

Section 2.5 Math 141

The Gauss-Jordan Method for Calculus Inverses

Main ideas

There is not a nice, simple formula for finding A^{-1} for matrices A larger than 2×2 .

To find the inverse of square matrix A , do Gauss-Jordan Elimination $[A | I] \rightarrow [I | A^{-1}]$.

If A has no inverse, this process will result in a matrix other than I in the lefthand side of the row reduced matrix.

In Class

1. Let's see if we can find a formula for a 3×3 matrix inverse online.
Let's see if we can find a formula for a 4×4 matrix inverse online.
2. Let's work HW 2.5.17. (Find the inverse of a 4×4 matrix? Yeah, that ought to be fun.)
Of course, in real life we use technology to find matrix inverses.
Let's use the G-J Elimination Website tool to do this problem.
And finally let's use Excel.
3. Let's look at Book Example 2.5.2. Recall that not all matrices have inverses.
What if we had used technology (say Excel) to try to find the inverse?

In Groups

4. HW 2.5.7: find the inverse of $\begin{bmatrix} 1 & 2 & -2 \\ 1 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$.

5. HW 2.5.9: try to find the inverse of $\begin{bmatrix} -2 & 5 & 2 \\ 1 & -3 & -1 \\ -1 & 2 & 1 \end{bmatrix}$.

This doesn't turn out quite how you might expect.

What if we had tried to use Excel to find the inverse?

6. HW 2.5.20: find a 2×2 matrix A for which $\begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix} A = \begin{bmatrix} -1 & 0 \\ 4 & 2 \end{bmatrix}$.