Lab Assignment 3 – 12/2/2019 (Extra Credit) - Solution

Points Possible: 5

For all problems. Show your work. Otherwise, you will get points deducted, up to and including receiving zero credit.

(3 points)

1. If X and Y are matrices:

$$X = \begin{bmatrix} 2 & 3 & 1 \\ -2 & 4 & 8 \\ 4 & 2 & 9 \end{bmatrix} \qquad Y = \begin{bmatrix} 5 & -8 & 3 & -1 \\ 11 & 13 & 5 & 2 \\ 12 & 7 & -11 & 10 \end{bmatrix}$$

Then what is XY ?

Solution:

Matrix X is 3 x 3 and matrix Y is 3 x 4. Since the column count of matrix X is the same as the row count of matrix Y, you can multiply the two matrices. The resulting matrix is 3 x 4.

After taking the dot product of each row of matrix X with each column of matrix Y, matrix XY is

$$\begin{bmatrix} 55 & 30 & 10 & 14 \\ 130 & 124 & -74 & 90 \\ 150 & 57 & -77 & 90 \end{bmatrix}$$

(2 points)
2. Write a comprehension that would plot a line of 30 points, connecting points [-2, 4] and [3, -1]. Your graph should have a scale parameter of 5 and your code should just be one line.

Assume scalar_vector_mult and add2 are already implemented.

Solution:

Two possible solutions, both are right:

Solution 1:

[-2, 4] – [3, -1] = [-5, 5]

plot([add2(scalar_vector_mult(i/29,[-5,5]),[3,-1]) for i in range(30)],5)

Solution 2:

[3, -1] – [-2, 4] = [5, -5]

plot([add2(scalar_vector_mult(i/29,[5,-5]),[-2,4]) for i in range(30)],5)