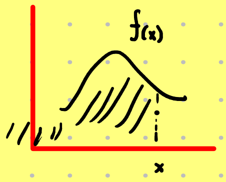
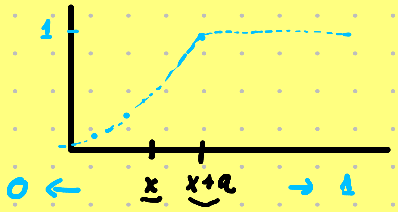
Distribuição Acumulada

$$\boxed{F(x) = P(X \leq x) = \int_{-\infty}^{x} f(t)\,dt}$$





1) $0 \leq F(x) \leq 1$

2) $\lim_{x \to -\infty} F(x) = 0$, $\lim_{x \to +\infty} F(x) = 1$

3) $F(x)$ é não decrescente

Proposição 7.1. Para todos os valores de x para os quais $F(x)$ é derivável, vale

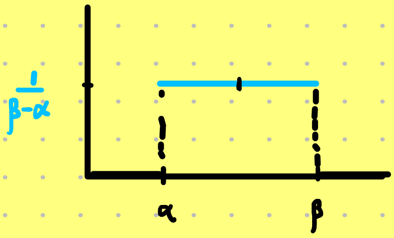
$$F'(x) = f(x)$$

Modelos VA's contínuas

- Modelo uniforme

$\therefore \int_{-\infty}^{\infty} f(x) = 1$

$$f(x, \alpha, \beta) = \begin{cases} \frac{1}{\beta - \alpha}, & \text{se } \alpha \leq x \leq \beta \\ 0, & cc \end{cases}$$



$$\boxed{E(X) = \frac{\alpha + \beta}{2}, \quad Var(X) = \frac{(\beta - \alpha)^2}{12}}$$

$$F(x) = \begin{cases} 0, & \text{se } x < \alpha \\ \frac{x - \alpha}{\beta - \alpha}, & \text{se } \alpha \leq x < \beta \\ 1, & \text{se } x \geq \beta \end{cases}$$

Notação: $X \sim U(\alpha, \beta)$

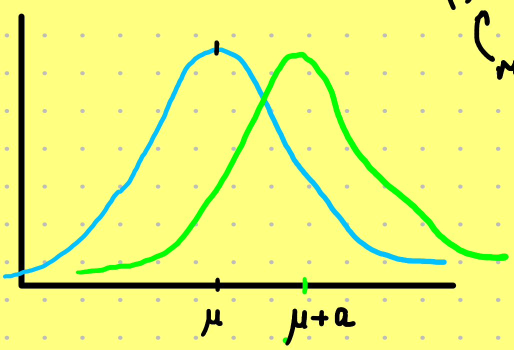
Modelo Normal

Gráfico

2 parâmetros (μ, σ^2)

variância

média



$X \sim N(\mu, \sigma^2)$

$\therefore$
- $E(X) = \mu$
- $Var(X) = \sigma^2$

Normal padrão:

$$Z = \frac{X - \mu}{\sigma} \sim N(0,1)$$

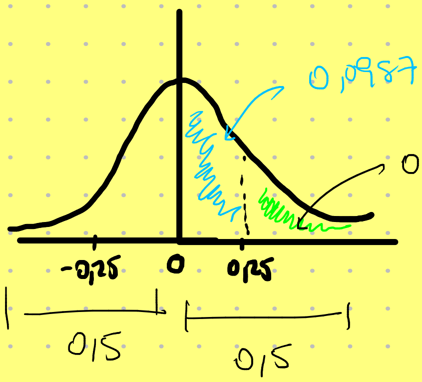
EXEMPLO.

$Y \sim N(2, \overset{\sigma^2}{4}) \therefore P(Y \geq 2{,}5) = P(Z \geq 0{,}25) = 0{,}4013$

$Z = \dfrac{Y-2}{2} \sim N(0,1)$

$Y = 2{,}5 \therefore Z = \dfrac{2{,}5-2}{2} = \dfrac{0{,}5}{2} = 0{,}25$

NA MINHA TABELA:



$0{,}0987$

$0{,}5 - 0{,}0987 = 0{,}4013$

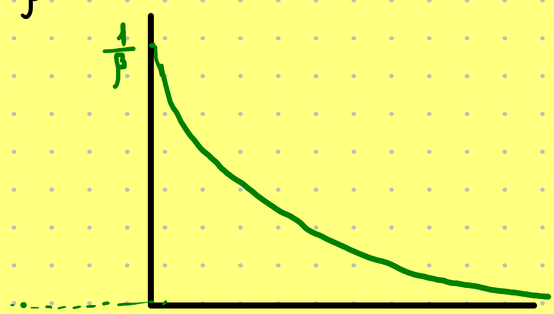
MODELO EXPONENCIAL

$X \sim Exp(\beta)$

$f(t;\beta) = \begin{cases} \frac{1}{\beta} e^{-t/\beta} & p/\ t \geq 0 \\ 0 & p/\ t < 0 \end{cases}$

$e^{-\infty} = \left(\dfrac{1}{e^{\infty}}\right) \to 0$

$\begin{cases} E(x) = \beta & (\lambda) \\ Var(x) = \beta^2 \end{cases}$



EXEMPLO 7.10

$P(T = 500) = 0$

$\beta = 500 \quad , \quad T \sim Exp(500)$

$P(T > 500) = \int_{500}^{+\infty} \frac{1}{500} e^{-t/500} dt = \frac{1}{500} \int_{500}^{+\infty} e^{-t/500} dt = \frac{1}{500} \cdot \lim_{A \to +\infty} \int_{500}^{A} e^{-t/500} dt$

$= \frac{1}{500} \lim_{A \to +\infty} \left[-500 e^{-t/500}\right]_{500}^{A} = \frac{1}{500} \cdot \lim_{A \to +\infty} \cancel{-500\, e^{-A/500}}^{\,0} - \left(-500\, e^{-\frac{500}{500}}\right)$

$= \frac{1}{500} 500 \cdot e^{-1} = e^{-1} \approx 0{,}3678$