

1 Answer and give a short proof:

- (a) If the columns of $B \in \mathbb{R}^{n \times p}$ are linearly dependent then so are the columns of AB (for any $A \in \mathbb{R}^{m \times n}$). (T/F)
- (b) If the columns of $B \in \mathbb{R}^{n \times p}$ are linearly *independent* then so are the columns of AB (for any $A \in \mathbb{R}^{m \times n}$). (T/F)
- (c) If the columns of $B \in \mathbb{R}^{n \times p}$ and those of $A \in \mathbb{R}^{m \times n}$ are linearly *independent* then so are the columns of AB . (T/F)
- (d) If A, B are both invertible matrices then $A+B$ is also invertible. (T/F)
- (e) If A, B are not invertible matrices then $A+B$ cannot be invertible. (T/F)

- (f) If A and B are invertible then so is AB^{-1} .
(T/F) If true what is the inverse of AB^{-1} ?
- (g) If A and B are invertible then so is $A^T B$.
(T/F) If true what is the inverse of $A^T B$?

2 Calculate the inverse of the matrix shown on the right $A = \begin{bmatrix} 2 & 2 & -4 \\ -1 & 0 & 2 \\ 1 & 3 & -1 \end{bmatrix}$

3 Find the LU factorization of the matrix A of Question 2.