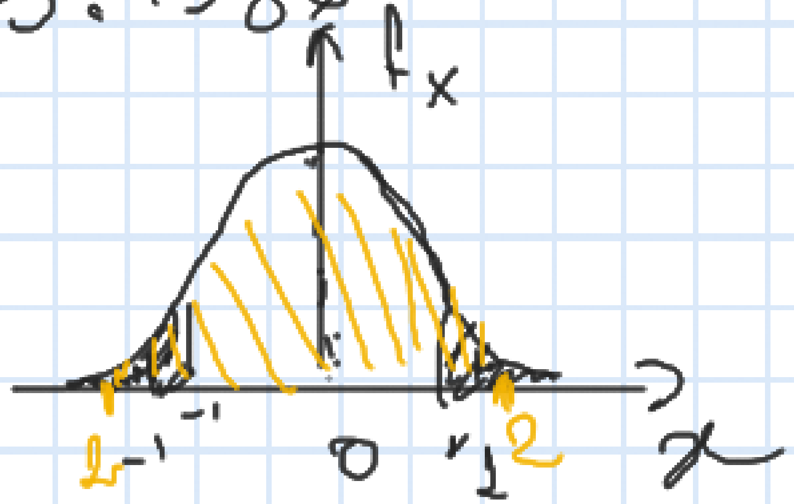
Ej 1 $X \sim N(0, 1)$ $P(X>1)$

media (0), varianza (1)   norm.cdf

$P(X>1) = 1 - P(X \leq 1) = 1 - \underbrace{F_X(1)}_{\Phi(1)} = 1 - \text{stats.norm.cdf}(1) = 0.1586$

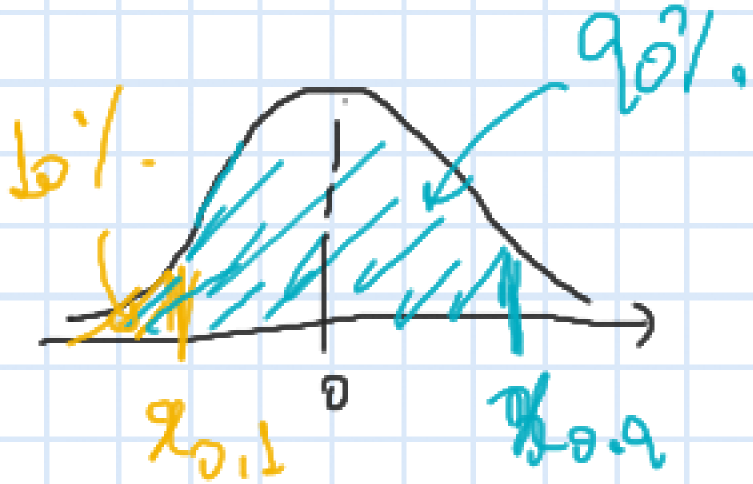


$P(X<-1) = F_X(-1) = 0.1586$

$P(|X|<2) = P(-2<X<2) = F_X(2) - F_X(-2) = 0.9544$

$x_{0,1}$: $x_{0,1} \,/\, P(X<x_{0,1}) = 0,1$

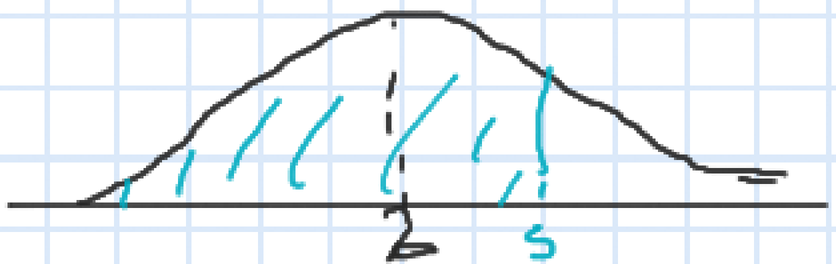
$x_{0,1} = -1,28$ $x_{0,9} = 1.28$



$Y \sim N(2, 9)$ $2X+Y \sim N(2\cdot 0 + 2,\ 2^2 \cdot 1 + 9)$

$2 \ ,\ 13$

$P(2X+Y<5) = 0.79$



Ej 2   X: "tiempo entre llamados" $f_X(x) = 1/5\, e^{-x \cdot 1/5}\, \mathbb{1}\{x>0\}$

$X \sim \mathcal{E}(1/5)$

1. $\mathbb{P}(X > 2) = \int_2^{\infty} 1/5\, e^{-x/5}\, dx$

$= 1 - \mathbb{P}(X \leq 2) = 0.6703$

primer llamado

Calcular la probabilidad de que la ~~probabilidad~~ de que llegue despúes de los 5 minutos, si se sabe que en los primeros 3 minutos no se recibieron llamados

2.

$$\mathbb{P}(X>5 \mid X>3) = \frac{\mathbb{P}(X>5,\ X>3)}{\mathbb{P}(X>3)} = \frac{\mathbb{P}(X>5)}{\mathbb{P}(X>3)}$$

perdida de memoria

Es 3

$$f_{X,Y}(x,y) = \frac{1}{2\pi 0.6} e^{-\frac{1}{2} \underbrace{[x \quad y]}_{(\underline{x}-\underline{\mu})^T} \begin{bmatrix} 1 & -0.8 \\ -0.8 & 1 \end{bmatrix}^{-1} \underbrace{\begin{bmatrix} x \\ y \end{bmatrix}}_{(\underline{x}-\mu)}}$$

$$f_{\underline{X}}(\underline{x}) = \frac{1}{(2\pi)^{n/2}|\Sigma|^{1/2}} e^{-\frac{1}{2}(\underline{x}-\underline{\mu})^T \Sigma^{-1} (\underline{x}-\underline{\mu})}$$

$$E[X] = \mu_X = 0$$
$$E[Y] = \mu_Y = 0$$

$$f_X(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

$$\Sigma = \begin{bmatrix} \sigma_1^2 & cov(X_1,X_2) & \cdot & cov(X_1,X_n) \\ cov(X_2,X_1) & \sigma_2^2 & & \\ & & \ddots & \\ & & & \sigma_n^2 \end{bmatrix}$$

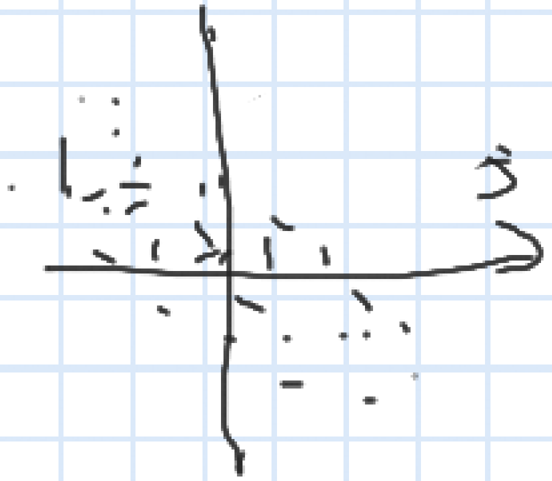
$$X,Y \sim N(\mu_X, \mu_Y, \sigma_X^2, \sigma_Y^2, \rho)$$

$$\begin{bmatrix} (x-\mu_X) & (y-\mu_Y) \end{bmatrix}$$
$$x \qquad y$$

$$\Sigma = \begin{bmatrix} \sigma_X^2 & cov(X,Y) \\ cov(X,Y) & \sigma_Y^2 \end{bmatrix}$$

$$\rho = \frac{cov(X,Y)}{\sqrt{\sigma_X^2 \cdot \sigma_Y^2}} = -0{,}8$$

$$var(X) = var(Y) = 1$$
$$cov(X,Y) = -0{,}8$$



$$X \sim N(0,1)$$

$$Y \sim N(0,1)$$

$$\mathbb{P}(X < 2,\ Y < -1) = 0{,}1377$$