MAT222
LINEAR ALGEBRA
HOMEWORK ASSIGNMENT 2
Final Delivery Date: April 1, 2024, 17.30

(1) Find the inverse of

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

if any exists.

(2) If A is an $n \times n$ matrix with integer entries such that $\det(A) = 1$, are the entries of A^{-1} necessarily integers? Explain your answer.

(3) Let

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

If $\det(A) = 30$, find x.

(4) Show that the matrix

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

cannot be the adjoint of any invertible matrix with real entries.

(5) Show that the adjoint matrix of the transpose of a matrix is the transpose of adjoint of that matrix.