



LINEAR ALGEBRA
SPRING 2024

ASSIGNMENT 4.2
DUE FEBRUARY 7

Exercise 1. Textbook exercise 2.2.9

Exercise 2. Textbook exercise 2.2.10

Exercise 3. Let

$$A = \begin{pmatrix} 2 & 3 & 4 \\ 4 & 6 & 5 \\ -2 & 1 & 1 \end{pmatrix}, \quad \mathbf{b} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}.$$

Find an elimination matrix E so that $EA = U$ is upper triangular. Solve $A\mathbf{x} = \mathbf{b}$ by instead solving $U\mathbf{x} = E\mathbf{b}$ using back substitution.

Exercise 4. Let

$$A = \begin{pmatrix} a & a & a & a \\ a & b & b & b \\ a & b & c & c \\ a & b & c & d \end{pmatrix}.$$

Find an elimination matrix E so that $EA = U$ is upper triangular. What conditions on a , b , c and d ensure that U has 4 pivots?