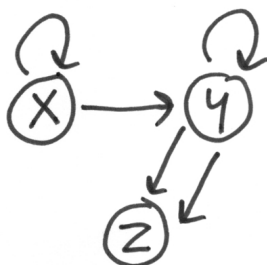


[1] Find the general solution to the following system of equations.

$$\begin{bmatrix} 0 & 2 & 1 & 1 & -1 \\ 0 & -1 & 1 & 0 & 4 \\ 0 & 1 & 2 & 1 & 3 \end{bmatrix} \begin{bmatrix} v \\ w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 5 \\ 8 \end{bmatrix}$$

[2] Using matrix multiplication, count the number of paths of length eight from x to z .



[3] Find the intersection of the following two affine subspaces of \mathbb{R}^3 .

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} + \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} q \\ r \end{bmatrix}, \quad \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} + \begin{bmatrix} 1 & 1 \\ 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} s \\ t \end{bmatrix}$$

[4] Find the 2×2 matrix A that reflects across the line $2y = 3x$.

[5] Find a basis for the subspace of \mathbb{R}^5 spanned by the following vectors:

$$(1, 1, 0, 0, 2), \quad (1, 0, 1, 0, 2), \quad (1, 0, 0, 1, 2), \quad (0, 1, 1, 0, 2), \quad (0, 1, 0, 1, 2), \quad (0, 0, 1, 1, 2)$$