Partición de conjuntos

Partición a 2

Los que pasaron y los que no pasaron

Partición a C

$k>0$, $k>10$, $k>20$ ....

Conjunto <u>NO</u> finito

partición infinita numerable $\rightarrow \sum_{k=1}^{\infty} P(A_k) = 1$

partición infinita <u>NO</u> numerable $\rightarrow \int P_r(A(x))dx$

Variable Aleatoria Discreta

$X: \Omega \rightarrow \text{valores}(x)$

$\text{Valores}(x) = \{V_1, V_2 \ldots V_n\}$

$X = x \rightarrow \{w \mid w \in \Omega \ni X(w) = x\}$

$P(x) = X \leftrightarrow P(\{w \mid w \in \Omega \wedge X(w) = x\}$

$X ::=$ V.A. 2 valores

$\text{Val}(x) = \{0, 1\}$

$$\left.\begin{aligned} P(x=1) &= p \\ P(x=0) &= 1-p \end{aligned}\right\} \; p^x (1-p)^{1-x}$$

$\leftarrow X \sim \text{Bernoulli}(p)$

X tiene varios valores finitos

$\text{Val}(x) = \{1, 2, \ldots, C\}$

$\downarrow$

$P[X=i] = \phi_i$ donde $\sum_{i=1}^{C} \phi_i = 1$ $\quad \phi_i \geq 0$

$$P[X=i] = \prod_{i=1}^{C} \phi_i^{1\{x=i\}}$$

$X \sim \text{Multinomial}(\overbrace{\phi_1 \ldots \phi_c}^{\text{Vector } \phi})$

$X \quad Val(x) = \{1, 2 \ldots\}$

$\sum_{i=1}^{\infty} P[x=i] = 1$

$e^{\lambda} = 1 + \lambda + \frac{\lambda^2}{2!} + \frac{\lambda^3}{3!} + \ldots$

$1 = \frac{e^{\lambda}}{e^{\lambda}} = e^{\lambda} e^{-\lambda} = e^{-\lambda}\left[1 + \lambda + \frac{\lambda^2}{2!} + \ldots\right]$

$1 = e^{\lambda} + \frac{\lambda e^{-\lambda}}{1!} + \frac{\lambda^2 e^{-\lambda}}{2!} + \frac{\lambda^3 e^{-\lambda}}{3!} + \ldots = \sum_{i=0}^{\infty} \frac{\lambda^i e^{-\lambda}}{i!} = \sum_{i=0}^{\infty} P_r[X=i]$

$P_r[X=i] = \frac{\lambda^i e^{-\lambda}}{i!} \leftrightarrow X \sim \text{Poisson}(\lambda)$

$X \rightarrow val(x) = \mathbb{R}$

$X = x \leftrightarrow \{\Omega \mid \Omega \in \Omega \wedge \lim_{\varepsilon \to 0} x - \varepsilon \leq X(\Omega) \leq x + \varepsilon\}$

$P[X=x] = \int_{-\infty}^{\infty} P_r[X=x]\, dx = 1$

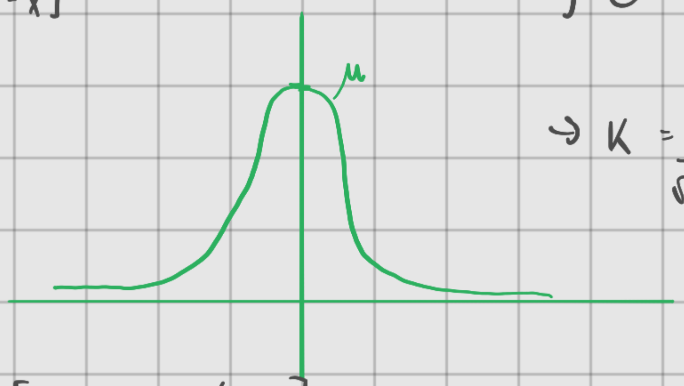
Pdf: función de densidad de probabilidad

No Prob

$\underbrace{K \overbrace{e^{-\frac{1}{2}\frac{(x-\mu)}{\sigma}}}}_{\text{Prob}} = P_{df}[X=x]$

$\int e^{-1/2 \frac{(x-\mu)}{\sigma}} dx = 1/K$

$\rightarrow K = \frac{1}{\sqrt{2\pi\sigma^2}} \leftrightarrow X \sim \text{Normal}(\mu, \sigma^2)$



$P[X, Y] = P[X=x \wedge Y=y]$

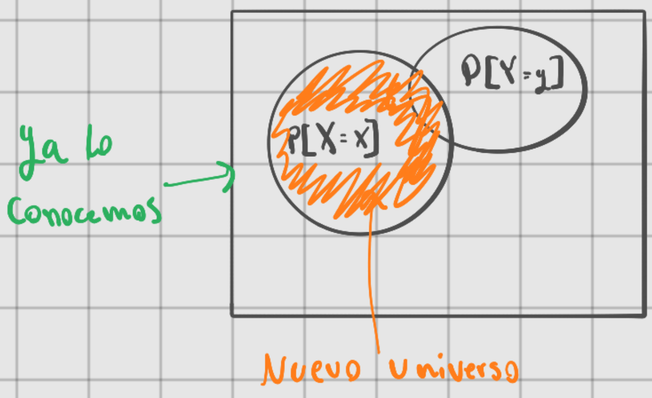
Prob conjunta

X	y	P(x,y)
x_0	y_0	0
x_1	y_1	0
⋮	⋮	⋮
x_n	y_n	0

$\downarrow$

1

$X \quad Y \qquad P[Y=y \mid X=x]$



$$\rightarrow \frac{P(Y=y, X=x)}{P(X=x)}$$

$$P(Y=y \mid X=x) = P(Y=y)$$

Si son independientes:

$$P(Y=y)\,P(X=x) = P(X=x, Y=y)$$

$$P(X=x \mid Y=y) = P(X=x)$$