Test Prob. Corrección

miércoles, 27 de mayo de 2020 10:36

Lanzamos dos dados y anotamos los números que salen.

Sea A = {la suma es 8} y B = {los números difieren en 2}

Calcular:

a) p(A y B) $\cap$ **b) p(A y no B)** **c) p(no A y B)** **d) p(no A y no B)**

e) p(A / B) **f) p(A / no B)** **g) p(no A / B)** **h) p(A o B)** $\cup$

$A = \{(2,6)\ (6,2)\ (3,5)\ (5,3)\ (4,4)\}$ card $\bar{A} = 31$

$B = \{(1,3)\ (3,1)\ (2,4)\ (4,2)\ (3,5)\ (5,3)\ (4,6)\ (6,4)\}$. $\Rightarrow$ 8 RES. POSIBLES

card $\bar{B} = 36 - 8 = 28$

card (E) = $6 \cdot 6 = 36$

a) $p(A \cap B) = \frac{2}{36} = \frac{1}{18}$

$\frac{2}{8} = \frac{1}{4}$

b) $p(A \cap \bar{B}) = \frac{3}{36} = \frac{1}{12}$

$x \in \bar{B} \Leftrightarrow x \notin B$

Están en A y están NO B

Están en A NO están en B

c) $p(\bar{A} \cap B) = \frac{6}{36} = \frac{1}{6}$

$x \in B$ pero no en A

* d) $p(\bar{A} \cap \bar{B})$

31 28

DE MORGAN $\bar{A} \cap \bar{B} = \overline{A \cup B}$

$p(\bar{A} \cap \bar{B}) = p(\overline{A \cup B}) = 1 - p(A \cup B)$

Aptdo(a)

$p(A \cup B) = p(A) + p(B) - p(A \cap B) = \frac{5}{36} + \frac{8}{36} - \frac{1}{18} = \frac{11}{36}$

$p(\overline{A \cup B}) = 1 - \frac{11}{36} = \frac{25}{36} = p(\bar{A} \cap \bar{B})$

(e) $p(A|B) = \frac{p(A \cap B)}{p(B)} = \frac{1/18}{8/36} = \frac{36}{8 \cdot 18} = \frac{1}{4}$

$$\frac{}{p(B)} = \frac{}{8/36} = \frac{}{8\cdot 18} = \frac{}{4}$$

"Suceda A si ha sucedido B"

(f) $$p(A|\bar{B}) = \frac{p(A\cap\bar{B})}{p(\bar{B})} = \frac{1/12}{7/9} = \frac{9}{7\cdot 12} = \frac{9}{84}$$

$$p(\bar{B}) = 1 - p(B) = 1 - \frac{8}{36} = \frac{28}{36} = \frac{14}{18} = \frac{7}{9}$$

(g) $$p(\bar{A}/B) = \frac{p(\bar{A}\cap B)}{p(B)} = \frac{\frac{1}{6}}{\frac{8}{36}} = \frac{36}{6\cdot 8} = \frac{3}{4}$$

(h) $$p(A\cup B) = \frac{11}{36}$$

Sean A y B dos sucesos aleatorios con $p(A) = \frac{1}{3}$, $p(B) = \frac{1}{4}$, $p(A\cap B) = \frac{1}{5}$.

Determinar:

a $p(A/B)$

b $p(B/A)$

c $p(A\cup B)$

d $p(\bar{A}/B)$

e $p(\bar{B}/\bar{A})$ $37/40$

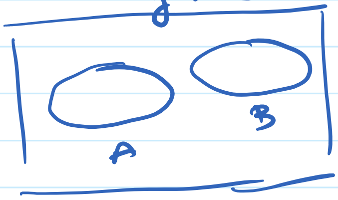
f $p(\bar{B}/A)$ $2/5$

(a) $$p(A|B) = \frac{p(A\cap B)}{p(B)} = \frac{1/5}{1/4} = \frac{4}{5}$$

(b) $$p(B|A) = \frac{p(A\cap B)}{p(A)} = \frac{1/5}{1/3} = \frac{3}{5}$$

(c) $p(A\cup B) = p(A) + p(B)$ EN UN CASO

$A \cap B = \emptyset$ — B y A son INCOMPATIBLES

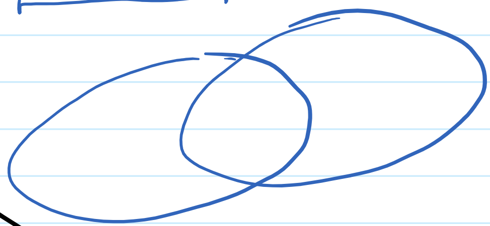


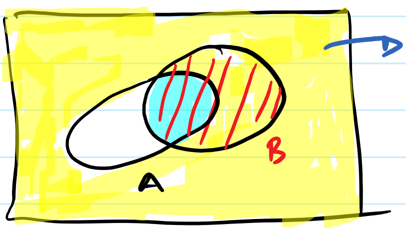
$$p(A\cup B) = \frac{1}{3} + \frac{1}{4} - \frac{1}{5} = \frac{20+15-12}{60} = \frac{23}{60}$$

FOR. ERRÓNEO
PROB. ERRÓNEO

$$p(\bar{A}|B) = \frac{p(\bar{A}\cap B)}{p(B)}$$

$\bar{A} \cap B$





→ $\bar{A}$

$B - (A \cap B)$ → Resta conjuntos

$\bar{A} \cap B$

$$p(\bar{A}|B) = \frac{p(\bar{A}\cap B)}{p(B)} = \frac{p(B-(A\cap B))}{p(B)} = \frac{p(B)-p(A\cap B)}{p(B)} =$$

$$= \frac{1/4 - 1/5}{1/4} = \frac{1/20}{1/4} = \frac{1}{5}$$

$$\frac{p(B)}{p(B)} - \frac{p(A\cap B)}{p(B)}$$

Con otras letras

$$p(\bar{C}|D) = 1 - p(C|D)$$

$$\underbrace{p(\bar{A}|B)} = 1 - \underbrace{\frac{p(A\cap B)}{p(B)}}$$

$$p(\bar{A}|B) = 1 - p(A|B)$$

Los sucesos $\bar{A}|B$ y $A|B$ son sucesos complementarios

Ej anterior

$$p(\bar{B}|\bar{A}) = \frac{p(\bar{A} \cap \bar{B})}{p(\bar{A})} = \frac{p(\overline{A \cup B})}{p(\bar{A})} = \frac{1 - p(A \cup B)}{1 - p(A)}$$

Ley de DeMorgan