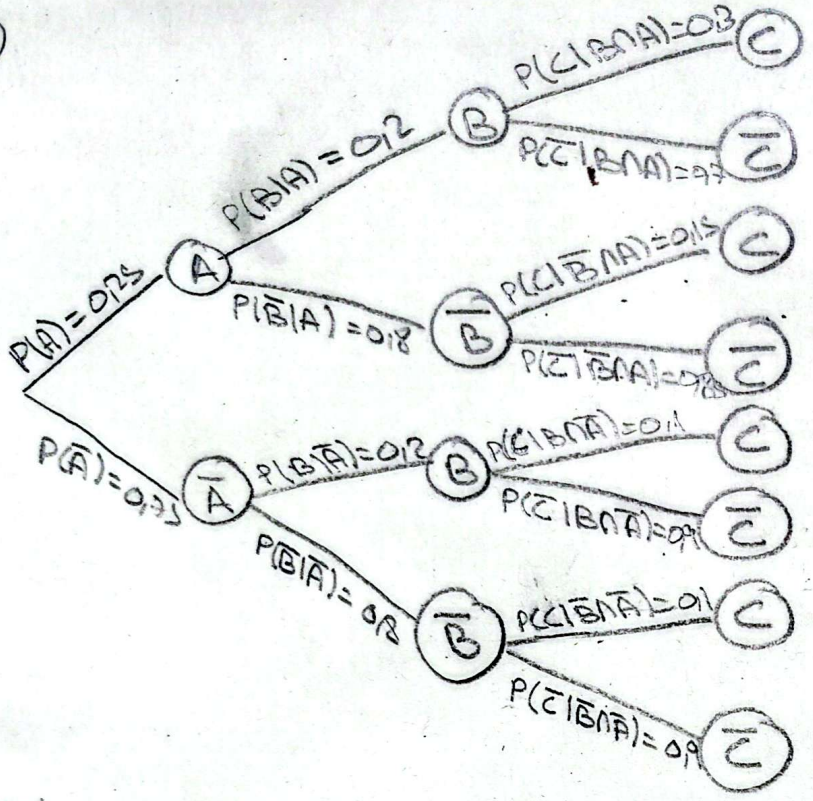
(41)



$P(A \cap B \cap C) = 0,25 \cdot 0,2 \cdot 0,3 = 0,015$

$P(A \cap B \cap \bar{C}) = 0,25 \cdot 0,2 \cdot 0,7 = 0,035$

$P(A \cap \bar{B} \cap C) = 0,25 \cdot 0,8 \cdot 0,15 = 0,03$

$P(A \cap \bar{B} \cap \bar{C}) = 0,25 \cdot 0,8 \cdot 0,85 = 0,17$

$P(\bar{A} \cap B \cap C) = 0,75 \cdot 0,2 \cdot 0,1 = 0,015$

$P(\bar{A} \cap B \cap \bar{C}) = 0,75 \cdot 0,2 \cdot 0,9 = 0,135$

$P(\bar{A} \cap \bar{B} \cap C) = 0,75 \cdot 0,8 \cdot 0,1 = 0,06$

$P(\bar{A} \cap \bar{B} \cap \bar{C}) = 0,75 \cdot 0,8 \cdot 0,9 = 0,54$

Teorema probabilidad total

$$P(C) = P(A \cap B \cap C) + P(A \cap \bar{B} \cap C) + P(\bar{A} \cap B \cap C) + P(\bar{A} \cap \bar{B} \cap C) =$$

$$= 0,015 + 0,03 + 0,015 + 0,06 = 0,12$$

Teorema de Bayes

$$P(B|C) = \sum_{\text{all the lines}} \frac{P(B \cap C)}{P(C)} = *$$

$$P(B \cap C) = \sum_{\text{all the lines}} P(B_i) \cdot P(C|B_i) =$$

$$= P(B \cap A) \cdot P(C|B \cap A) + P(B \cap \bar{A}) \, P(C|B \cap \bar{A}) =$$

$$= P(A) \cdot P(B|A) \cdot P(C|B \cap A) + P(\bar{A}) P(B|\bar{A}) \, P(C|B \cap \bar{A}) =$$

$$= 0,25 \cdot 0,2 \cdot 0,3 + 0,75 \cdot 0,2 \cdot 0,1 = 0,03$$

sum of all the lines that contain $B \cap C$

$$* = \frac{0,03}{0,12} = 0,25$$

$$P(\overline{A} \mid \overline{B} \cap \overline{C}) = \frac{P(\overline{A} \cap \overline{B} \cap \overline{C})}{P(\overline{B} \cap \overline{C})} = \frac{0,54}{0,71}$$

Teorema prob total

$$P(\overline{B} \cap \overline{C}) = \sum_{\text{all even}} P(\overline{B}) \cdot P(\overline{B} \mid \overline{C}) = \ldots$$

Sum all the lines that contain $\overline{B} \cap \overline{C}$

$$= P(\overline{A} \cap \overline{B} \cap \overline{C}) + P(A \cap \overline{B} \cap \overline{C}) =$$

$$= 0,54 + 0,17 = 0,71$$

(e) Son B y C independientes?

$$P(B \mid C) = P(B)$$

$P(B \mid C) = 0,25$

Teorema de la Probabilidad total

$$P(B) = \sum_{\text{even}} P(B_i) = P(A) \cdot P(B \mid A) + P(\overline{A}) \cdot P(B \mid \overline{A}) =$$

Sum all the lines that contain B

$$= 0,25 \cdot 0,2 + 0,75 \cdot 0,2 = 0,2$$

$$0,25 \overset{?}{=} 0,2 \quad \text{NO}$$

$\Downarrow$

no son independientes