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You should be able to do this whole packet in approximately \(\frac{1}{2} \) minutes, by working \(\text{efficiently} \) but without rushing.

by working efficiently but without running.

(1) Solve the system of equations with augmented matrix $\begin{bmatrix} -1 & 3 & -2 & 0 \\ 0 & -3 & -6 & 6 \\ -2 & 10 & 2 & -6 \end{bmatrix}$

$$\sim \begin{bmatrix} 0 & 4 & 6 & -6 \\ 0 & -3 & -6 & 6 \\ -6 & 6 & 6 \\ 0 & -3 & -6 & 6 \\ 0 & -4 & -6 & -6 \\ 0 & -4 & -6 & -6 \\ 0 & -6 & -6 \\ 0 & -6 & -6 & -6 \\ 0 & -6 & -6 & -6 \\ 0 & -6 & -6 & -6 \\ 0 & -6 & -6 & -6 \\ 0 & -6$$

$$\begin{bmatrix}
(1) & 3 & -2 & 0 \\
0 & 1) & 2 & -3 \\
0 & 0 & -2 & 2
\end{bmatrix}
 \begin{bmatrix}
7 & 7 & 7 & 7 & 7 \\
7 & 7 & 7 & 7
\end{bmatrix}$$

=) has unique sln.

$$\sim
\begin{bmatrix}
-1 & 0 & 0 & -2 \\
0 & 1 & 0 & 0 \\
0 & 0 & -2 & 2
\end{bmatrix}
\begin{bmatrix}
\Gamma_1 - 3\Gamma_2 \\
0 \\
0 & 0
\end{bmatrix}$$

$$\begin{cases} x_1 = \lambda \\ x_2 = 0 \\ x_3 = -1 \end{cases}$$

the unique sla

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(2) Solve the system of equations with augmented matrix $\begin{vmatrix} 2 & 4 & -2 & 0 \\ 0 & 4 & 2 & -6 \\ -4 & -4 & 6 & -6 \end{vmatrix}$

$$(3) \begin{cases} x_{1} + y_{2} + y_{3} = 3 \\ x_{2} + y_{3} + y_{3} = -\frac{3}{2} \end{cases}$$

$$(3) \begin{cases} x_{2} + y_{3} + y_{3} = 3 \\ x_{3} \end{cases}$$

$$\sim \begin{bmatrix} * & 1 & 0 & -2 & | & 3 \\ 0 & 1 & y_2 & | & -3/2 \\ 0 & 0 & 0 & | & 0 \end{bmatrix} \begin{array}{c} y_2 & r_1 \\ y_4 & r_2 \end{array}$$

$$\sim \begin{bmatrix} 2 & 4 & -3 \\ 0 & 4 & 2 \\ 0 & 4 & 2 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \end{bmatrix} r_3 + 2r_4$$

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(4) Give an example of the augmented matrix of a system of 3 equations in 3 variables . . . (*Hint:* you can make the systems as simple as you like.)

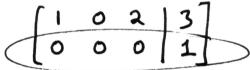
(a) with a unique solution

(b) with no solutions

(c) with infinitely many solutions

(5) Give an example of the augmented matrix of a system of 2 equations in 3 variables ... (Hint: you can make the systems as simple as you like.)

(a) with no solutions



(b) with infinitely many solutions.

(6) Use Theorem 2 to prove that you cannot write a system of 2 equations in 3 variables that has a unique solution. (*Hint:* your argument must consider all relevant reduced-echelon form matrices.)

By theorem 2 unique solution (=> has pivot in each welf column

you cannot fit 3 pivots in two rows.

the system cannot have a unique solution

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7. Find the general solution (in parametric form) for a system whose augmented matrix is row equivalent to

$$\begin{bmatrix} (1) & 6 & 2 & -5 & -2 & | & 4 \\ 0 & 0 & (2) & -8 & -1 & | & 3 \\ 0 & 0 & 0 & 0 & (1) & | & 7 \end{bmatrix}$$

work botton to Hop

NOTE: Oalready in echelon form

@ NO [0...0] => has a solution by the one a.

(3) some coeff columns

- - (00-280 |-10) -P2
- $\sim \begin{bmatrix} 0 & 6 & 0 & 3 & 0 & 0 \\ 0 & 0 & 3 & -8 & 0 & 10 \\ 0 & 0 & 0 & 0 & 7 & 7 \end{bmatrix} \begin{pmatrix} P_1 P_2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 7 & 7 & 7 \end{pmatrix}$

X1, X3, X5 bound (have pivots)

Xa, X4 fee (No pivots.

The original system is equivalent to $\begin{cases}
X_1 + 6X_2 + 3X_4 = 0 \\
X_2 + 6X_4 = 5
\end{cases}$

General Solution = $\begin{cases} x_1 = -6 \times_3 - 3 \times_4 \\ x_2 \text{ fee} \\ x_3 = 5 + 4 \times_4 \\ \text{xy fee} \end{cases}$