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Math 2250, Fall 2011, Quiz 3
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1. Convert to reduced row-echelon form:

$$\begin{bmatrix} 2 & 2 & -2 & 2 & | & 2 \\ 1 & 1 & 1 & 5 & | & 3 \\ 0 & 0 & 2 & 4 & | & 2 \end{bmatrix} \begin{array}{l} \times \frac{1}{2} \\ \hline \\ \hline \times \frac{1}{2} \end{array}$$

2. Write the general solution to the corresponding inhomogeneous equation

$$\begin{array}{rrrrrrrrr} 2x_1 & + & 2x_2 & - & 2x_3 & + & 2x_4 & = & 2 \\ x_1 & + & x_2 & + & x_3 & + & 5x_4 & = & 3 \\ & & & & 2x_3 & + & 4x_4 & = & 2 \end{array}$$

3. Give one particular solution to the inhomogeneous equation.

4. Write the general solution to the corresponding homogeneous equation.

1.

$$\begin{bmatrix} 1 & 1 & -1 & 1 & | & 1 \\ 1 & 1 & 1 & 5 & | & 3 \\ 0 & 0 & 1 & 2 & | & 1 \end{bmatrix} \xrightarrow[-R_1]{+R_3} \begin{bmatrix} 1 & 1 & 0 & 3 & | & 2 \\ 0 & 0 & 2 & 4 & | & 2 \\ 0 & 0 & 1 & 2 & | & 1 \end{bmatrix} \xrightarrow[-\frac{1}{2}R_2]{\times \frac{1}{2}} \begin{bmatrix} 1 & 1 & 0 & 3 & | & 2 \\ 0 & 0 & 1 & 2 & | & 1 \\ 0 & 0 & 0 & 0 & | & 0 \end{bmatrix}$$

2.
$$\left.\begin{array}{l} x_1 + x_2 \quad +3x_4 = 2 \\ \\ x_3 + 2x_4 = 1 \end{array}\right\} \text{So}$$

$$\left.\begin{array}{l} x_1 = 2 - x_2 - 3x_4 \\ x_2 = \quad x_2 \\ x_3 = 1 \quad - 2x_4 \\ x_4 = \quad x_4 \end{array}\right\} \text{OR} \quad \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 2 \\ 0 \\ 1 \\ 0 \end{bmatrix} + x_2 \begin{bmatrix} -1 \\ 1 \\ 0 \\ 0 \end{bmatrix} + x_4 \begin{bmatrix} -3 \\ 0 \\ -2 \\ 1 \end{bmatrix}$$

3.
$$\begin{bmatrix} 2 \\ 0 \\ 1 \\ 0 \end{bmatrix}$$

4.
$$x_2 \begin{bmatrix} -1 \\ 1 \\ 0 \\ 0 \end{bmatrix} + x_4 \begin{bmatrix} -3 \\ 0 \\ -2 \\ 1 \end{bmatrix}$$