

STU22004 – Sample Questions 8

Q1. Using $n = 10$ samples of (x_i, y_i) , we have $S_{xx} = \sum (x_i - 4)^2 = 9$, $r_{XY} = -0.75$ and $S_{yy} = \sum (y_i - 6)^2 = 16$. Find the equation for the linear regression model Y over X .

Q2. In situation similar to Q1, we have $\sum x_i = 10$, $\sum y_i = 90$, and $S_{xx} = \sum (x_i - \bar{x})^2 = 42$, and $n = 10$. If the estimated line for \hat{y} passes through the point $(9,9)$, estimate β_1 .

Q3. In a SLR model, $\hat{y} = -2 + 2x$, and we $\bar{x} = 3$ and $r_{XY} = 0.5$. If we wish to develop the regression model $\hat{x} = \alpha_0 + \alpha_1 y$, find $\hat{\alpha}_0$ and $\hat{\alpha}_1$.

Q4. In regression model $\hat{y} = \beta_1 x$ (regression from the origin, i.e. $\beta_0 = 0$), find the estimate for β_1 using the least square method.

Q5. Determine the data transformation that converts the regression model

$$\hat{y} = \frac{x}{\beta_0 + \beta_1 x}$$

to an SLR model.

Q6. In an SLR model, if $\bar{x} = \bar{y} = 10$, $S_{yy} = 4S_{xx}$ and $r_{XY} = -0.8$, find the equation for the SLR model.