EST-46114

= Distribución gaussiana =

$\mathbb{X} \in \mathbb{R}^p$, con

$$f(x \mid \mu, \Sigma) = (2\pi)^{-p/2} |\Sigma|^{-1/2} \times \exp\left\{-\frac{1}{2}(x-\mu)'\Sigma^{-1}(x-\mu)\right\}$$

$$= (2\pi)^{-p/2} |\Lambda|^{1/2} \times \exp\left\{-\frac{1}{2}(x-\mu)'\Lambda(x-\mu)\right\}$$

con $\Sigma$ - matriz covarianzas

$\Lambda = \Sigma^{-1}$ - matriz de precisión.

Caso $p = 2$

$$\Sigma = \begin{pmatrix} \sigma_1^2 & \rho\sigma_1\sigma_2 \\ \rho\sigma_1\sigma_2 & \sigma_2^2 \end{pmatrix}$$

$$\Rightarrow \quad \Lambda = \begin{pmatrix} \frac{1}{\sigma_1^2(1-\rho^2)} & -\frac{\rho}{\sigma_1\sigma_2(1-\rho^2)} \\ -\frac{\rho}{\sigma_1\sigma_2(1-\rho^2)} & \frac{1}{\sigma_2^2(1-\rho^2)} \end{pmatrix}$$

donde $\quad \mathrm{cov}(\mathbb{X}_1, \mathbb{X}_2) = \rho\sigma_1\sigma_2$, i.e.

$$\rho = \mathrm{corr}(\mathbb{X}_1, \mathbb{X}_2).$$

Caso $p=2$

$$f_{X_2|X_1}(x_2|x_1) = N\left(x_2 \mid \mu_2(x_1), \sigma_2(x_1)\right)$$

donde $\mu_2(x_2) = \mu_1 - \frac{\rho\sigma_2}{\sigma_1}(x_1-\mu_1)$

$\sigma_2(x_1) = \sigma_2\left(1-\rho^2\right)^{1/2}$

donde $\rho = \text{corr}(X_1, X_2)$.

i.e.

$$f_{X_2|X_1}(x_2|x_1) = (2\pi)^{-1/2}\left[\sigma_2^2(1-\rho^2)\right]^{-1/2}$$

$$\times \exp\left\{-\frac{1}{2\sigma_2^2(1-\rho^2)} \times \left(x_2-\mu_2-\frac{\rho\sigma_2}{\sigma_1}(x_1-\mu_1)^2\right)\right\}$$