RS Chapter 6 Simple Linear Regression

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Contents

1 Example 6.2

1.1 Data Table, $ex6_2$

y	x
95	96
80	77
0	0
0	0
79	78
77	64
72	89
66	47
98	90
90	93
0	18
95	86
35	0
50	30
72	59
55	77
75	74
66	67

1.2 Analysis in R

1.2.1 Estimation of B_0, B_1

The prediction equation is:

$$\hat{y} = 10.73 + 0.87x$$

1.2.2 (Example 6.3) t-test

We want to test the hypothesis H_0: $\beta_1 = 0$.

Our t-value is 8.8. It is 0.999999921465578

1.2.3 95% confidence interval for β_1

$$\hat{\beta}_1 \pm t_{.025,16} \frac{s}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}}$$

0.87 ± 0.21

This gives a range of β_1 from 0.66 to 1.08.

1.2.4 Coefficient of determination r^2 (Example 6.4)

The cofficient of determination, r^2 is defined as

$$r^2 = \frac{\text{SSR}}{\text{SST}} = \frac{\sum_{i=1}^{n}(\hat{y}_i - \bar{y})^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2}$$

r^2 gives the proportion of variation in y that is explained by the model (accounted for by regression on x).

r is the *sample correlation coefficient* between x and y, here 0.91