ASSIGNMENT-8

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1 Question:-

1.1 Let

$$A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$$

,

$$B = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}$$

,

$$C = \begin{bmatrix} 2 & 5 \\ 3 & 8 \end{bmatrix}$$

Find the matrix D such that CD-AB=0.

1.2 Solution:-

Order of A=2×2 and Order of B=2×2.
Order of AB=2×2.

So we are doing CD-AB
Order of CD=Order of AB
Order of CD =2×2

Order of CD=2×2
So,order of D=2×2
Now, CD=AB
D=C^{-1}AB
Now check $|C|$;

$|C|$=2×8-5×3=1

i,e $|C| \neq 0$.

Therefore, C is non-singular.Hence its inverse exists

Now,

$C^{-1}=\frac{AdjC}{|C|}$—

$$C^{-1} = \frac{Adj\begin{pmatrix} 2 & 5 \\ 3 & 8 \end{pmatrix}}{\begin{vmatrix} 2 & 5 \\ 3 & 8 \end{vmatrix}} = \frac{1}{1}\begin{pmatrix} 8 & -5 \\ -3 & 2 \end{pmatrix}$$

Therefore, $C^{-1} = \begin{pmatrix} 8 & -5 \\ -3 & 2 \end{pmatrix}$

Therefore,
$D = C^{-1}AB$

$$D = \begin{bmatrix} 8 & -5 \\ -3 & 2 \end{bmatrix} \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix} \tag{1}$$

$$D = \begin{bmatrix} 8*2+(-5)*3 & 8*(-1)+(-5)*4 \\ -3*2+2*3 & 3*(-1)+2*4 \end{bmatrix} \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix} \tag{2}$$

$$D = \begin{bmatrix} 1 & -28 \\ 0 & 11 \end{bmatrix} \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix} \tag{3}$$

$$D = \begin{bmatrix} 1*5+(-28)*7 & 1*2+(-28)*4 \\ 0*5+11*7 & 0*2+11*4 \end{bmatrix}$$

Thus matrix D:

$$D = \begin{bmatrix} -191 & -110 \\ 77 & 44 \end{bmatrix}$$