

lista de exercícios resolvidos - Trabalho 2
Jomilly Silva e Guilherme Stevani

Regressão Linear Simples

$$\begin{vmatrix} \sum_{i=1}^n 1 & \sum_{i=1}^n x \\ \sum_{i=1}^n x & \sum_{i=1}^n x^2 \end{vmatrix} \cdot \begin{vmatrix} a \\ b \end{vmatrix} = \begin{vmatrix} \sum_{i=1}^n y \\ \sum_{i=1}^n yx \end{vmatrix}$$

① A partir da tabela encontrar a reta que melhor se encaixa aos pontos.

x	y	$\sum_{i=1}^6 1 = 6$
1	0	$\sum x = 1+2+3+4+5+6 = 21$
2	3	$\sum y = 0+3-1+2+1+4 = 9$
3	-1	$\sum xy = 0+6-3+8+5+24 = 40$
4	2	$\sum x^2 = 1+4+9+16+25+36 = 91$
5	1	
6	4	

$$\begin{vmatrix} 6 & 21 \\ 21 & 91 \end{vmatrix} \cdot \begin{vmatrix} a \\ b \end{vmatrix} = \begin{vmatrix} 9 \\ 40 \end{vmatrix} \quad \begin{matrix} \text{multiplicação} \\ \text{linha} \times \text{coluna} \end{matrix}$$

$$6a + 21b = 9 \rightarrow a = \frac{9-21b}{6}$$

$$21a + 91b = 40$$

$$21 \left(\frac{9-21b}{6} \right) + 91b = 40$$

$$\frac{189}{6} - \frac{441b}{6} + 91b = 40$$

$$31,5 - 73,5b + 91b = 40 \rightarrow 17,5b = 8,5$$

$$b = 0,4857 \quad a = \frac{9-21(0,4857)}{6} = -0,19995$$

$$R(x) = -0,19995x + 0,4857$$

②

x	y
1	0
0	1
-1	2

$$\sum_{i=1}^3 1 = 3$$

$$\sum x = 1+0-1 = 0$$

$$\sum y = 0+1+2 = 3$$

$$\sum x^2 = 1+0+1 = 2$$

$$\sum yx = 0+0-2 = -2$$

$$\begin{vmatrix} 3 & 0 \\ 0 & 2 \end{vmatrix} \cdot \begin{vmatrix} a \\ b \end{vmatrix} = \begin{vmatrix} 3 \\ -2 \end{vmatrix} \quad \begin{matrix} 3a + 0b = 3 \\ 0a + 2b = -2 \end{matrix}$$

$$a = \frac{3}{3} = 1 \quad b = \frac{-2}{2} = -1$$

$$R(x) = x - 1$$

③

x	y
1	1
2	-1
-1	0
0	2

$$\sum_{i=1}^4 1 = 4$$

$$\sum x = 1+2-1+0 = 2$$

$$\sum y = 1-1+0+2 = 2$$

$$\sum x^2 = 1+4+1+0 = 6$$

$$\sum yx = 1-2+0+0 = -1$$

$$\begin{vmatrix} 4 & 2 \\ 2 & 6 \end{vmatrix} \cdot \begin{vmatrix} a \\ b \end{vmatrix} = \begin{vmatrix} 2 \\ -1 \end{vmatrix}$$

$$4a + 2b = 2 \rightarrow a = \frac{2-2b}{4}$$

$$2a + 6b = -1$$

$$2 \left(\frac{2-2b}{4} \right) + 6b = -1$$

$$\frac{4-4b}{4} + 6b = -1 \rightarrow 1-b+6b = -1$$

$$5b = -1-1 \rightarrow b = \frac{-2}{5} = -0,4$$

$$a = \frac{2-2(-0,4)}{4} = 0,7$$