

# Matrices de covarianzas

## Contents

Sean  $m + 1$  variables, con  $n$  observaciones cada una:

| $y$      | $x_1$    | $x_2$    | $\cdots$ | $x_m$    |
|----------|----------|----------|----------|----------|
| $y_1$    | $x_{11}$ | $x_{21}$ | $\cdots$ | $x_{m1}$ |
| $y_2$    | $x_{12}$ | $x_{22}$ | $\cdots$ | $x_{m2}$ |
| $\cdots$ | $\cdots$ | $\cdots$ | $\cdots$ | $\cdots$ |
| $y_n$    | $x_{1n}$ | $x_{2n}$ | $\cdots$ | $x_{mn}$ |

se define la covarianza entre las variables  $x_j$  e  $y$  como:

$$cov(x_j, y) = S_{jy} = \frac{\sum_{i=1}^n (x_{ji} - \bar{x}_j)(y_i - \bar{y})}{n - 1}, \quad j \in [1, m], \quad i \in [1, n]$$

y la covarianza entre las variables  $x_j$  e  $x_k$  como:

$$cov(x_j, x_k) = S_{jk} = \frac{\sum_{i=1}^n (x_{ji} - \bar{x}_j)(x_{ki} - \bar{x}_k)}{n - 1}, \quad j, k \in [1, m], \quad i \in [1, n]$$

Se define la matriz de covarianzas para  $x_j$  y  $x_k$  como:

$$S_{xx} = \begin{bmatrix} S_{11} & S_{12} & \cdots & S_{1m} \\ S_{21} & S_{22} & \cdots & S_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ S_{m1} & S_{m2} & \cdots & S_{mm} \end{bmatrix}$$

Se define la matriz de covarianzas entre  $x_j$  e  $y$  como:

$$S_{xy} = \begin{bmatrix} S_{1y} \\ S_{2y} \\ \cdots \\ S_{my} \end{bmatrix}$$