

1-6 In-Class Exercise

1. Determine conditions on the b_i 's, if any, in order to guarantee that the linear system is consistent.

$$6x_1 - 4x_2 = b_1$$

$$3x_1 - 2x_2 = b_2$$

1-6 Suggested Exercise

1. Determine conditions on the b_i 's, if any, in order to guarantee that the linear system is consistent.

$$\begin{aligned}x_1 - x_2 + 3x_3 + 2x_4 &= b_1 \\-2x_1 + x_2 + 5x_3 + x_4 &= b_2 \\-3x_1 + 2x_2 + 2x_3 - x_4 &= b_3 \\4x_1 - 3x_2 + x_3 + 3x_4 &= b_4\end{aligned}$$

2. Consider the matrices

$$A = \begin{bmatrix} 2 & 1 & 2 \\ 2 & 2 & -2 \\ 3 & 1 & 1 \end{bmatrix} \quad \text{and} \quad \mathbf{x} = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

- a) Show that the equation $A\mathbf{x} = \mathbf{x}$ can be rewritten as $(A - I)\mathbf{x} = \mathbf{0}$ and use this result to solve $A\mathbf{x} = \mathbf{x}$ for \mathbf{x} .
- b) Solve $A\mathbf{x} = 4\mathbf{x}$.

3. Solve the matrix equation for X .

$$\begin{bmatrix} 1 & -1 & 1 \\ 2 & 3 & 0 \\ 0 & 2 & -1 \end{bmatrix} X = \begin{bmatrix} 2 & -1 & 5 & 7 & 8 \\ 4 & 0 & -3 & 0 & 1 \\ 3 & 5 & -7 & 2 & 1 \end{bmatrix}$$