Image Processing Project #4

0510894 電機 4D 翁紹恩

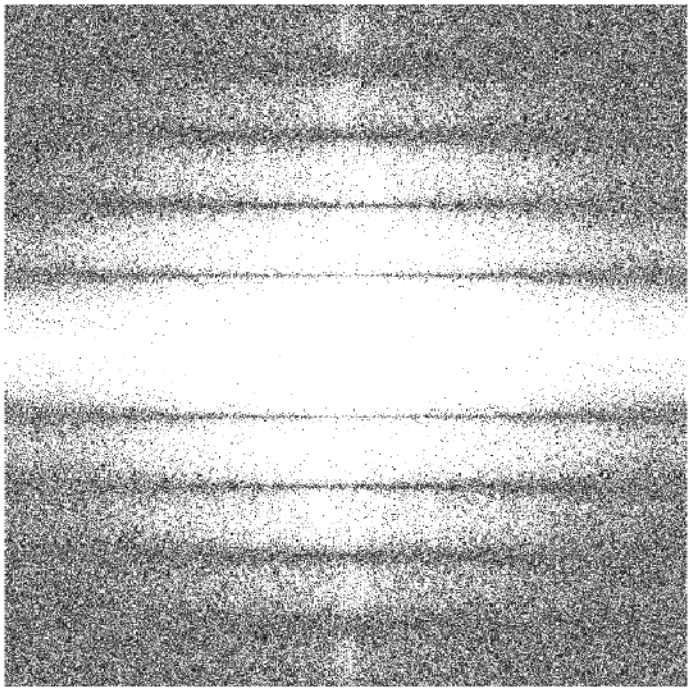
I. Source codes (With Matlab)

```
close all;
clear all;
clc;
%%%%%%%%%% load image %%%%%%%%%%%%%%%
im = im2double(imread('image-pj4 (motion blurring).tif'));
%%%%%% create u,v for H centering value %%%%%%%
[m n] = size(im);
s= [linspace(-256,-1,256), linspace(1,256,256)];
[v u] = meshgrid(s);
T = 1;
a = -0.019;
b = 0;
temp = pi * (a*u + b*v);
H = (T./temp) .* sin(temp) .* exp(-1i.*temp);
%%%%DFT and decide linear-motion degradation %%%%
G = fft2(im);
Fsh = fftshift(G);
F = Fsh ./H;
%%%%%%%%%% show image %%%%%%%%%%%%%%%
S2 = log(1+abs(Fsh));
filt = ifftshift(F);
y = ifft2(filt);
figure
imshow(abs(Fsh))
title('Figures of the Fourier magnitude spectra of the degraded image')
saveas(gcf,'degraded image','png');
figure
imshow(abs(S2),[])
title('Figures of the Fourier magnitude spectra of the degraded image(log &
normalize)')
saveas(gcf,'degraded image(log)','png');
figure
imshow(abs(H))
title('Figure of the Fourier magnitude of degradation model H(u,v)')
saveas(gcf,'H(u,v)','png');
```

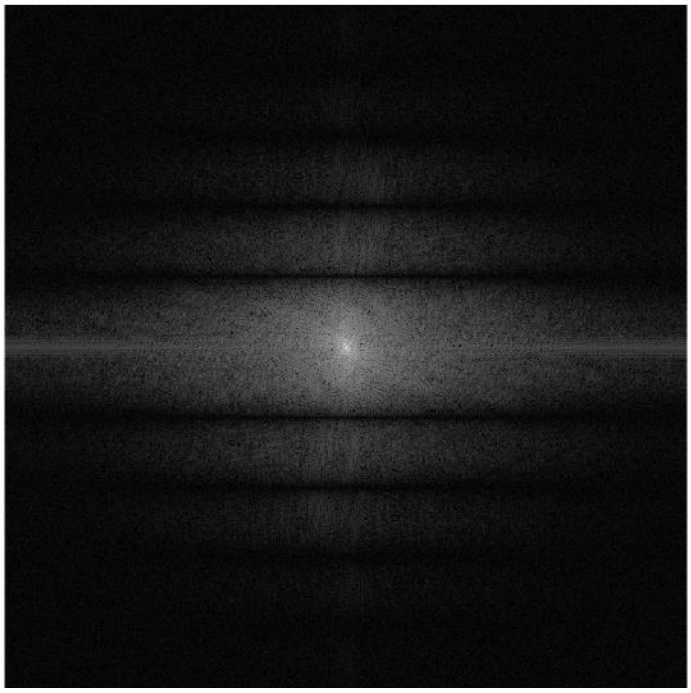
```
figure
imshow(uint8(y*255))
title('Figure of the output image')
saveas(gcf,'output','png');
```

II. Figures of the Fourier magnitude spectra of the degraded image image pj4 (motion blurring)

Figures of the Fourier magnitude spectra of the degraded image



Fourier magnitude spectra of the degraded image(log & normalize)



III. Figure of the Fourier magnitude of degradation model H(u,v) for uniformly linear motion blurring

Figure of the Fourier magnitude of degradation model H(u,v)

IV. Figure of the output image

Figure of the output image

V. Model parameters: direction of linear motion, estimate of displacement in pixel

$\text{direction of linear motion} = 0°$

$\text{displacement} = 10$

$a = -0.019$

$b = 0$

$T = 1$

(pick parameters using trail and error)