EE5609 Assignment 2

Gaydhane Vaibhav Digraj
RollNo : AI20MTECH11002

Abstract—**This assignment involves finding the matrix X by solving the equation.**

The python code solution can be downloaded from,

https://github.com/Vaibhav11002/EE5609/blob/
master/Assignment_3/Codes/assignment_3.
ipynb

1 PROBLEM

Prove that,

$$\begin{vmatrix} a^2 & bc & ac+c^2 \\ a^2+ab & b^2 & ac \\ ab & b^2+bc & c^2 \end{vmatrix} = 4a^2b^2c^2$$

2 SOLUTION

$$= 2a^2b^2c^2 \,(2) \qquad (2.0.2)$$

$$= 4a^2b^2c^2 \qquad (2.0.3)$$

$$\begin{vmatrix} a^2 & bc & ac+c^2 \\ a^2+ab & b^2 & ac \\ ab & b^2+bc & c^2 \end{vmatrix}$$

$$\xrightarrow{R1 \leftarrow \frac{R1+R2+R3}{2}} 2 \begin{vmatrix} a^2+ab & b^2+bc & ac+c^2 \\ a^2+ab & b^2 & ac \\ ab & b^2+bc & c^2 \end{vmatrix}$$

$$\xrightarrow{R1 \leftarrow R1-R2} 2 \begin{vmatrix} 0 & bc & c^2 \\ a^2+ab & b^2 & ac \\ ab & b^2+bc & c^2 \end{vmatrix}$$

$$\xrightarrow[C3 \leftarrow \frac{C3}{c}]{C1 \leftarrow \frac{C1}{a};C2 \leftarrow \frac{C2}{b}} 2abc \begin{vmatrix} 0 & c & c \\ a+b & b & a \\ b & b+c & c \end{vmatrix}$$

$$\xrightarrow{R3 \leftarrow R3-R1} 2abc \begin{vmatrix} 0 & c & c \\ a+b & b & a \\ b & b & 0 \end{vmatrix}$$

$$\xrightarrow{R2 \leftarrow R2-R3} 2abc \begin{vmatrix} 0 & c & c \\ a & 0 & a \\ b & b & 0 \end{vmatrix}$$

$$\xrightarrow[R3 \leftarrow \frac{R3}{b}]{R1 \leftarrow \frac{R1}{c};R2 \leftarrow \frac{R2}{a}} 2a^2b^2c^2 \begin{vmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{vmatrix} \quad (2.0.1)$$