

Linear Algebra II Quiz 1

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1.2.13. Find the general solution for the system whose augmented matrix is:

$$\begin{bmatrix} 1 & -3 & 0 & -1 & 0 & -2 \\ 0 & 1 & 0 & 0 & -4 & 1 \\ 0 & 0 & 0 & 1 & 9 & -4 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$R_1 = R_1 + 3R_2 \Rightarrow \begin{bmatrix} 1 & 0 & 0 & -1 & -12 & 1 \\ 0 & 1 & 0 & 0 & -4 & 1 \\ 0 & 0 & 0 & 1 & 9 & -4 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$R_1 = R_1 + R_3 \Rightarrow \begin{bmatrix} 1 & 0 & 0 & 0 & -3 & -3 \\ 0 & 1 & 0 & 0 & -4 & 1 \\ 0 & 0 & 0 & 1 & 9 & -4 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

Thus:

$$\begin{cases} x_1 = 3x_5 - 3 \\ x_2 = 1 + 4x_5 \\ x_3 \text{ is free} \\ x_4 = -4x_5 - 9 \\ x_5 \text{ is free} \end{cases}$$

1.2.19. a. Consistent with a unique solution.

b. Inconsistent.

1.2.24

$$\begin{bmatrix} 1 & 3 & 2 \\ 3 & h & k \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 3 & 2 \\ 0 & h-9 & k-6 \end{bmatrix}$$

a. There will be no solution when $h = 9$ and $k \neq 6$.

b. There will be a unique solution when $h \neq 9$

c. There will be infinitely many solutions when $h = 9$ and $k = 6$.