LINEAR ALGEBRA. VASILY KRYLOV. RECITATION 2: EXERCISES.

My name is Vasily Krylov. If you have any questions or comments, please feel free to ask me by email (krvas@mit.edu) or during my office hours (Thursday 5p.m. - 7 p.m. Room 2-361).

1. Problem 1

Solve equation $A\mathbf{x} = \mathbf{b}$ for the following A, $\mathbf{b}$ (use elimination):

(a) $A = \begin{bmatrix} 2 & 3 & 1 \\ 4 & 7 & 5 \\ 0 & -2 & 2 \end{bmatrix}$, $\mathbf{b} = \begin{bmatrix} 8 \\ 20 \\ 0 \end{bmatrix}$.

(b) $A = \begin{bmatrix} -2 & -1 & 1 \\ 4 & 2 & -1 \\ 0 & 5 & -2 \end{bmatrix}$, $\mathbf{b} = \begin{bmatrix} -1 \\ 5 \\ 4 \end{bmatrix}$.

2. Problem 2

Which number b leads later to a row exchange? Which b leads to a missing pivot? In that singular case find a nonzero solution x, y, z.

$$\begin{cases} x + by = 0 \\ x - 2y - z = 0 \\ y + z = 0 \end{cases}$$

3. Problem 3

Find LU decomposition for the following matrices.

(a) $A = \begin{bmatrix} 2 & 1 & 0 \\ 0 & 4 & 2 \\ 6 & 3 & 5 \end{bmatrix}$.

(b) $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 4 & 5 \\ 0 & 4 & 0 \end{bmatrix}$.