

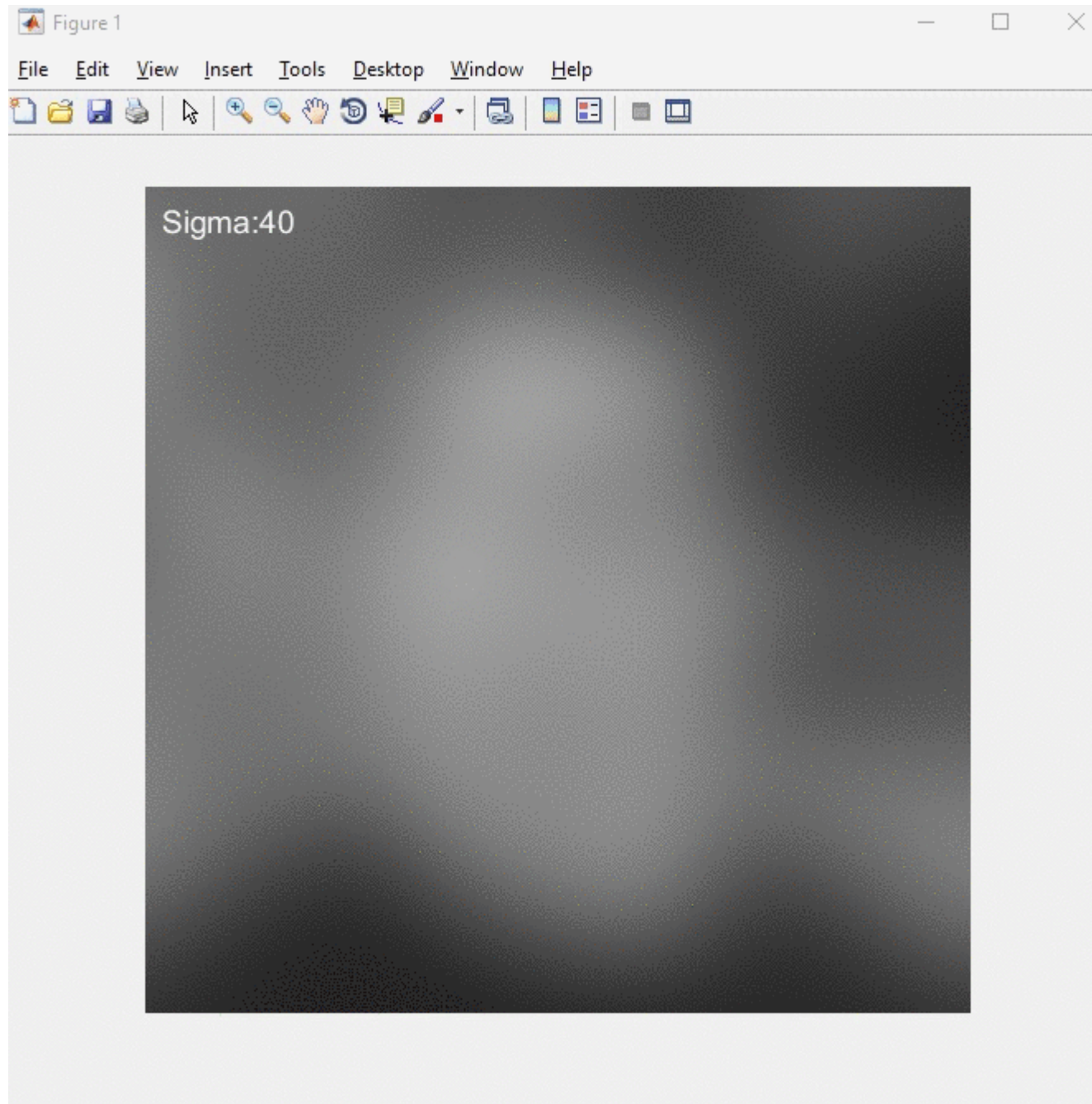
# Computer Vision for HCI

## CSE 5524

Homework Assignment #2

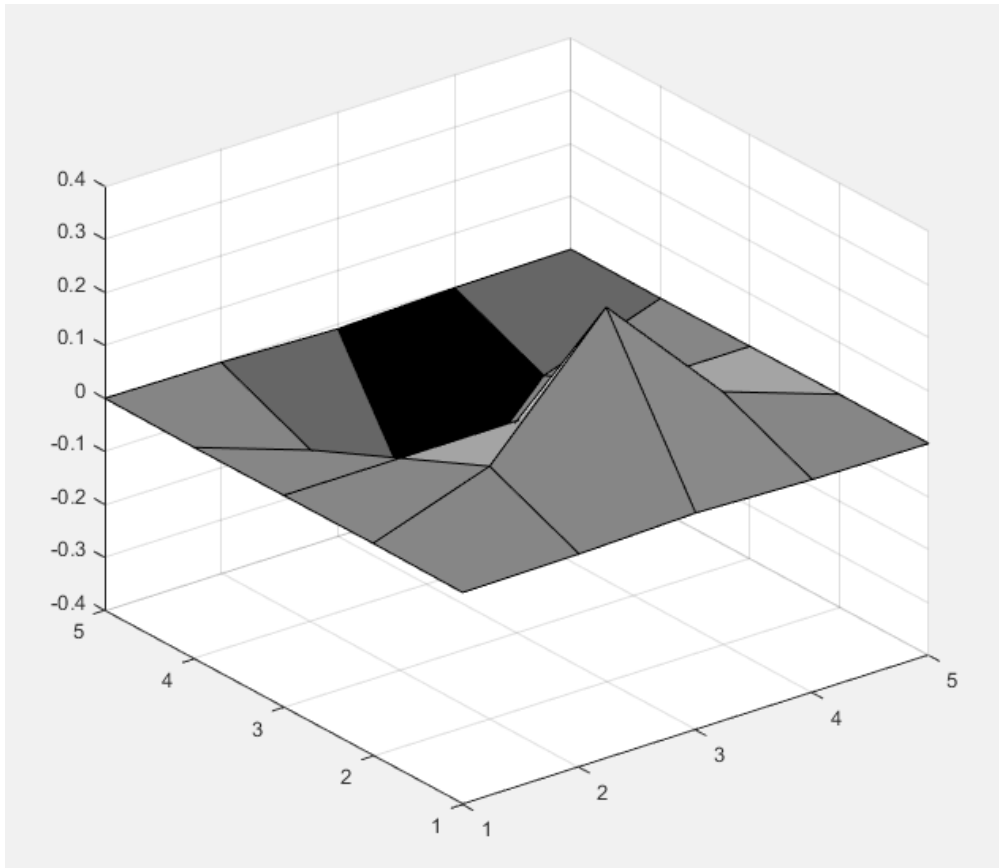
Chandrasekar Swaminathan (CS)

1) Perform Gaussian smoothing on **face.jpeg**. Try with multiple sigma values, starting with larger values (e.g., from 20 to 0.5). When does the face become recognizable?

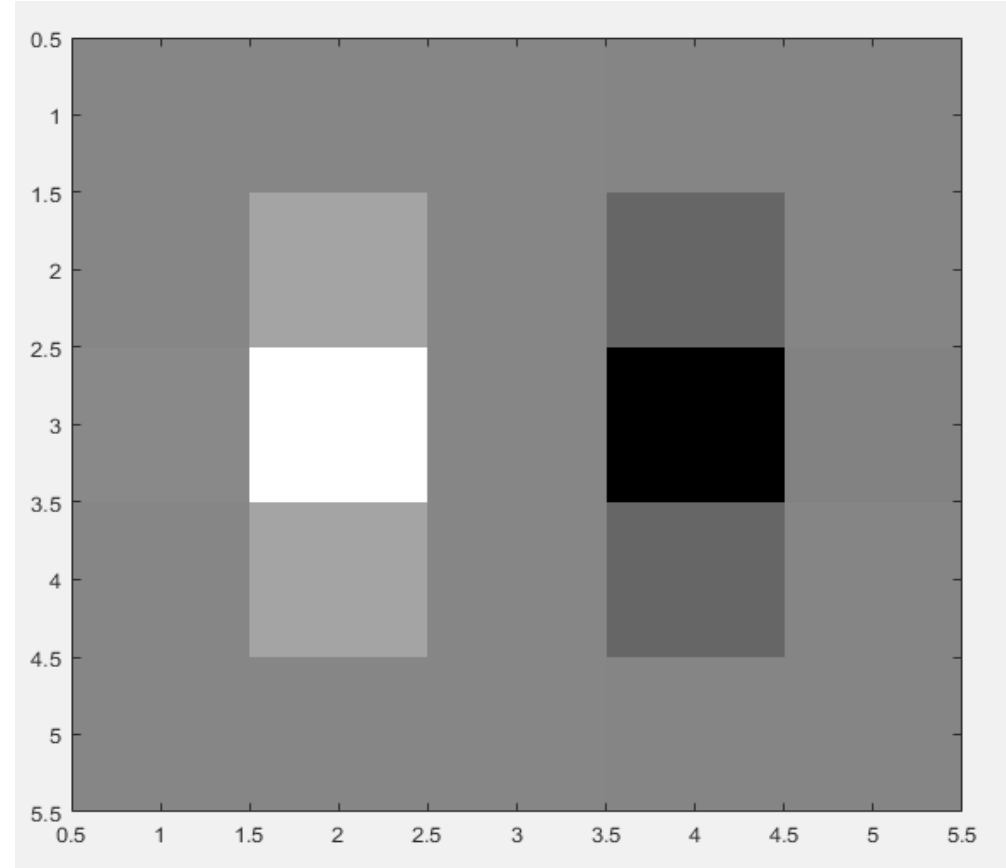


2) Write a MATLAB function to compute and display the 2D Gaussian derivative masks  $G_x$  and  $G_y$  for a given sigma (see class notes).

Sigma = 0.6

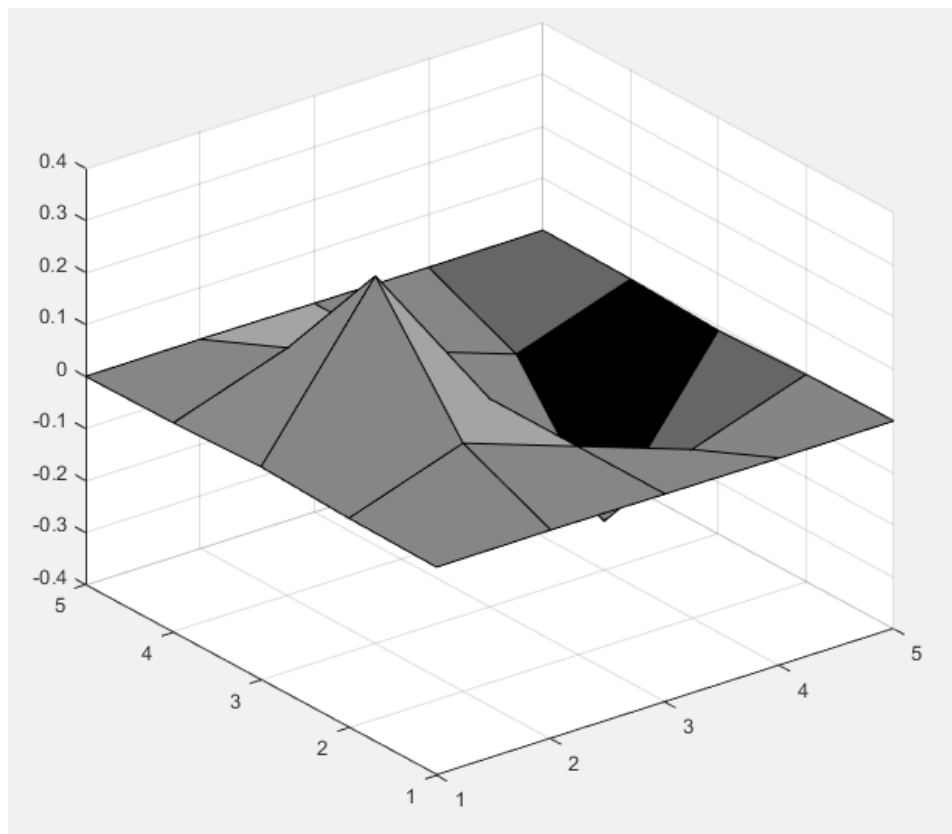


surf( $G_x$ )

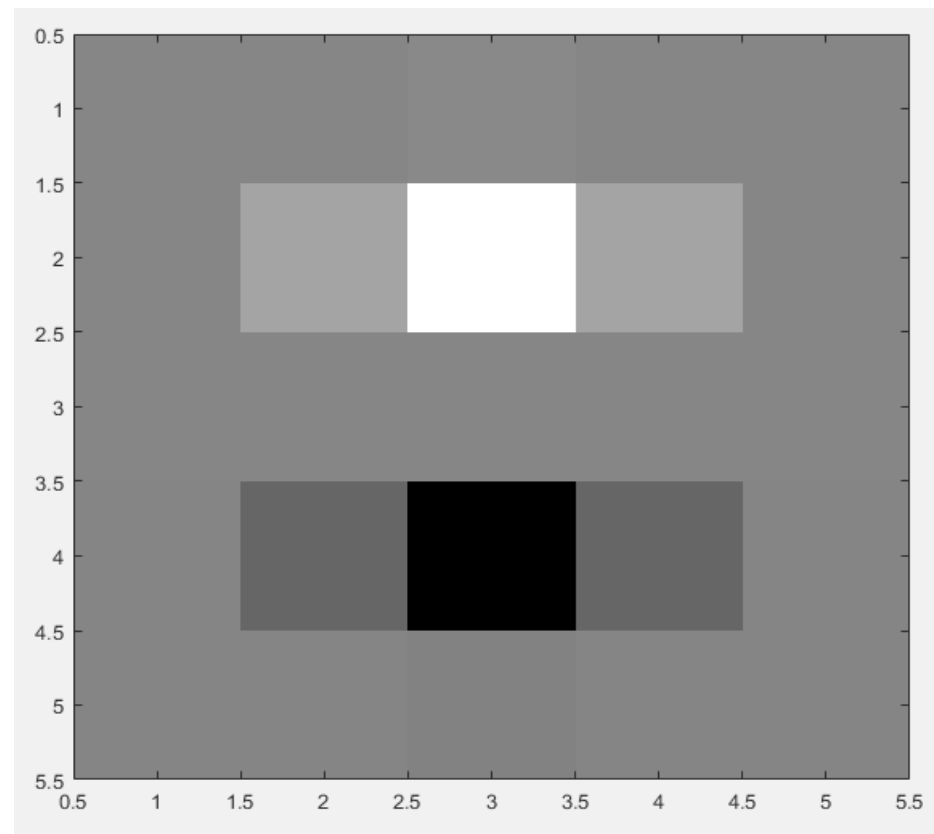


imagesc( $G_x$ )

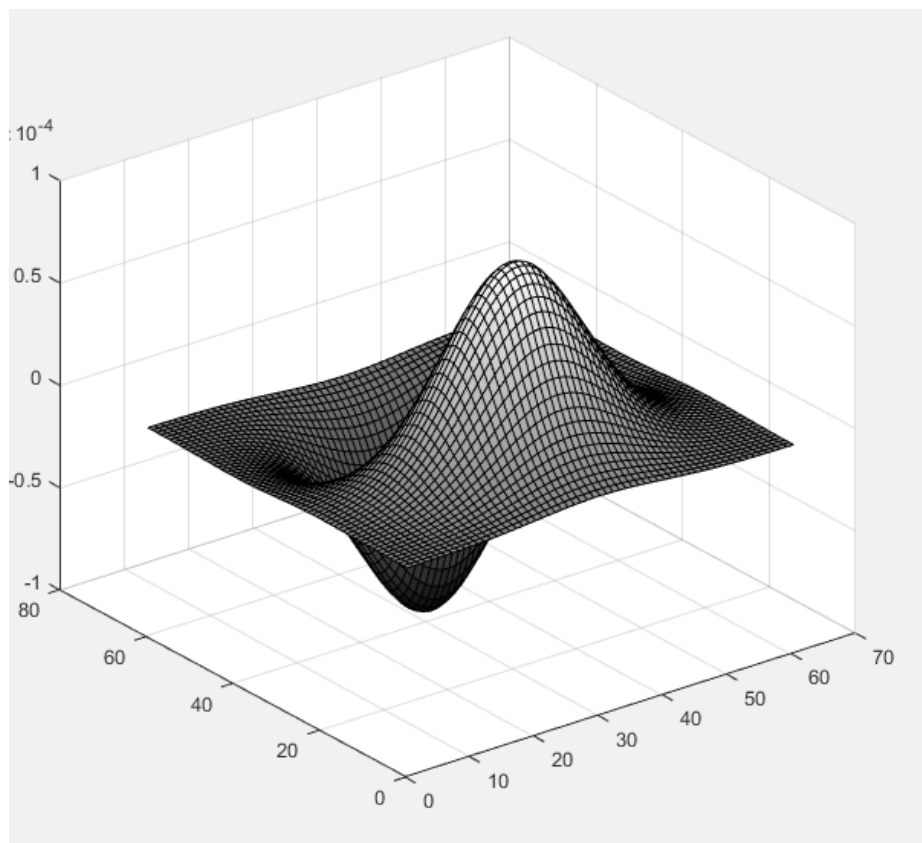
$\text{Sigma} = 0.6$



surf(Gy)



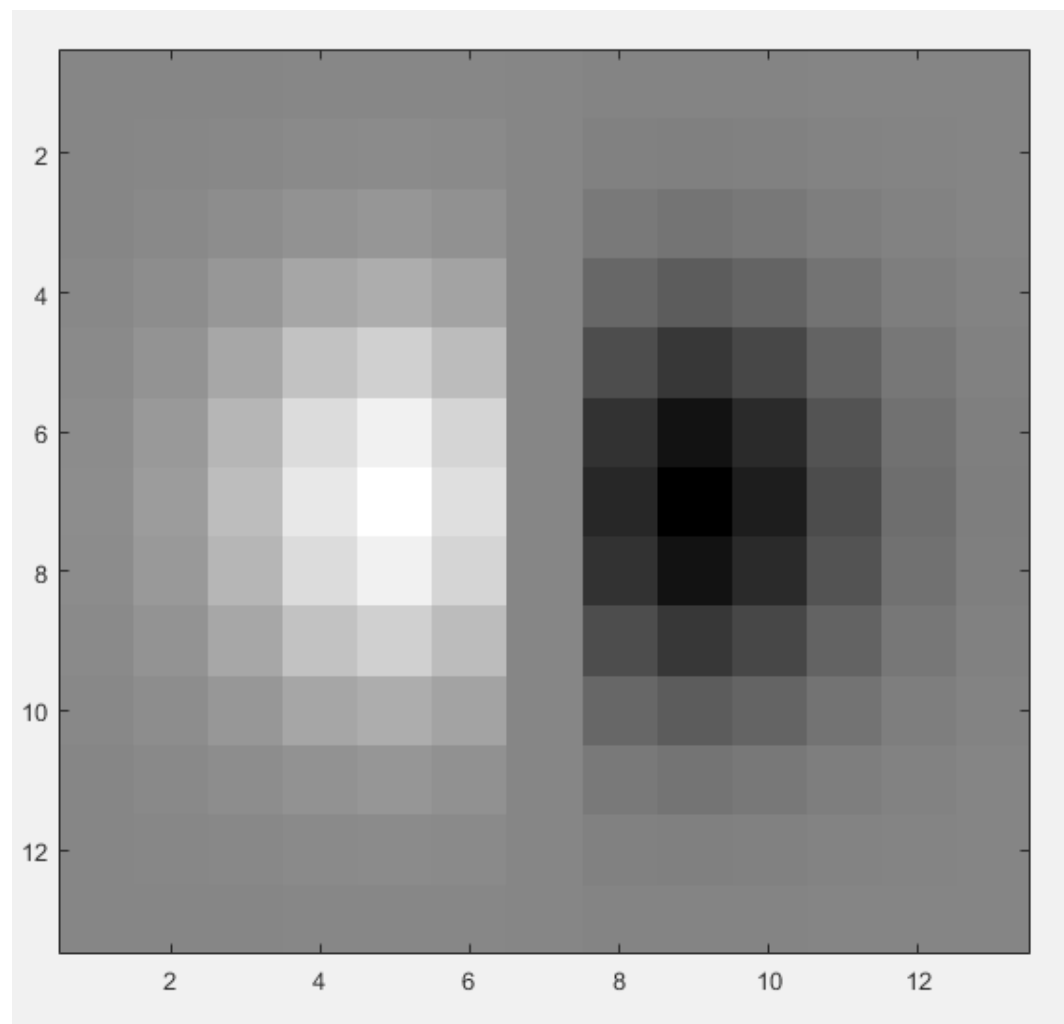
imagesc(Gy)

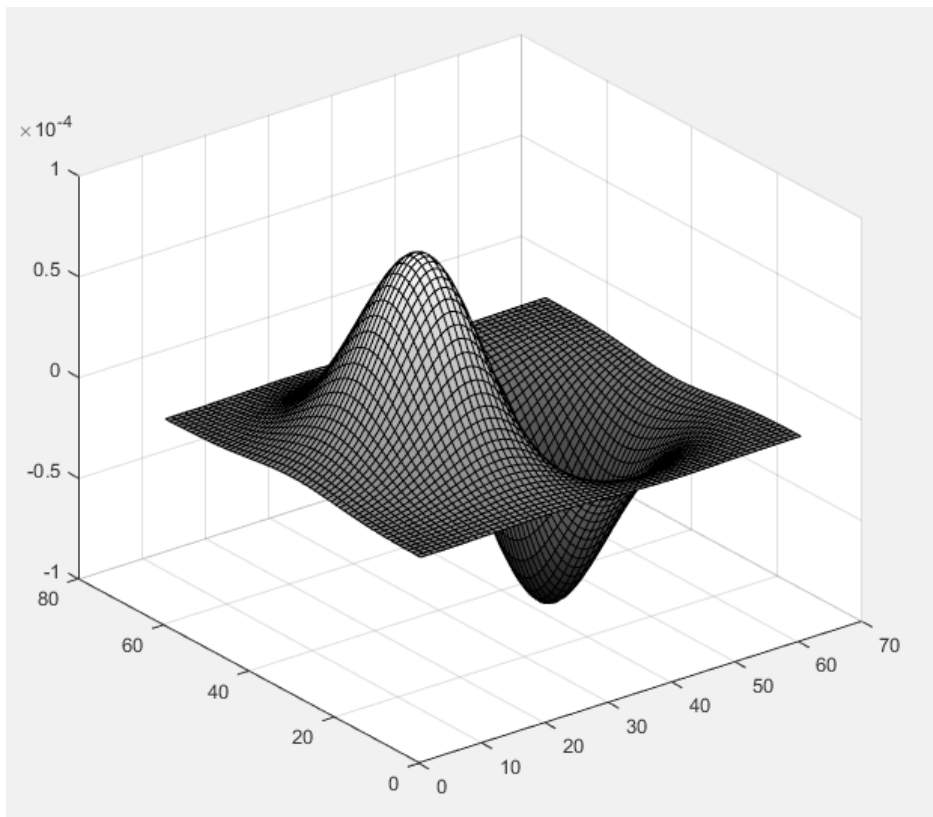


surf(Gx)

Sigma=2

imagesc(Gx)

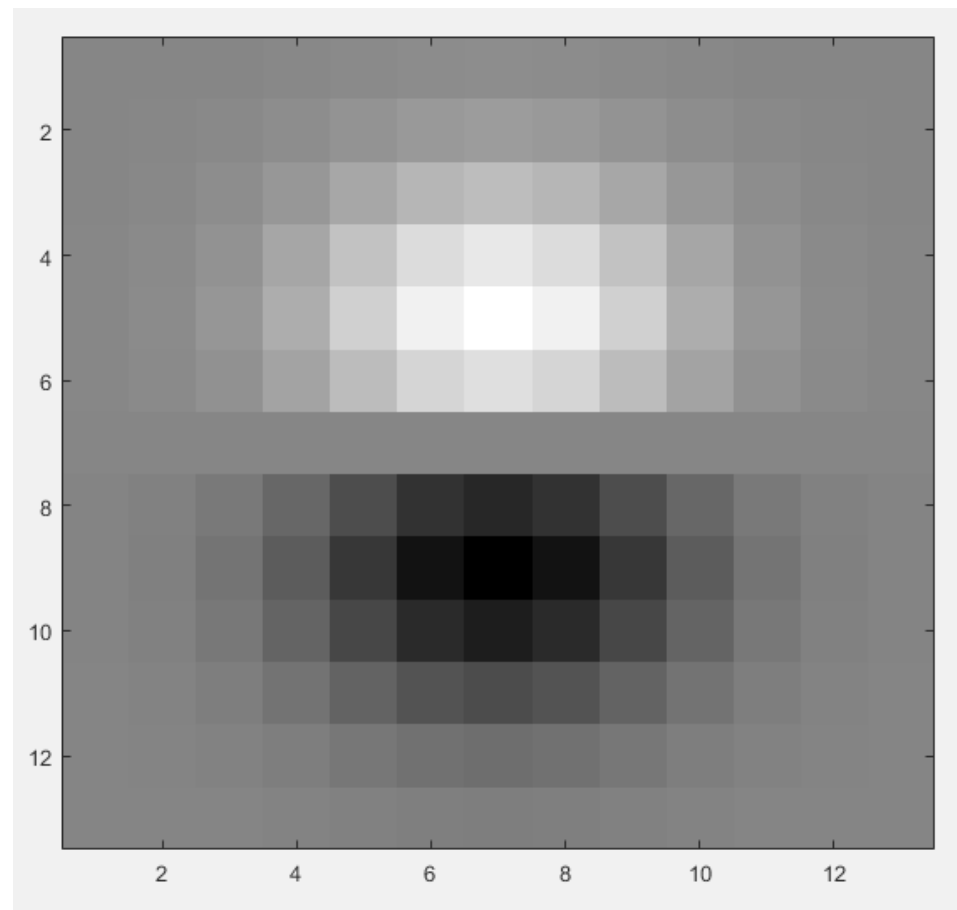




surf(Gy)

Sigma=2

imagesc(Gy)



3) Compute and display the gradient magnitude of an image (search the web for an interesting image; convert to grayscale if necessary; make sure to upload the image with code in your submission)

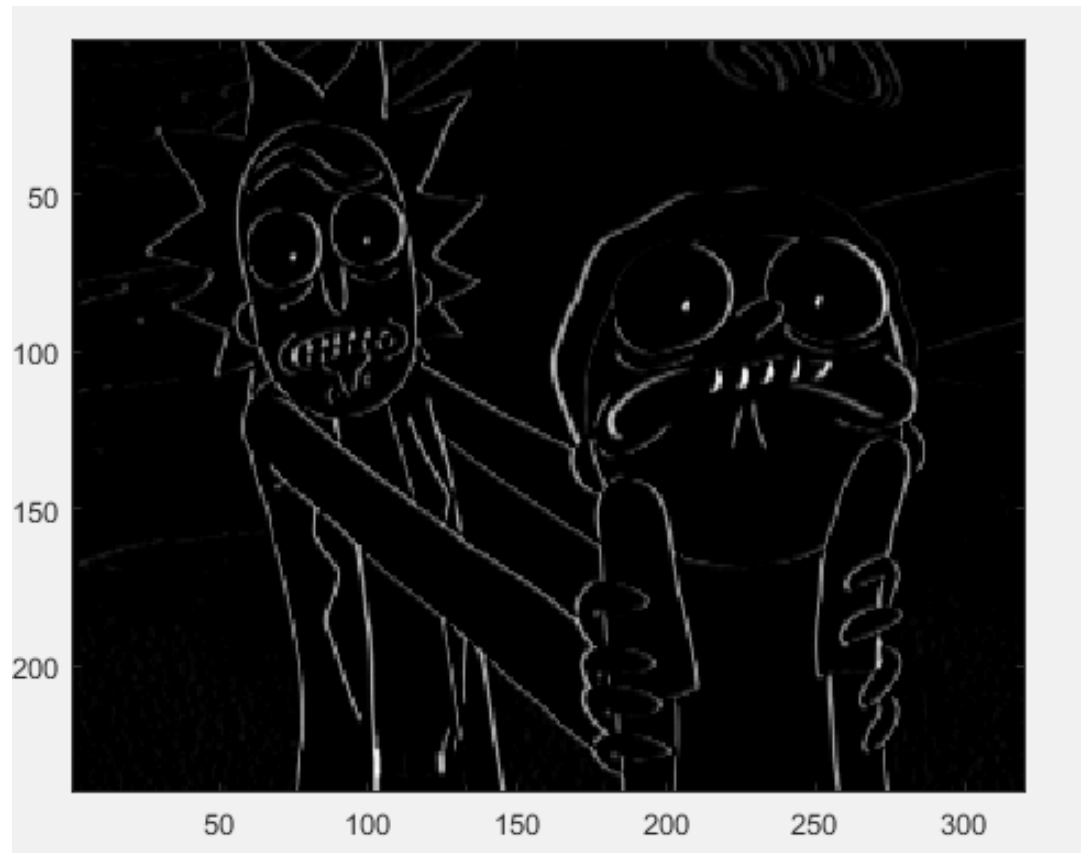


Original image

Vertical edges are more prominent in the filtered image

$\text{Sigma}=0.6$

`imfilter(img, Gx, 'replicate')`



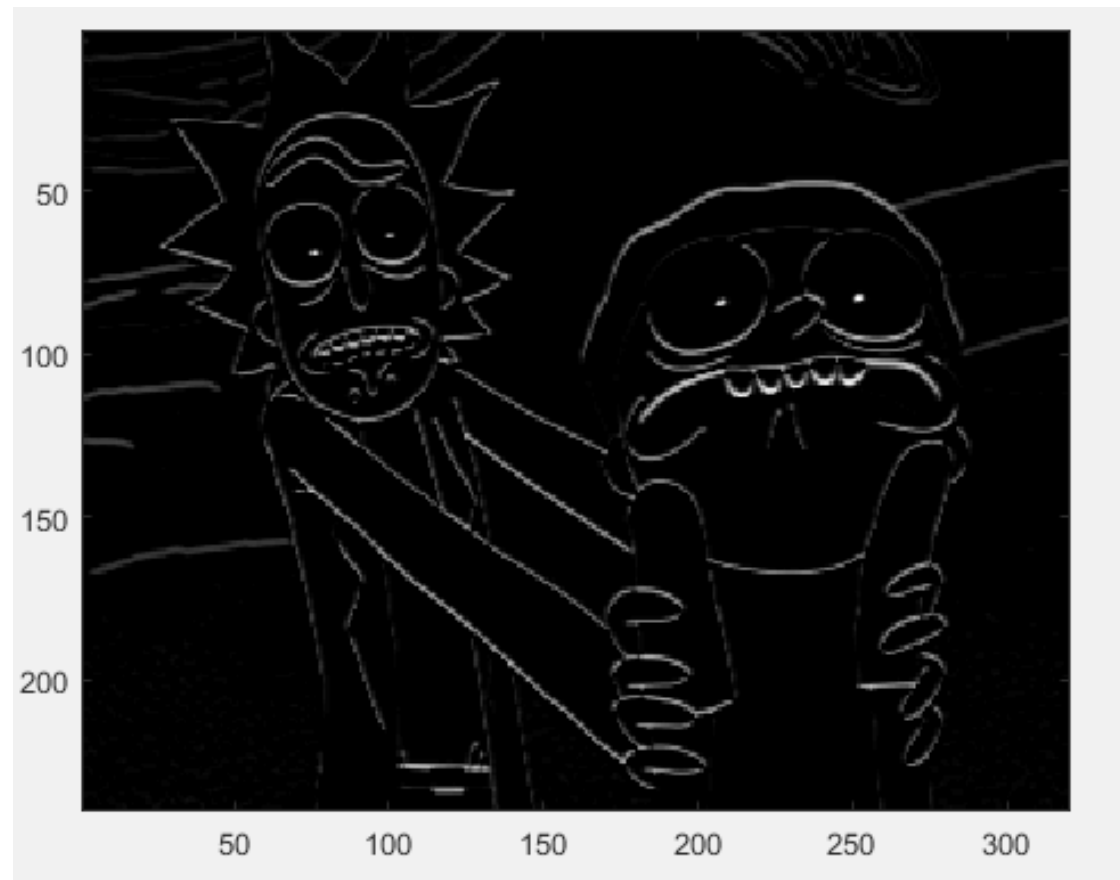


Original image

Horizontal edges are more prominent in the filtered image

$\text{Sigma}=0.6$

`imfilter(img, Gy, 'replicate')`



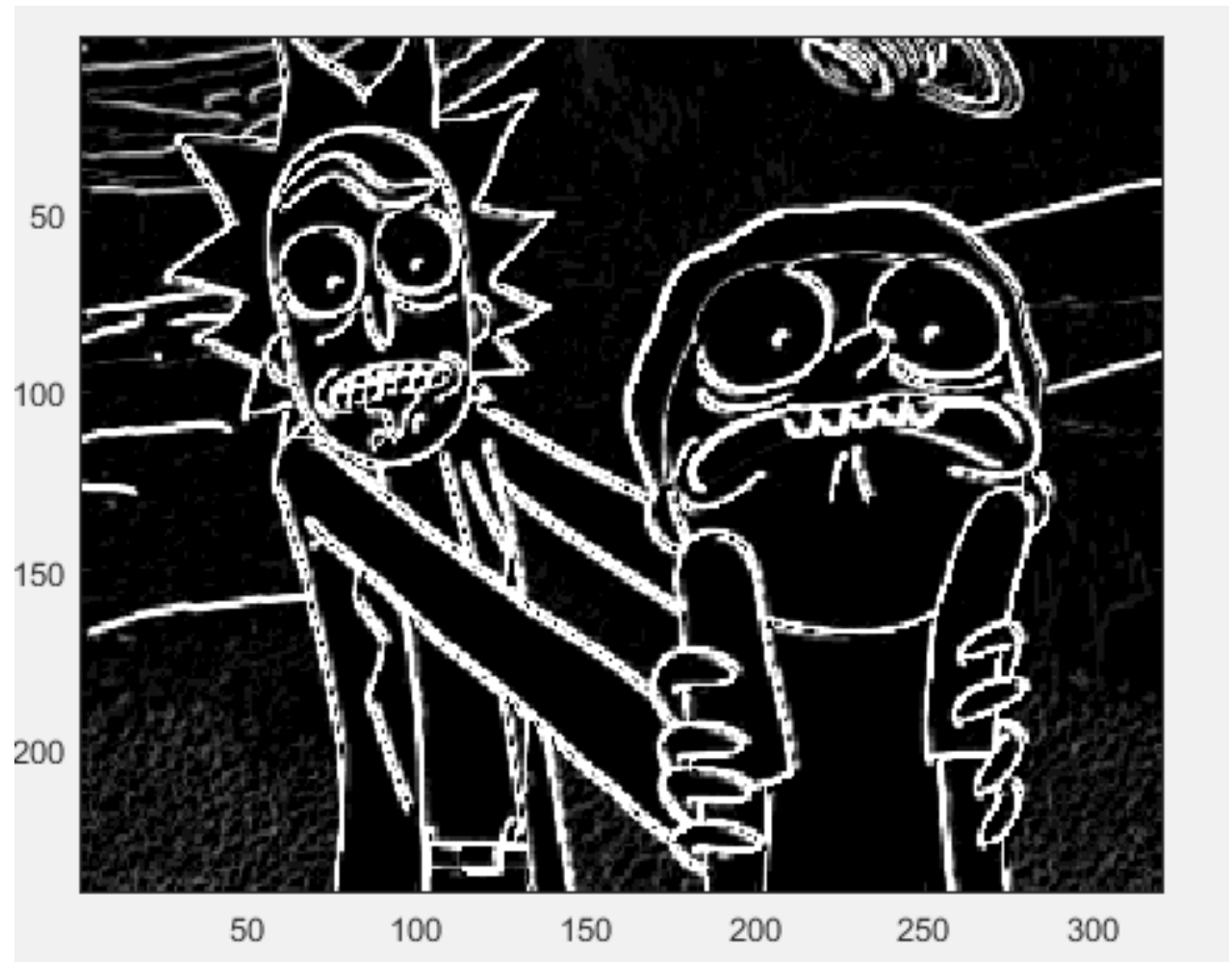




Original image

$\text{Sigma}=0.6$

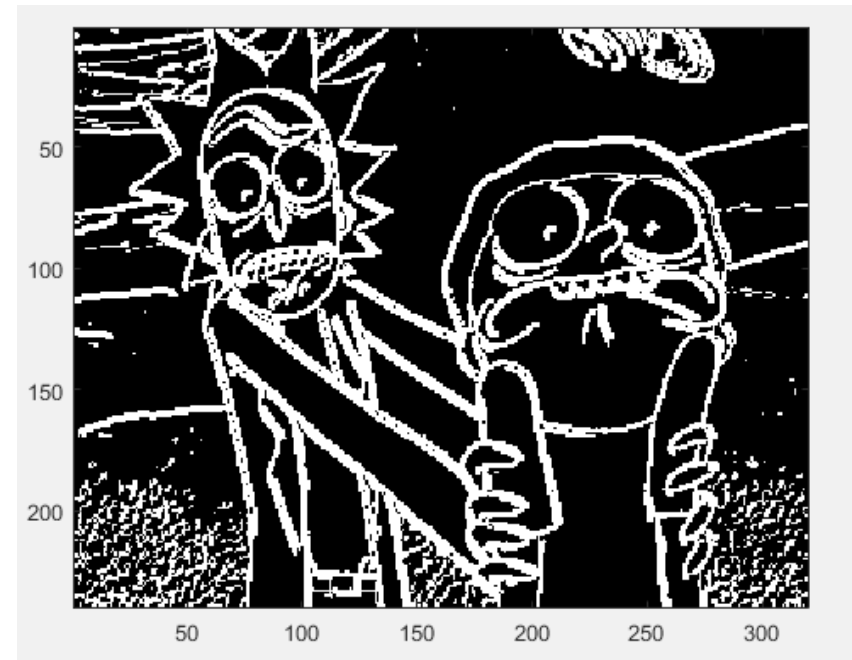
Gradient magnitude



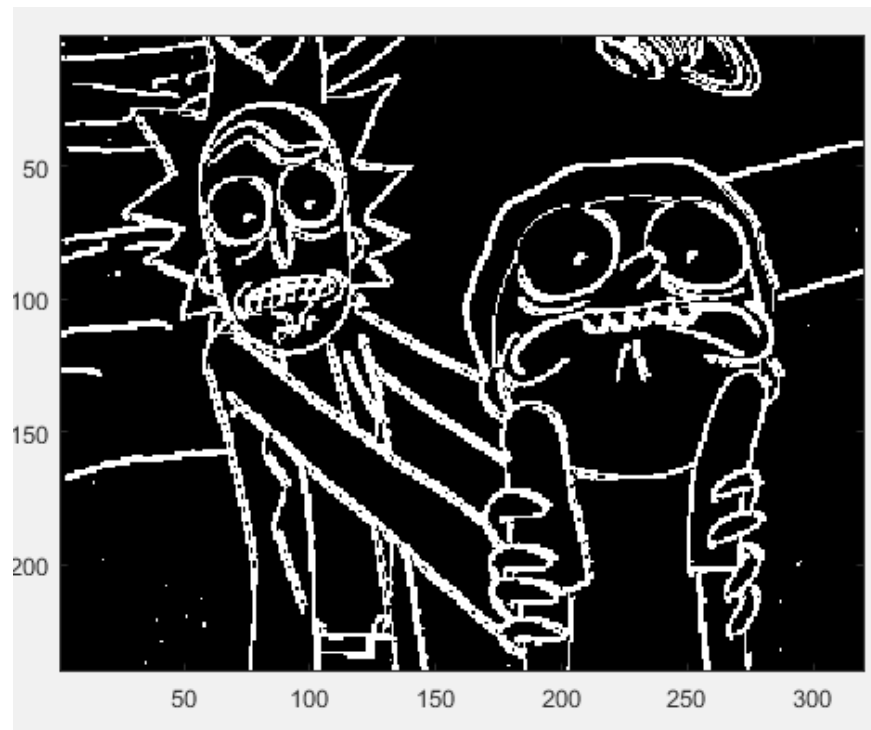
4) Threshold and display the magnitude image with different threshold  $T$  levels.



$T=0.5$



$T=1.5$



$T=5$

5) Compare the above results with the Sobel masks.

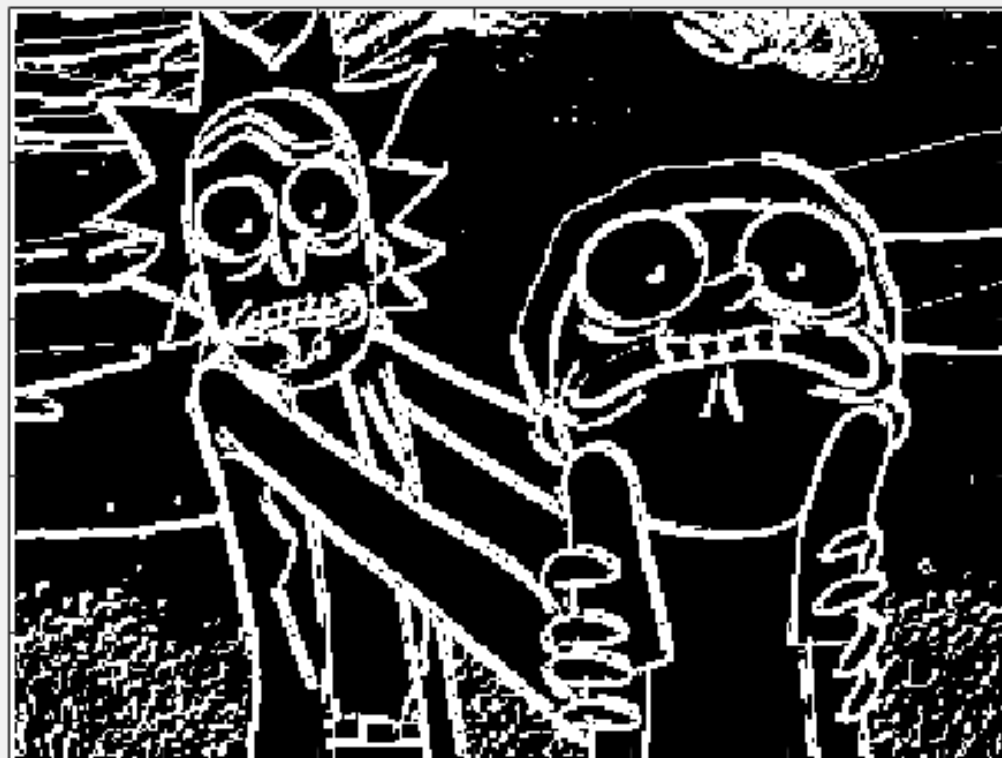


Threshold=5

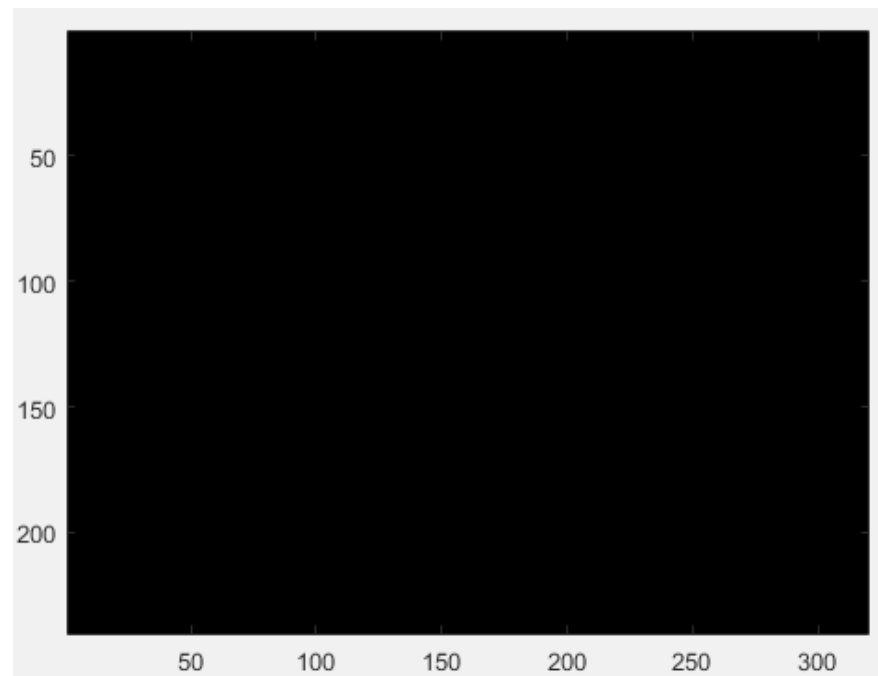


Threshold=10

Threshold = 15.95



Threshold = 16.0



6) Run the MATLAB canny edge detector, `edge(Im, 'canny')`, on your image and display the default results. How does it compare?

