

1. Tablero con 81 casillas en las que hay bomba en 10 casillas.

Calcular la probabilidad que no haya bombas en las ~~primas~~ primeras casillas seleccionadas.

$A_i :=$ "no hay bomba casilla i "

$$P(A_1 \cap A_2 \cap A_3 \cap A_4) = P(A_1) \cdot P(A_2|A_1) \cdot P(A_3|A_1 \cap A_2) \cdot P(A_4|A_1 \cap A_2 \cap A_3)$$

$$= \frac{71}{81} \cdot \frac{70}{80} \cdot \frac{69}{79} \cdot \frac{68}{78}$$

2. Norte $\rightarrow P(N) = 20\%$; $P(A|N) = 70\%$
 Centro $\rightarrow P(C) = 50\%$; $P(A|C) = 50\%$
 Sur $\rightarrow P(S) = 30\%$; $P(A|S) = 20\%$

$A :=$ "tener ojos azules"

1- Seleccionamos 1 zona

2- seleccionamos 3 personas

$$P(N|AAA) = ?$$

$$P(N|AAA) = \frac{P(AAA|N) \cdot P(N)}{P(AAA)} = \frac{(0.7)^3 \cdot 0.2}{P(AAA)}$$

$$P(AAA) = P(AAA|N) \cdot P(N) + P(AAA|C) \cdot P(C) + P(AAA|S) \cdot P(S) =$$

$$= (0.7)^3 \cdot 0.2 + (0.5)^3 \cdot 0.5 + (0.2)^3 \cdot 0.3 = \text{número}$$

$$\Rightarrow P(N|AAA) = \frac{(0.7)^3 \cdot 0.2}{\text{número}}$$

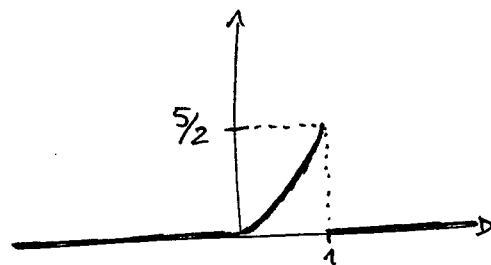
3. X v.a. continua, $f_X(x) = \begin{cases} 0 & , x \notin (0,1) \end{cases}$

a) $E(X) = ?$

$$E(X) = \int_{\mathbb{R}} x f_X(x) dx = \int_0^1 x \cdot \frac{1}{2}(2x + 3x^2) dx = \left[\frac{1}{2} \left(\frac{2x^3}{3} + \frac{3x^4}{4} \right) \right]_{x=0}^{x=1} = \frac{1}{2} \left(\frac{2}{3} + \frac{3}{4} \right)$$

b) $P(X \leq 3/4 | X \geq 1/2) = ?$

$$P(X \leq 3/4 | X \geq 1/2) = \frac{P(1/2 \leq X \leq 3/4)}{P(X \geq 1/2)} = \frac{\int_{1/2}^{3/4} f_X(x) dx}{\int_{1/2}^{\infty} f_X(x) dx} = \frac{\frac{1}{2} \int_{1/2}^{3/4} (2x + 3x^2) dx}{\frac{1}{2} \int_{1/2}^1 (2x + 3x^2) dx} = \dots$$



c) $Y = 1/X$; $F_Y(y)$

$$F_Y(y) = P(Y \leq y) = P(1/X \leq y) =$$

$$= \begin{cases} P(X \leq 1/y) , & y < 0 \\ P(X \geq 1/y) , & y > 0 \\ P(X < 0) , & y = 0 \end{cases} = \begin{cases} 0 & y < 0 \\ 0 & y = 0 \\ 1 - \frac{1}{2} \left(2 \left(\frac{1}{y^2} \right) + \frac{3}{y^3} \right) & y > 1 \end{cases}$$

d) $T = g(X)$

$$g(x) = \begin{cases} 0 , & x \in (0, 1/2) \\ 1 , & x \in [1/2, 1) \cap \mathbb{Q} \\ 2 , & x \in [1/2, 1) \cap (\mathbb{R} \setminus \mathbb{Q}) \\ 3 , & x \notin (0, 1) \end{cases}$$

$$E(T) = ? = \sum_{i=1}^4 x_i \cdot P(T=x_i) = 0 \cdot P(T=0) + 1 \cdot P(T=1) + 2 \cdot P(T=2) + 3 \cdot P(T=3)$$

$$= P(X \in [1/2, 1) \cap \mathbb{Q}) + 2 \cdot P(X \in [1/2, 1) \cap (\mathbb{R} \setminus \mathbb{Q})) + 3 \cdot P(X \notin (0, 1))$$

$$\int_A f(x) dx = 0 \text{ si } A \text{ numerable}$$

$$1.625 = \frac{13}{8}$$