

Any vector
$$x_n$$
 in the nullspace can be added to a particular solution x_p . The solutions to all linear equations have this form, $x = x_p + x_n$:

Complete solution

$$Ax_p = b \text{ and } Ax_p = 0 \text{ produce } Ax_p + x_n = b.$$

$$Ax_p + Bx_2p + Cx_2p = b$$

$$Ax_n + Bx_{2n} + Cx_{3n} = 0$$

$$A(x_p + x_n) + B(x_{2n} + Cx_{3n}) + C(x_2p + x_{3n}) + C(x_2p + x$$

Find the complete solution
$$y + z = 2$$

$$2y + 2z = 4$$

$$\begin{vmatrix} 4 & -2 & 0 & 1 & 2 \\ 2 & 4 & 2 & 1 & 2 \end{vmatrix}$$

$$\begin{vmatrix} 4 & -2 & 0 & 1 & 2 \\ 2 & 4 & 2 & 1 & 2 \end{vmatrix}$$

$$\begin{vmatrix} 4 & 2 & 1 & 2 & 1 \\ 2 & 4 & 2 & 1 & 2 & 1 \end{vmatrix}$$

$$\begin{vmatrix} 4 & -2 & 0 & 1 & 2 & 1 \\ 2 & 4 & 2 & 1 & 2 & 1 \\ 2 & 4 & 2 & 1 & 2 & 1 \end{vmatrix}$$

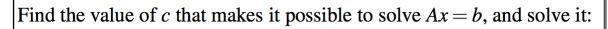
$$\begin{vmatrix} 4 & 1 & 2 & 1 & 2 & 1 \\ 2 & 1 & 1 & 2 & 1 & 2 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 1 & 2 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 1 & 2 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1 \\ 2 & 1 & 1 & 1 & 2 & 1$$

rite the complete solution

$$\begin{bmatrix} 1 & 2 & 2 \\ 2 & 4 & 5 \end{bmatrix} \begin{bmatrix} u \\ v \\ w \end{bmatrix} = \begin{bmatrix} 1 \\ 4 \end{bmatrix}$$

rite the complete solution

$$\begin{bmatrix} 1 & 2 & 2 \\ 2 & 4 & 4 \end{bmatrix} \begin{bmatrix} u \\ v \\ w \end{bmatrix} = \begin{bmatrix} 1 \\ 4 \end{bmatrix}$$



$$u + v + 2w = 2$$

$$2u + 3v - w = 5$$

$$3u + 4v + w = c.$$