23 February 2024 09:09 PM

1. Bayes Theorem 2. Minors, Cofactors 3. Input-Output analysis.

Matrix and Determinant.

M_{31}, M_{32}, M_{33}

$(-1)^{3+1} = C_{31} = 69(-1)^4 = 69$ ✓

$(-1)^{3+2} = C_{32} = 61(-1)^5 = -61$ ✓

$(-1)^{3+3} = C_{33} = -15(-1)^{3+3} = -15$ ✓

Minors:

$A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}_{2\times 2}$ M_{12}, M_{11}

$M_{22} = (-1)^{2+2} |a_{11}|_{1\times 1}$ (+ve) $= C_{22}$

$M_{21} = |a_{12}|_{1\times 1}$

$M_{12} = |a_{21}|_{1\times 1}$

$M_{11} = |a_{22}|_{1\times 1}$

$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}_{3\times 3}$ M_{22}, M_{21}

$M_{11} = \begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix}$

$M_{21} = \begin{vmatrix} a_{21} & a_{22} \\ a_{31} & a_{33} \end{vmatrix}$

$M_{12} = \begin{vmatrix} a_{12} & a_{13} \\ a_{22} & a_{23} \end{vmatrix}$

$M_{22} = \begin{vmatrix} a_{22} & a_{13} \\ a_{32} & a_{33} \end{vmatrix}$

$A = \begin{bmatrix} 13 & 17 \\ 19 & 15 \end{bmatrix}$ 13, 17

$A =$

$M_{11} = \begin{vmatrix} 5 & 1 \\ 4 & \end{vmatrix} =$

$M_{12} = \begin{vmatrix} 4 & 1 \\ 7 & \end{vmatrix} =$

$M_{13} = \begin{vmatrix} 4 & 5 \\ 7 & \end{vmatrix} =$

$= 1\begin{vmatrix} 5 & 1 \\ & \end{vmatrix} - 2\begin{vmatrix} 4 & 1 \\ & \end{vmatrix} + 3\begin{vmatrix} 4 & 5 \\ 7 & 8 \end{vmatrix}$

$$|A| = 1\begin{vmatrix} 5 & 6 \\ 8 & 9 \end{vmatrix} - 2\begin{vmatrix} 4 & 6 \\ 7 & 9 \end{vmatrix} + 3\begin{vmatrix} 4 & 5 \\ 7 & 8 \end{vmatrix}$$

Q

$$A = \begin{bmatrix} 9 & 11 & 4 \\ 3 & 2 & 7 \\ 6 & 10 & 4 \end{bmatrix}$$

Bayes theorem :

Conditional probability, $P(A/B) = \frac{P(A \cap B)}{P(B)}$

S → stripped
R → Red

$P(S/R) = \frac{P(S \cap R)}{P(R)}$

$= \frac{4/10}{6/10}$

$= 4/6 = 2/3$

Joint / compound probability

$P(A \cap B) = P(A/B) \times P(B)$

$P(A \cap B) = P(B/A) \times P(A)$

$P(R) = 6/10$

$P(S \cap R) = P(S/R) \cdot P(R)$

$= 2/3 \times 6/10.$

$P(S/R) = 2/3$ $\quad P(R) = 6/10$

$P(S/R) = 2/3$ $P(R) = 6/10$

$P(S \cap R) = P(S/R) \times P(R)$

$P(A \cap B) = P(A) \times P(B) \rightarrow$ independent

$= 2/3 \times 6/10$

$= 4/10$