

Step-1

We have to construct a matrix whose null space consists of all multiples $(4, 3, 2, 1)$

Let A be a 3 by 4 matrix in which last column is free column (that is x_4 is free variable)

Let $Ax = 0$, and

$$x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} \\ = x_4 \begin{bmatrix} 4 \\ 3 \\ 2 \\ 1 \end{bmatrix}$$

Step-2

$$\Rightarrow x_1 = 4x_4$$

$$x_2 = 3x_4$$

$$x_3 = 2x_4$$

$$x_4 = x_4$$

Step-3

$$\Rightarrow x_1 - 4x_4 = 0$$

$$x_2 - 3x_4 = 0$$

$$x_3 - 2x_4 = 0$$

Therefore the matrix is in the form

$$A = \begin{bmatrix} 1 & 0 & 0 & -4 \\ 0 & 1 & 0 & -3 \\ 0 & 0 & 1 & -2 \end{bmatrix}$$

The null space of A is consist of all multiples of $(4, 3, 2, 1)$