

Solving Linear Equations

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Matrix Operations

$$\begin{bmatrix} 1 & 2 & -4 \\ -2 & 3 & 1 \\ 4 & 1 & 2 \end{bmatrix} \begin{bmatrix} x_1 & x_2 & x_3 \\ y_1 & y_2 & y_3 \\ z_1 & z_2 & z_3 \end{bmatrix} = \begin{bmatrix} \underline{c_1} & \underline{c_2} & \underline{c_3} \end{bmatrix}$$

$$\underline{c_2} = x_2 \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix} + y_2 \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix} + z_2 \begin{bmatrix} -4 \\ 1 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} a & b & c \end{bmatrix} \begin{bmatrix} 1 & 2 & -4 \\ -2 & 3 & 1 \\ 4 & 1 & 2 \end{bmatrix} = a \begin{bmatrix} 1 & 2 & -4 \end{bmatrix} + b \begin{bmatrix} -2 & 3 & 1 \end{bmatrix} + c \begin{bmatrix} 4 & 1 & 2 \end{bmatrix}$$

Properties of Matrices

$A(BC) = (AB)C$ (Associative law holds)

$AB \neq BA$ (Commutative law does not hold)

$C(A + B) = CA + CB$ or $(A + B)C = AC + BC$ (Distributive laws hold)