

Sure, I'd be happy to help you with that. Here is the step by step process for finding the inverse of a matrix using Gaussian elimination:

1. Start with the matrix you want to find the inverse of, and augment it with the identity matrix of the same size.

For example, let's consider the matrix A:

...

$$A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$$

$$\begin{bmatrix} 4 & 5 \end{bmatrix}$$

...

The augmented matrix would be:

...

$$\left[\begin{array}{cc|cc} 2 & 3 & 1 & 0 \end{array} \right]$$

$$\left[\begin{array}{cc|cc} 4 & 5 & 0 & 1 \end{array} \right]$$

...

2. Perform row operations to transform the left-hand side of the augmented matrix into the identity matrix. Keep track of the same row operations done on the right-hand side.

We can use the following row operations to transform the first column of the matrix to have a 1 in the first row:

- Divide the first row by 2:

...

$$\left[\begin{array}{cc|cc} 1 & 3/2 & 1/2 & 0 \end{array} \right]$$

$$\begin{bmatrix} 4 & 5 & | & 0 & 1 \end{bmatrix}$$

...

- Subtract 4 times the first row from the second row:

...

$$\begin{bmatrix} 1 & 3/2 & | & 1/2 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -1 & | & -2 & 1 \end{bmatrix}$$

...

We can now transform the second column of the matrix to have a 1 in the second row:

- Multiply the second row by -1:

...

$$\begin{bmatrix} 1 & 3/2 & | & 1/2 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 & | & 2 & -1 \end{bmatrix}$$

...

- Subtract 3/2 times the second row from the first row:

...

$$\begin{bmatrix} 1 & 0 & | & -1/2 & 3/2 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 & | & 2 & -1 \end{bmatrix}$$

...

The left-hand side of the augmented matrix is now the identity matrix, and the right-hand side contains the inverse of the original matrix A:

...

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

$$\begin{bmatrix} -1/2 & 3/2 \end{bmatrix}$$

$$\begin{bmatrix} 2 & -1 \end{bmatrix}$$

...

So the inverse of A is:

...

$$\begin{bmatrix} -1/2 & 3/2 \end{bmatrix}$$

$$\begin{bmatrix} 2 & -1 \end{bmatrix}$$

...

I hope this helps! Let me know if you have any further questions.