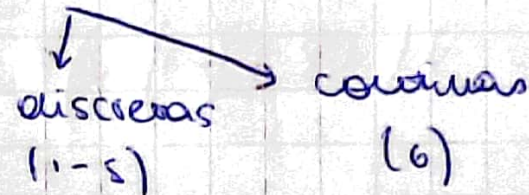


Pr 5

v.a. bidimensionales

app



EJERCICIO 5

parecias ↓

2. v.a. discretas

X e Y son independientes

$$F(x, y) = P(\underbrace{X=x, Y=y}_{\text{conjuntos}})$$

X	3	4
p(x)	0,4	0,3
Y	0	1
p(y)	0,9	0,1

coeficiente
relacion

$$f(x, y) = p(x) \cdot q(y) \quad V(x, y)$$

a) Hallar r.a.p. conjunta

meas
mean
an
partial

marginal
x

Hallar

marginal x

sumar
columnas

$y \backslash x$	3	4	$q(y)$
0	0,63	0,27	0,90
1	0,07	0,03	0,10
$p(x)$	0,7	0,3	1

$$f(3,0) = p(3) \cdot q(0) = 0,7 \cdot 0,9$$

b) Hallar $E(x)$, $E(y)$, $V(x)$, $V(y)$

$$E(x) = \sum_{x \in R_x} x \cdot p(x) = 3 \cdot 0,7 + 4 \cdot 0,3 = 3,3$$

$$V(x) = E(x^2) - (E(x))^2 = > 0$$

$$E(x, y) = \sum_{x \in R_x} \sum_{y \in R_y} (x, y) \cdot f(x, y) = 3 \cdot 0 \cdot 0,63 + 4 \cdot 0 \cdot 0,27 + 3 \cdot 1 \cdot 0,07 + 4 \cdot 1 \cdot 0,03 = 0,21 + 0,12 = 0,33$$

casos
terminos
como
celas

$$a + b \sqrt{V(x)}$$

$$\text{cor}(x, y) = E(x \cdot y) - E(x) \cdot E(y)$$

$$E(ax + by + c) = aE(x) + bE(y) + c$$

$$V(ax + by + c) = a^2 V(x) + b^2 V(y) + 2ab \cdot \text{cor}(x, y)$$

$$\text{Ej 4} \quad V(100x + 200y) = 100^2 V(x) + 200^2 V(y) + 2 \cdot 100 \cdot 200 \cdot \text{cor}(x, y)$$

$$\text{Ej 4a} \quad V(x - y) = V(1x + (-1)y) = V(x) + V(y) - 2 \cdot \text{cor}(x, y)$$

si x e y son indep $\Rightarrow \text{cor}(x, y) = 0$

$$E(x, y) = E(x) \cdot E(y)$$

$$V(ax + by + c) = a^2 V(x) + b^2 V(y)$$

cuidado $\text{cor}(x, y) = 0$ NO implica que x e y son indep.

$$\sigma_{X+Y} = \sqrt{V(X+Y)}$$

$$P(X+Y=4) = F(2,2) + F(1,3) + F(3,1)$$

PS EJ 4-9

teor combination lineal de v.a normales indep. tiene dist normal

a) X = duración del foto A (hs)

$$X \sim N(\mu_X, \sigma_X^2)$$

Y = duración del foto B (hs)

$$Y \sim N(\mu_Y, \sigma_Y^2)$$

$$P(\underbrace{Y-X}_{W} > 0) = ?$$

$\nearrow 100 \quad \nearrow 100^2 + 150^2 = 32500$
 $W \sim N(\mu_W, \sigma_W^2)$

$$\mu_W = E(W) = E(Y-X) = E(Y) - E(X) = 100$$

$$\sigma_W^2 = V(W) = V(Y-X) = V(Y) + V(X) = 150^2 + 100^2 =$$

$$P(W > 0) = P\left(\frac{W - \mu_W}{\sigma_W} > \frac{0 - 100}{\sqrt{32500}}\right)$$

$W \sim N(\mu_W, \sigma_W)$

$$\mu_W = 100$$

$$\sigma_W^2 = 100^2 + 150^2 = 32500$$

TCL bosques prob total
 —————
 realeza imp

$\frac{W - 100}{100 + 150}$

→ z-score de la desviada

$\frac{W - 100}{32500}$

→ Varianza

$\frac{W - 100}{\sqrt{100^2 + 150^2}}$

→ W
mu
no
est.
dist.