$$

c. Compute Adj R^2:

$$\text{Adj } R^2 = 1 - (1 - R^2)\left(\frac{n-1}{n-p-1}\right)$$

$$= 1 - (1 - 0.92)\left(\frac{10-1}{10-2-1}\right) = \underline{0.9}$$

d. Comment on the goodness of fit.

8. $n = 10$, $p = 2$

$SST = 15182.9$ and $SSR = 14052.2$

a. Compute R^2 :

$$R^2 = \frac{SSR}{SST} = 0.93 .$$

b. Compute adj R^2 :

$$\text{adj } R^2 = 1 - (1-R^2)\left(\frac{n-1}{n-p-1}\right) = 1 - (1-0.93)\left(\frac{9}{7}\right)$$

$$= 0.91 .$$

c.

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9. $n = 30$

$\hat{y} = 17.6 + 3.8 X_1 - 2.3 X_2 + 7.6 X_3 + 2.7 X_4$. $\rightarrow p = 4$

$SST = 1805$, $SSR = 1760$.

a. Compute R^2 :

$$R^2 = \frac{SSR}{SST} = 0.98 .$$

b. Compute adj R^2 :

$$\text{adj } R^2 = 1 - (1-R^2)\left(\frac{n-1}{n-p-1}\right) = 1 - (1-.98)\left(\frac{29}{25}\right) = .98$$

10. $n = 10$

$\hat{y} = 25 + 10X_1 + 8X_2$, $p = 2$

$SST = 16000$, $SSR = 12000$

a. Compute R^2 :

$$R^2 = \frac{SSR}{SST} = 0.75.$$

b. Compute adj R^2 :

$$\text{adj } R^2 = 1 - (1 - R^2)\left(\frac{n-1}{n-p-1}\right) = 1 - (1 - 0.75)\left(\frac{9}{7}\right) = 0.68.$$

c.

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11. $\hat{y} = 83.2 + 2.29X_1 + 1.3X_2$, $n = 8$, $p = 2$

$SST = 25.5$, $SSR = 23.435$

a. Compute R^2 and adj R^2 :

$$R^2 = \frac{SSR}{SST} = 0.92.$$

$$\text{adj } R^2 = 1 - (1 - R^2)\left(\frac{n-1}{n-p-1}\right) = 1 - (0.08)(1.4)$$

$$= 0.89$$