Ej 5, práctico 5.

$$\boxed{F_M(x) = \prod_{i=1}^{n} F_i(x)}$$

$$= F_1(x) F_2(x) \ldots F_n(x)$$

$$= P(X_1 \leq x) \cdot P(X_2 \leq x) \ldots P(X_n \leq x)$$

$$= P(X_1 \leq x, X_2 \leq x, \ldots X_n \leq x)$$

$$= P(\underbrace{\max(X_i)} \leq x)$$

$$F_m(x) = 1 - \underbrace{\prod_{i=1}^{n} (1 - F_i(x))}$$

$$= 1 - \left[(1 - \underbrace{F_1(x)}_{P(X_1 \leq x)}) \cdot (1 - F_2(x)) \ldots (1 - F_n(x)) \right]$$

$$= 1 - \left[P(X_1 > x) P(X_2 > x) \ldots P(X_n > x) \right]$$

$$= 1 - P(X_1 > x, \ldots, X_n > x)$$

$$= 1 - P(\underbrace{\min(X_i)} > x)$$

$$= P(\min(X_i) \le x)$$

Ej 12 c)

$$\frac{f(x)}{g(x)} \le c \longrightarrow$$ h(x) está acotada superiormente, tiene máximo absoluto en su dominio

$$f(x) = \frac{1}{\lambda\pi\left(1+\left(\frac{x}{\lambda}\right)^2\right)} \qquad g(x) = \frac{1}{\sqrt{2\pi\sigma^2}}\, e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

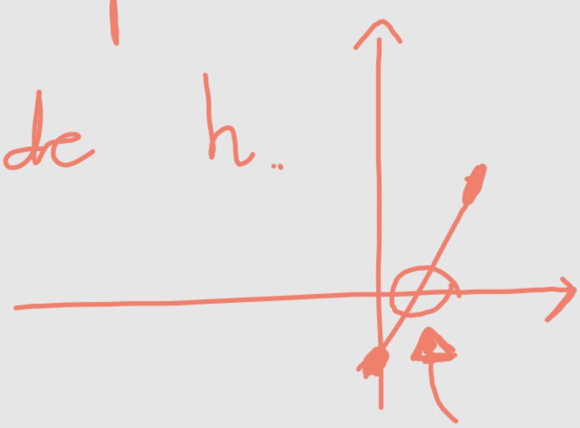
$$\frac{f(x)}{g(x)} = \dots \underbrace{\overset{K}{\frac{\lambda}{\pi\sqrt{2\pi\sigma^2}}}\; \frac{e^{+\frac{(x-\mu)^2}{2\sigma^2}}}{\lambda^2+x^2}}_{\text{Dom } h = \mathbb{R}} = h(x)$$

$$h'(x) = \dots = 0 \iff$$

$$p(x) = \underbrace{\lambda^2 x - \mu\lambda^2 + x^3 - \mu x^2 - 2x\sigma^2}_{} = 0$$

si $\bar{x}$ es raíz de p

$\Rightarrow$ $\bar{x}$ es punto crítico de h.



$$\lim_{x \to \infty} h(x) = \text{número}, \quad \lim_{x \to -\infty} h(x) = \text{num} ?$$

$$\lim_{x \to -\infty} h(x) = \dots\dots \underset{L'H}{=} \dots = +\infty$$

$$\frac{f(x)}{g(x)} = \frac{1 \cdot \lambda^2}{\lambda\pi(\lambda^2 + x^2)} \cdot \frac{1}{\frac{1}{\sqrt{2\pi\sigma^2}} \cdot e^{-\frac{(x-\mu)^2}{2\sigma^2}}}$$

$$= \frac{\lambda^{\cancel{2}}\sqrt{2\pi\sigma^2}}{\cancel{\lambda}\pi} \cdot \frac{e^{\frac{(x-\mu)^2}{2\sigma^2}}}{\lambda^2 + x^2}$$

$$f(x) = \frac{1}{\lambda\pi\left(1 + \left(\frac{x}{\lambda}\right)^2\right)} \to \left(1 + \frac{x^2}{\lambda^2}\right) = \left(\frac{\lambda^2 + x^2}{\lambda^2}\right)$$

$$\frac{1}{g(x)} =$$

Ej 2 a) I)

$$\boxed{f(x) = a x^{-(a+1)}} \qquad 1 \leq x < \infty$$

$$F(x) = \begin{cases} 0 & x < 1 \\ -x^{-a} + 1 & x \geq 1 \end{cases}$$

$$F(x) = \int_{-\infty}^{x} f(t)\,dt = \int_{-\infty}^{1} 0\,dt + \int_{1}^{\infty} a t^{\overbrace{-(a+1)}^{-a-1}}\,dt$$

$$= a \left. \frac{t^{-a}}{-a} \right|_{1}^{x}$$

$$= -x^{-a} - \left(-1^{-a}\right)$$

$$= -x^{-a} + 1$$

$$F(1) = 0 \quad , \quad \lim_{x \to \infty} F(x) = 1$$

$$U = -X^{-a} + 1$$

$$U - 1 = -X^{-a}$$

$$1 - U = X^{-a} = \frac{1}{X^{a}}$$

$$X^{a} = \frac{1}{1-U}$$

$$X = \sqrt[a]{\frac{1}{1-U}}$$

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Generar X()
  U = random()
  return a√(1/U)
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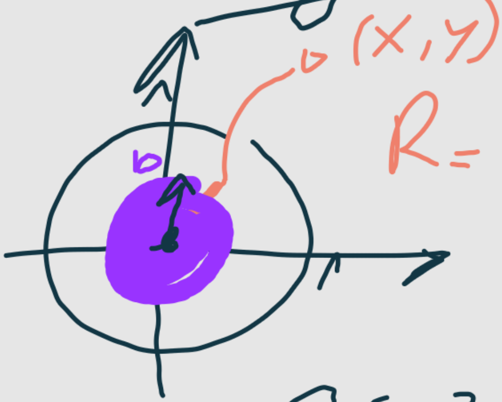
Ej 10



$$R = \sqrt{x^2 + y^2}$$

$$P(R^2 \leq b) = P(R \leq \sqrt{b}) = \frac{\text{área de } \bigcirc \text{ de radio } \sqrt{b}}{\text{área } \bigcirc \text{ radio } 1}$$

$$\frac{\cancel{\pi}\cdot b}{\cancel{\pi}} = b$$

Si $0 < b < 1$ $\quad \underbrace{P(R^2 \leq b) = b}$