HW03

MATH 102, WINTER 2018

DUE WEDNESDAY, JAN 31 NAME:

1. Construct a matrix whose column space contains $\begin{bmatrix}1\\1\\5\end{bmatrix}$ and $\begin{bmatrix}0\\3\\1\end{bmatrix}$, and whose nullspace contains $\begin{bmatrix}1\\1\\2\end{bmatrix}$.

2. Find the column space and nullspace of A and the solution to $A\boldsymbol{x} = \boldsymbol{b}$:

$$A = \begin{bmatrix}1 & 1 & 2 & 2\\2 & 5 & 7 & 6\\2 & 3 & 5 & 2\end{bmatrix} \quad \text{and} \quad \boldsymbol{b} = \begin{bmatrix}4\\3\\5\end{bmatrix}.$$

3. Find two independent vectors on the plane $x + 2y - 3z - t = 0$ in $\mathbb{R}^4$. Then find three independent vectors. Why not four? This plane is the nullspace of what matrix?

4. Describe the four subspaces of $\mathbb{R}^3$ associated with

$$A = \begin{bmatrix}0 & 1 & 0\\0 & 0 & 1\\0 & 0 & 0\end{bmatrix} \quad \text{and with} \quad I + A = A = \begin{bmatrix}1 & 1 & 0\\0 & 1 & 1\\0 & 0 & 1\end{bmatrix}.$$