EEE482: Homework 1

EFE ACER

Question 1:

a)

After performing the elementary row operations below, we obtain the reduced row echelon form () of **,** denoted as:

Using the , the linear system can be rewritten as:

Here, and are pivot variables; whereas and are free variables. Hence, the solution should be written in terms of some arbitrary values of and :

Let and , where

Then,

= = for , is the general solution

b)

Now, we construct the augmented matrix, , and compute :

Using we can rewrite the system as:

The values and satisfies the simplified system. Hence, a particular solution to the system is:

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c)

Proceeding from the simplified system that we obtained in part b, we can construct a general solution in terms of arbitrary values of the free variables and :

Again, let and , where

Then, we can write our solution set, say, as:

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d)

The pseudo-inverse of is denoted by . It is a generalization of the inverse matrix. When has linearly independent column vectors, meaning that is invertible, is given by:

We compute by simply switching row and column indices of :

Then, we compute by performing a matrix multiplication: