**ENGR 216 – Spring 2019**

**Sections 501/502/503**

**Professor Waer**

**Homework Assignment #2**

**Linear Algebra**

**This is an individual assignment. There are five (5) problems to solve. You will submit two items to the appropriate eCampus Submission Box:**

1. **A scanned/photographed copy of your hand-written solutions to the problems;**
2. **One ~.py file with all of the Python code for all problems.**
   1. **Please use comments to indicate which problem certain lines of code are associated with.**

**The due dates for this assignment for ALL sections are as follows: start of class Friday, September 20, 2019.**

**Problem 1.**

Given and , perform the following operations (on paper). If an operation is not defined, explain why it cannot be performed. Verify your results using Python.

1. b) c)

**Problem 2.**

Given and , perform the following operations (on paper). If an operation is not defined, explain why it cannot be performed. Verify your results using Python.

1. b)

**Problem 3.**

Given and perform the following operations (on paper). If an operation is not defined, explain why it cannot be performed. Verify your results using Python. Based on your results, what can you say about the relationship of to ?

1. b)

**Problem 4.**

Solve the following set of equations using numpy’s linear algebra capabilities.

1. First, on paper, put the equation in the form .
2. Next, create arrays in Python for the and matrices.
3. Use numpy’s solve() function to solve for the matrix. Record the results on paper.
4. Finally, verify the solution by printing the matrix product to show that it is indeed .
5. Just for fun, calculate , the inverse of . Show that the product gives the same result for **.** Record the result on paper.

**Problem 5.**

Solve the following set of equations using numpy’s linear algebra capabilities.

1. First, on paper, put the equation in the form . Remember, each column of the coefficient matrix represents coefficients of one of the variables. You’ll need to rewrite the equations above in that format before creating the A matrix.
2. Next, create arrays in Python for the and matrices.
3. Use numpy’s solve() function to solve for the matrix. Record the results on paper.
4. Finally, verify the solution by printing the matrix product to show that it is indeed .
5. Just for fun, calculate , the inverse of . Show that the product gives the same result for **.** Record the result on paper.