ojt-q2

May 12, 2024

0.1 Q2. Row Echelon Form:

```
[1]: import numpy as np
     import sympy as sp
```

```
[2]: np.random.seed(29) # My roll no = 29
     A = np.random.randint(0, 10, (5, 5))
     sp.Matrix(A)
```

$$
[2]: \begin{bmatrix} 5 & 3 & 2 & 8 & 0 \\ 9 & 1 & 8 & 5 & 3 \\ 1 & 8 & 1 & 5 & 4 \\ 7 & 0 & 4 & 2 & 6 \\ 7 & 3 & 0 & 8 & 3 \end{bmatrix}
$$

```
[3]: rows, cols = A.shape
     lead = 0
     row = 0
     while lead < cols and row < rows:
         if A[row, lead] == 0:
             non_zero_row = row + 1
             while non_zero_row < rows and A[non_zero_row, lead] == 0:
                 non_zero_row += 1
             if non_zero_row == rows:
                 lead += 1
                 row = 0
                 continue
             else:
                 A[[row, non_zero_row]] = A[[non_zero_row], row]

         A[row] = A[row] / A[row, lead]
         for i in range(rows):
             if i != row:
                 factor = A[i, lead]
                 A[i] = A[i] - factor * A[row]
         lead += 1
         row +=1
```

1

```
print("\nRow Echelon Form of Matrix A is:")
sp.Matrix(A)
```

Row Echelon Form of Matrix A is:

[3]: $\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$