A03

Saturday, 12. October 2019 19:04

$\hat{y} = a \cdot x + b$

$M_1 = \begin{pmatrix} \bar{\Sigma} x_i^2 & \bar{\Sigma} x_i \\ \bar{\Sigma} x_i & n \end{pmatrix}$, $c = \begin{pmatrix} a \\ b \end{pmatrix}$, $d = \begin{pmatrix} \bar{\Sigma} x_i \cdot y_i \\ \bar{\Sigma} y_i \end{pmatrix}$

$M_1 \cdot c = d$

$\begin{pmatrix} \bar{\Sigma} x_i^2 & \bar{\Sigma} x_i \\ \bar{\Sigma} x_i & n \end{pmatrix} \cdot \begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} \bar{\Sigma} x_i \cdot y_i \\ \bar{\Sigma} y_i \end{pmatrix} \Big) \cdot M_1^{-1}$

$\begin{pmatrix} a \\ b \end{pmatrix} = \frac{1}{n \cdot \bar{\Sigma} x_i^2 - (\bar{\Sigma} x_i)^2} \cdot \begin{pmatrix} n & -\bar{\Sigma} x_i \\ -\bar{\Sigma} x_i & \bar{\Sigma} x_i^2 \end{pmatrix} \cdot \begin{pmatrix} \bar{\Sigma} x_i \cdot y_i \\ \bar{\Sigma} y_i \end{pmatrix}$ A03 : i

$$\begin{pmatrix} a \\ b \end{pmatrix} = \frac{1}{n \cdot \bar{\Sigma} x_i^2 - (\bar{\Sigma} x_i)^2} \cdot \begin{pmatrix} n \cdot \bar{\Sigma} x_i \cdot y_i - \bar{\Sigma} x_i \cdot \bar{\Sigma} y_i \\ -\bar{\Sigma} x_i \cdot \bar{\Sigma} x_i \cdot y_i + \bar{\Sigma} x_i^2 \cdot \bar{\Sigma} y_i \end{pmatrix}$$

$x = 10, 11, 18 \qquad y = 5, 7, 9$

$\bar{\Sigma} x_i^2 = 545 \qquad \bar{\Sigma} x_i \cdot y_i = 289$

$\bar{\Sigma} x_i = 39 \qquad \bar{\Sigma} y_i = 21$

$(\bar{\Sigma} x_i)^2 = 1521$

$$\hat{y} = 0.4211 \cdot x + 1.5263$$

$\begin{pmatrix} a \\ b \end{pmatrix} = \frac{1}{3 \cdot 545 - 1521} \cdot \begin{pmatrix} 3 \cdot 289 - 39 \cdot 21 \\ -39 \cdot 289 + 545 \cdot 21 \end{pmatrix}$

$\begin{pmatrix} a \\ b \end{pmatrix} = \frac{1}{114} \cdot \begin{pmatrix} 48 \\ 174 \end{pmatrix}$

$\begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} 48/114 \\ 174/114 \end{pmatrix} = \begin{pmatrix} 0.4211 \\ 1.5263 \end{pmatrix}$