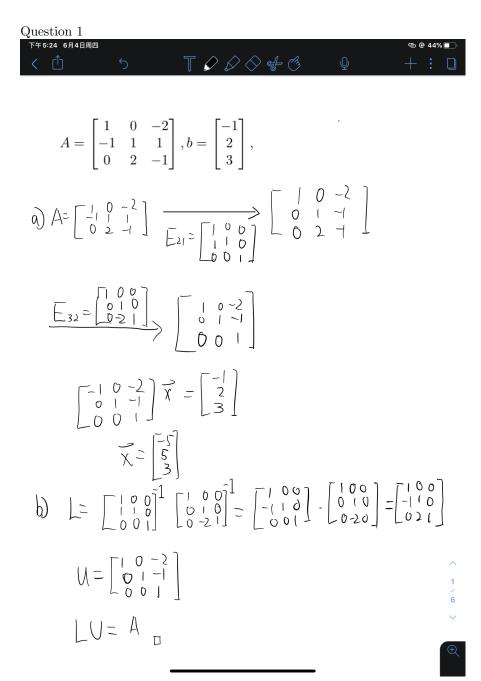
CSC338. Homework 3

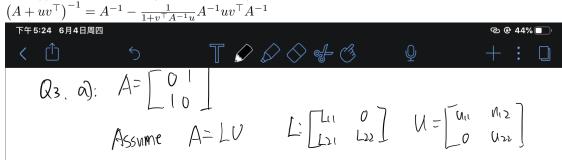
baibizhe

June 4, 2020



Question 3

For this part prove, i use lemma state in website: https://www.statlect.com/matrix-algebra/matrix-inversion-lemmas



 $A_{II} = L_{II} U_{II} = 0$ then at least one of L_{I} , and U_{I} , must be zero, \longrightarrow At least one of L and U is not invertible. This is contradiction that A is invertible L if A is invertible a new invertible I. Then A cannot have a L U decomposition.

b) we have lemma:

$$v, v$$
 yector, A matrix

 $(A + uv^{T})^{-1} = A^{-1} - \frac{1}{1+v^{T}A^{-1}u} A^{-1}uv^{T}A^{-1}$
 $M_{K} = I - m_{K}e^{T_{K}}$
 $(M_{K})^{-1} = I^{-1} + \frac{1}{1+e^{T_{K}}I^{-1}} \cdot m_{K}e^{T_{K}}I^{-1} \quad [I^{-1} = I]$
 $= I + \frac{1}{1+e^{T_{K}}M_{K}} \cdot m_{K}e^{T_{K}}$
 $= I + \frac{m_{K}e^{T_{K}}}{1+e^{T_{K}}M_{K}} \quad [e^{T_{K}}M_{K} = 0]$
 $= I + m_{K}e^{T_{K}} \quad as needed$