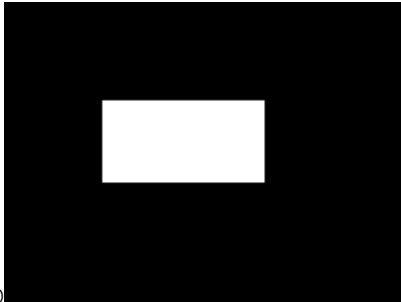# CSE 5524 HW4

Name: Neng Shi

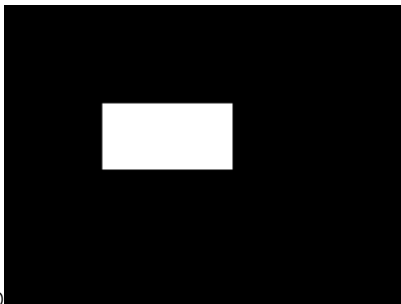## 1)

Input Image:

boxlm1.bmp

boxlm2.bmp

boxlm3.bmp

boxlm4.bmp

Result:

The 7 computed moment values [η_{02}, η_{03}, η_{11}, η_{12}, η_{20}, η_{21}, η_{30}] for the four images are:

[0.04215597711532671, 0.0, 0.0, 0.0, 0.1646090534979424, 0.0, 0.0]

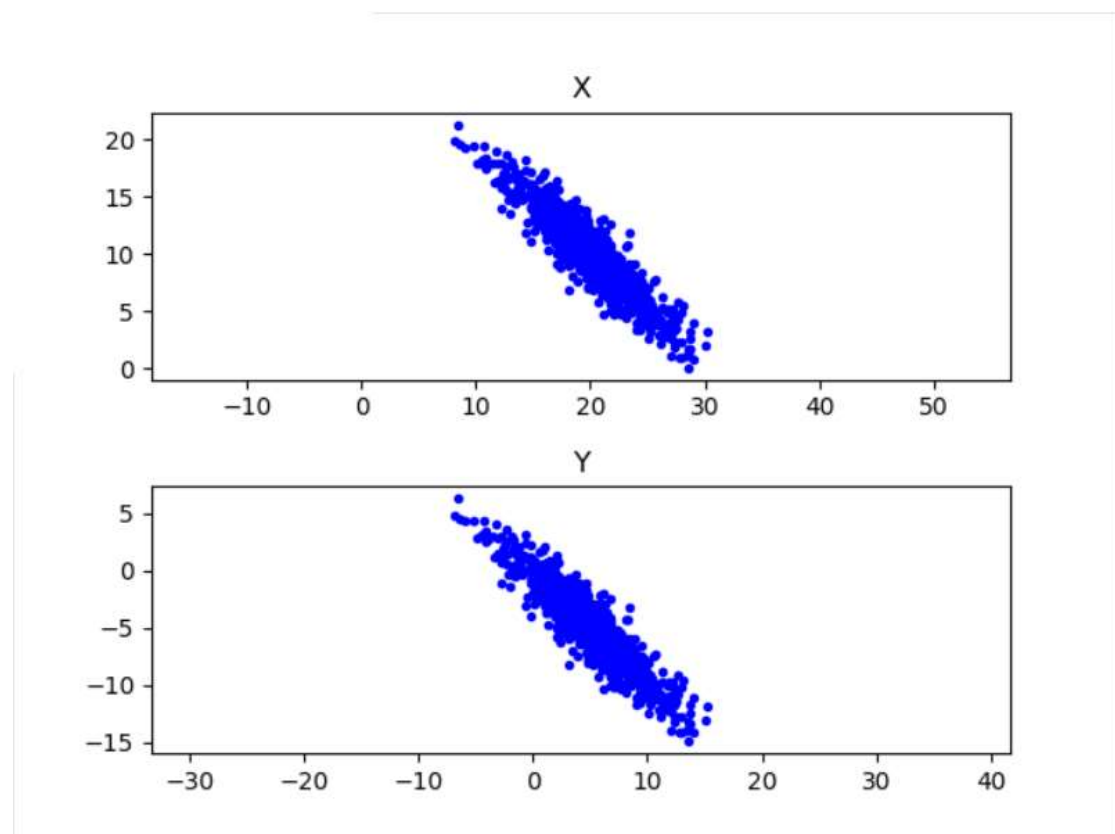[0.04215597711532671, 0.0, 0.0, 0.0, 0.1646090534979424, 0.0, 0.0]

[0.04226884226884227, 0.0, 0.0, 0.0, 0.1641025641025641, 0.0, 0.0]

[0.1646090534979424, 0.0, 0.0, 0.0, 0.04215597711532671, 0.0, 0.0].

We can see that the first three moment value vectors are the same because Similitude Moments are invariant to translation and scale. The fourth moment value vector has η_{02} equals η_{20} of the first three moment value vectors and has η_{20} equals η_{02} of the three first moment value vectors, which is because, in the fourth image, the white rectangle is rotated by 90 degrees compared to the rectangles in the first two images.
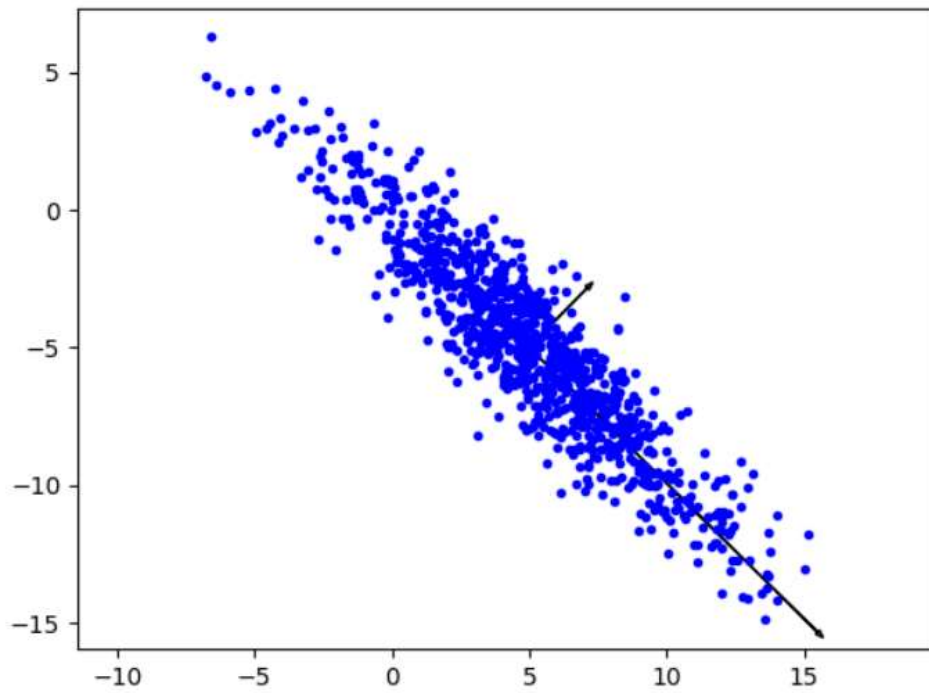
Some moments with at least one odd subscript are zero because the white rectangle is symmetric along both the x-axis and y-axis, which to the moment calculation zero.
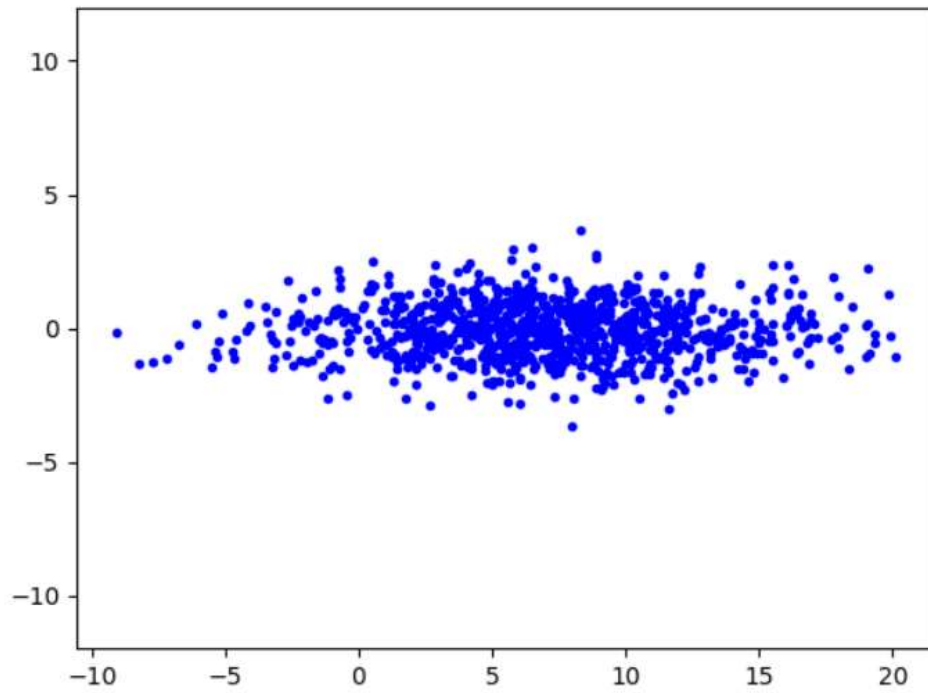
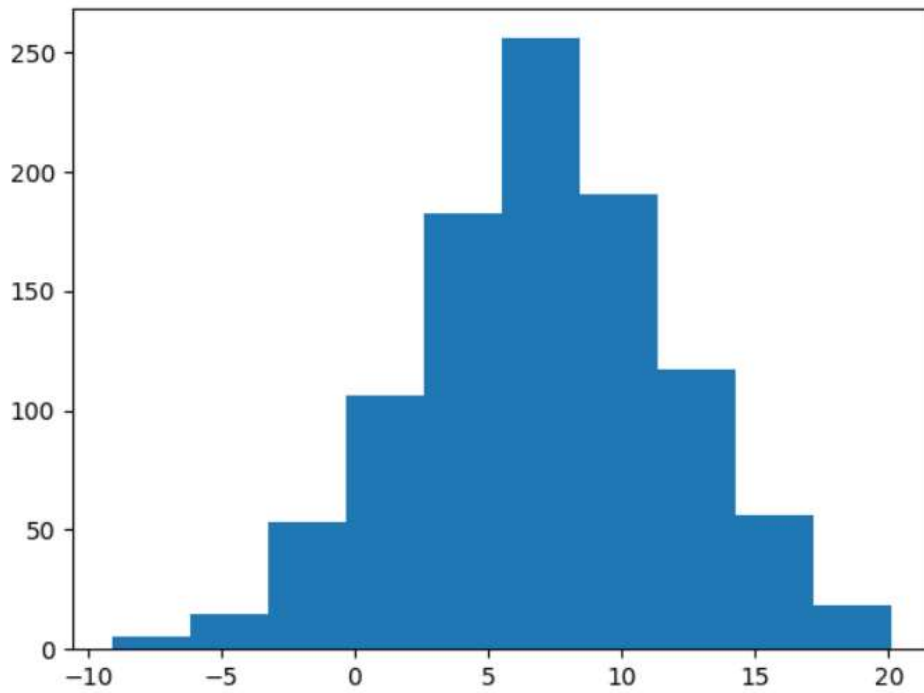## 2)

Output Image:

3)

Output Image:

4)

Output Image:

5)

Output Image:

The 1-D histogram lookes likes a 1-D Gaussian.