CSE 5524 HW4

**Problem 1**

The values for the first image:

0.0422 0.0000 0.0000 -0.0000 0.1646 0.0000 0.0000

The values for the second image:

0.0422 0.0000 0.0000 -0.0000 0.1646 0.0000 0.0000

The values for the third image:

0.0423 -0.0000 0.0000 0.0000 0.1641 0.0000 -0.0000

The values for the fourth image:

0.1646 0.0000 -0.0000 0.0000 0.0422 0.0000 0.0000

The similitude moments for the first 3 images are very close since we only moved the position of box horizontally and vertically and the relative location does not change a lot with respect to the mean. In the last image, we completely rotate the image and result in the switch of values between n02 and n20. This makes sense because after 90 degrees of rotation, the mean for x and y should interchange with each other.

Also, some of the moments are zero. One explanation for this is the evenly distribution of pixel in both side and cancelled each other in the summation.

**Problem 2**

Here are the two plots for this problem.

A screenshot of a social media post

Description automatically generated

A screenshot of a social media post

Description automatically generated

**Problem 3**

Here is the plot for problem 3, the length of the axis looks correct and fit the distribution

A close up of a map

Description automatically generated

**Problem 4**

Here is the plot, after multiply the eigenvector to the original data, we project the data in the eigenvector space to make it uncorrelated.

A close up of a map

Description automatically generated

**Problem 5**

After chopping out the data with smaller eigenvalue, the resulting distribution of the data with more variance looks like gaussian.

