Computational and Numerical Methods

Group 16

Set 9 (08-10-2018): The Gaussian Elimination Method

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Show Code

```
Q1.
```

Out[3]:
$$\begin{bmatrix} 1 & 2 & 1 & 0 \\ 2 & 2 & 3 & 3 \\ -1 & -3 & 0 & 2 \end{bmatrix}$$

```
Row-Reduced Echelon form is:
```

Out[4]:
$$\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 1 \end{bmatrix}$$

$x_1 = 1, x_2 = -1, x_3 = 1$

```
Q2.
```

Out[5]:
$$\begin{bmatrix} 4 & 3 & 2 & 1 & 1 \\ 3 & 4 & 3 & 2 & 1 \\ 2 & 3 & 4 & 3 & -1 \\ 1 & 2 & 3 & 4 & -1 \end{bmatrix}$$

```
Row-Reduced Echelon form is:
```

Out[6]:
$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & -1 \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

$x_1 = 0, x_2 = 1, x_3 = -1, x_4 = 0$

Q3.

Out[7]:
$$\begin{bmatrix} 1 & 1 & -1 \\ 1 & 2 & 2 \\ -2 & 1 & 1 \end{bmatrix}$$

The inverse of the matrix is:

Out[8]:
$$\begin{bmatrix} 0 & \frac{1}{5} & -\frac{2}{5} \\ \frac{1}{2} & \frac{1}{10} & \frac{3}{10} \\ -\frac{1}{2} & \frac{3}{10} & -\frac{1}{10} \end{bmatrix}$$