

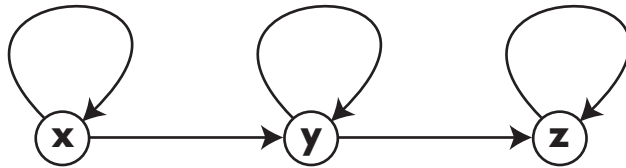
F14 Practice 1

Linear Algebra, Dave Bayer

[1] Solve the following system of equations.

$$\begin{bmatrix} 6 & 1 & 8 & 1 \\ 4 & 0 & 5 & 1 \end{bmatrix} \begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ 3 \end{bmatrix}$$

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



[3] Express A as a product of elementary matrices, where

$$A = \begin{bmatrix} -3 & 5 \\ 1 & 0 \end{bmatrix}$$

[4] Find the matrix A such that

$$A \begin{bmatrix} 1 & 0 & 1 \\ -1 & 1 & 1 \\ 0 & -1 & 1 \end{bmatrix} = \begin{bmatrix} 3 & 0 & 0 \\ -3 & 3 & 0 \\ 0 & -3 & 0 \end{bmatrix}$$

[5] Find the intersection of the following two affine subspaces of \mathbb{R}^4 .

$$\begin{bmatrix} 1 & 1 & 1 & 0 \\ 0 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix} + \begin{bmatrix} 1 & 0 \\ -2 & 1 \\ 1 & -2 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} r \\ s \end{bmatrix}$$