

Digital Image Processing – Quiz2 2022/11/16

(1) Please design point operations (transformation function) or filtering masks (3x3) for the following requests (in spatial domain).

- (a) A filter for monitor/LCD displayer degradation;
- (b) An enhancement filter for dark images;
- (c) A noise removing filter for salt-and-pepper noise degraded images;
- (d) A noise removing filter for Gaussian noise degraded images;
- (e) A filter detecting vertical edges.

(2) A gray level image with size of 5x5 and 8 (0~7) different intensity levels, please use histogram equalization approach to enhance the contrast, and show the newly enhanced image.

3	3	5	5	6
2	3	5	5	6
2	3	5	6	6
2	3	4	4	3
2	2	4	4	3

(3) Apply Laplacian edge detectors on the following matrix and show the results.

0	0	0	0	0	0
0	1	1	1	4	0
0	0	0	4	5	0
0	0	5	4	6	0
0	0	6	6	5	0
0	0	0	0	0	0

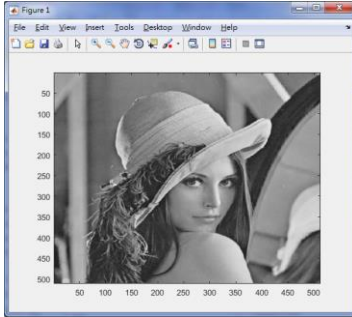
(4) Describe the four main steps for Canny edge detector, and describe the purpose for each step.

(5) If an image was degraded by periodic noises, what it looks like after the degradation? How to solve/restore these kind of degraded images? What are the reasons?

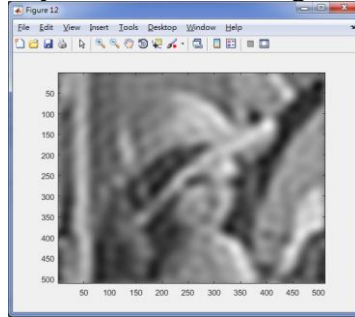
(6) On the next page.

(6) What are the corresponding amplitude spectrum for the following images?

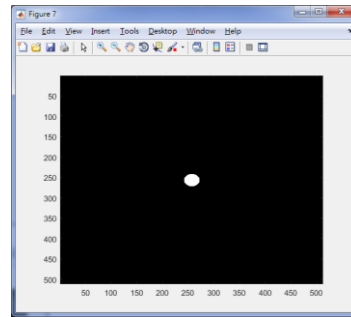
Spatial Domain Images



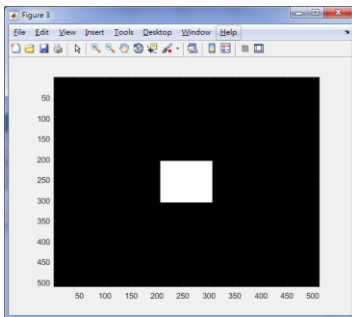
(a)



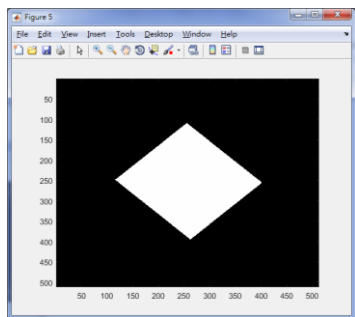
(b)



(c)

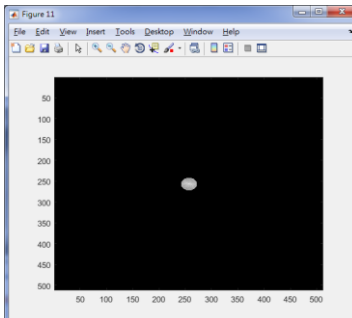


(d)

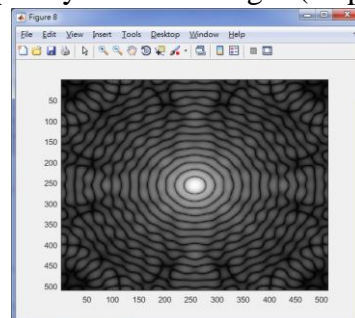


(e)

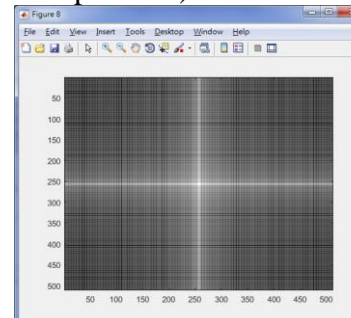
Frequency Domain Images (amplitude spectrum)



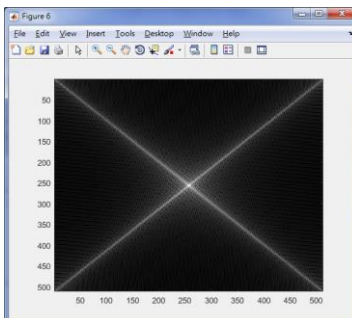
(1)



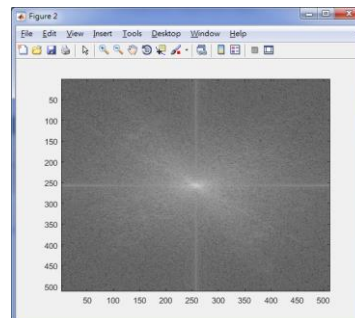
(2)



(3)



(4)



(5)