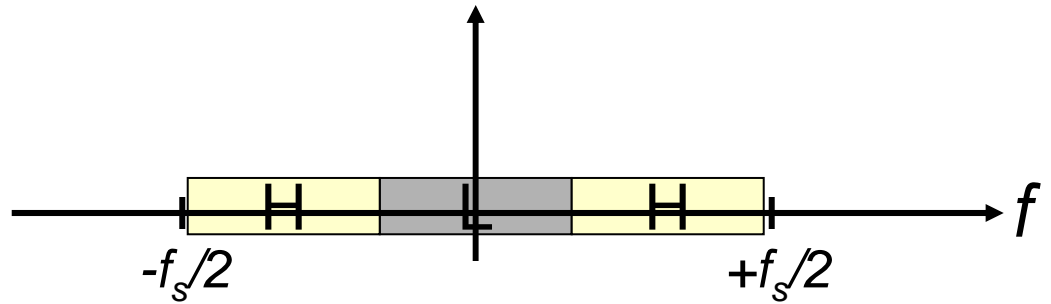


# 1D Fourier Analysis



# 2D Fourier Analysis

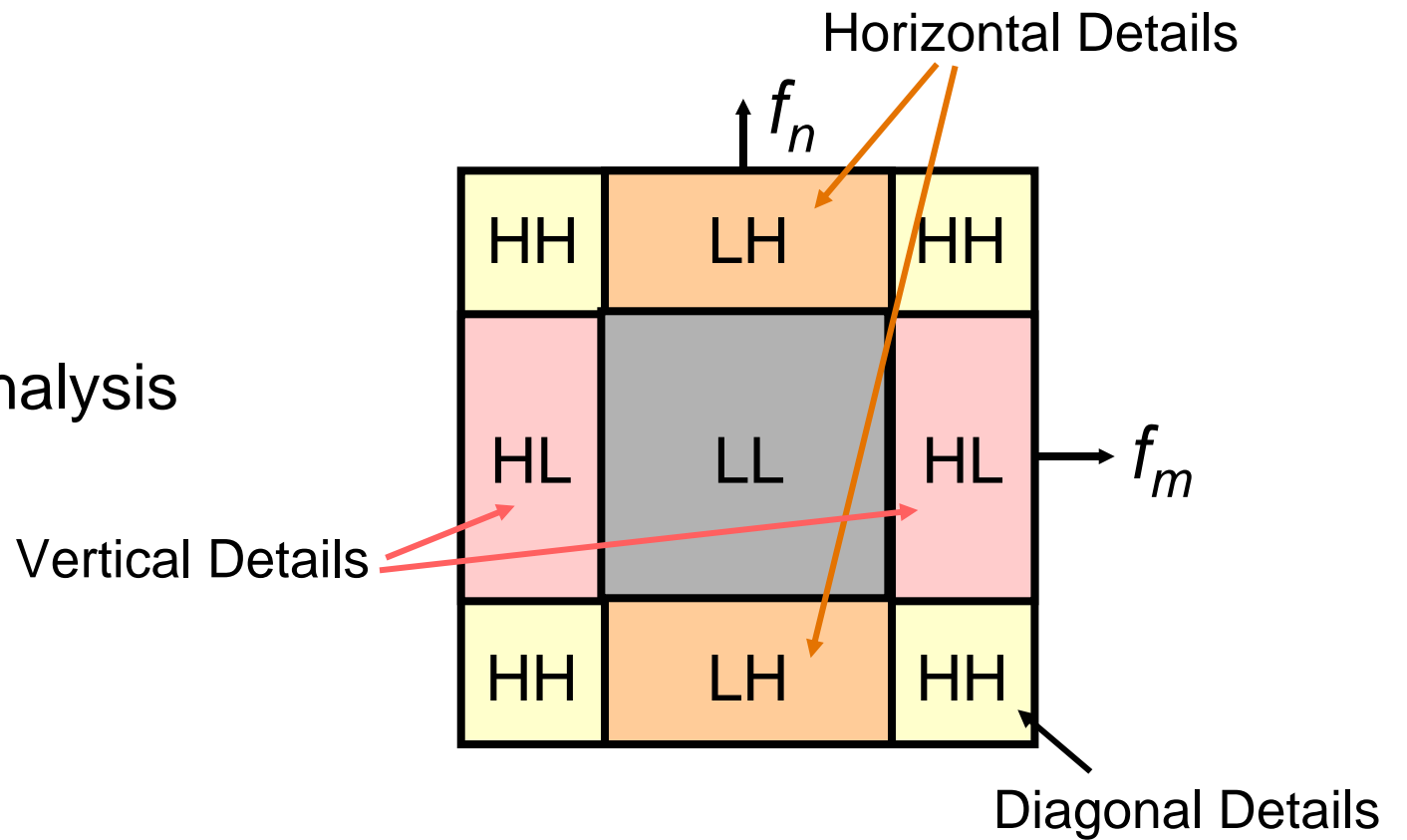


image in space domain (double)

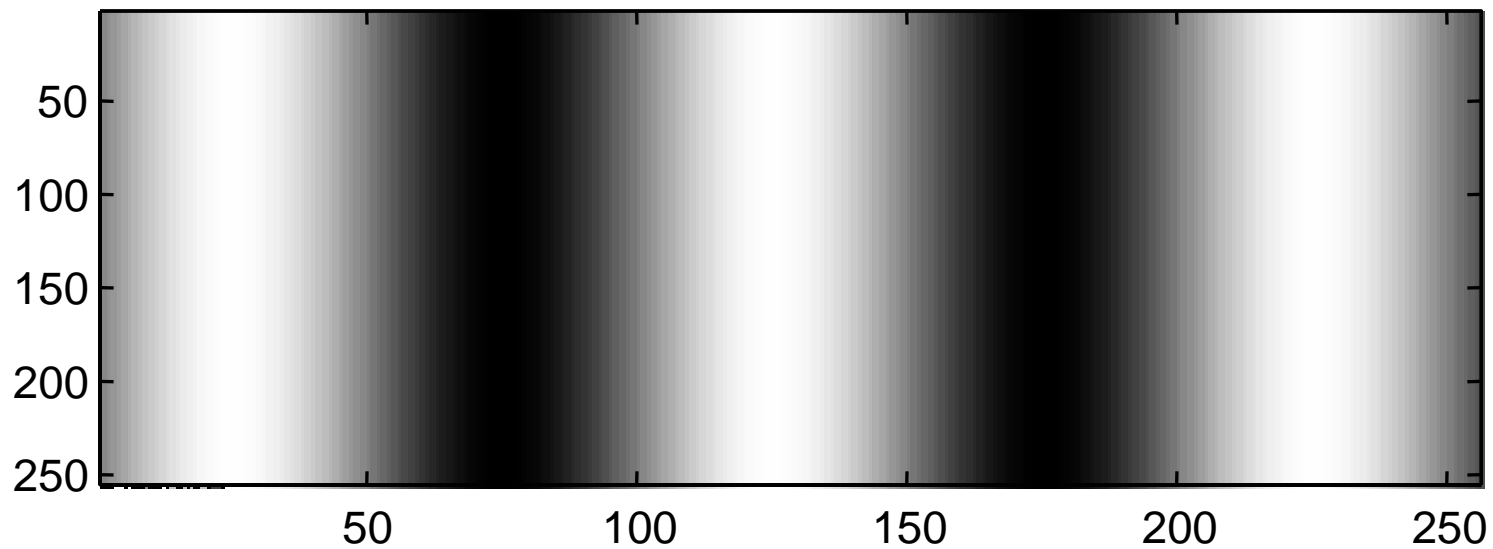


image in Fourier/frequency domain

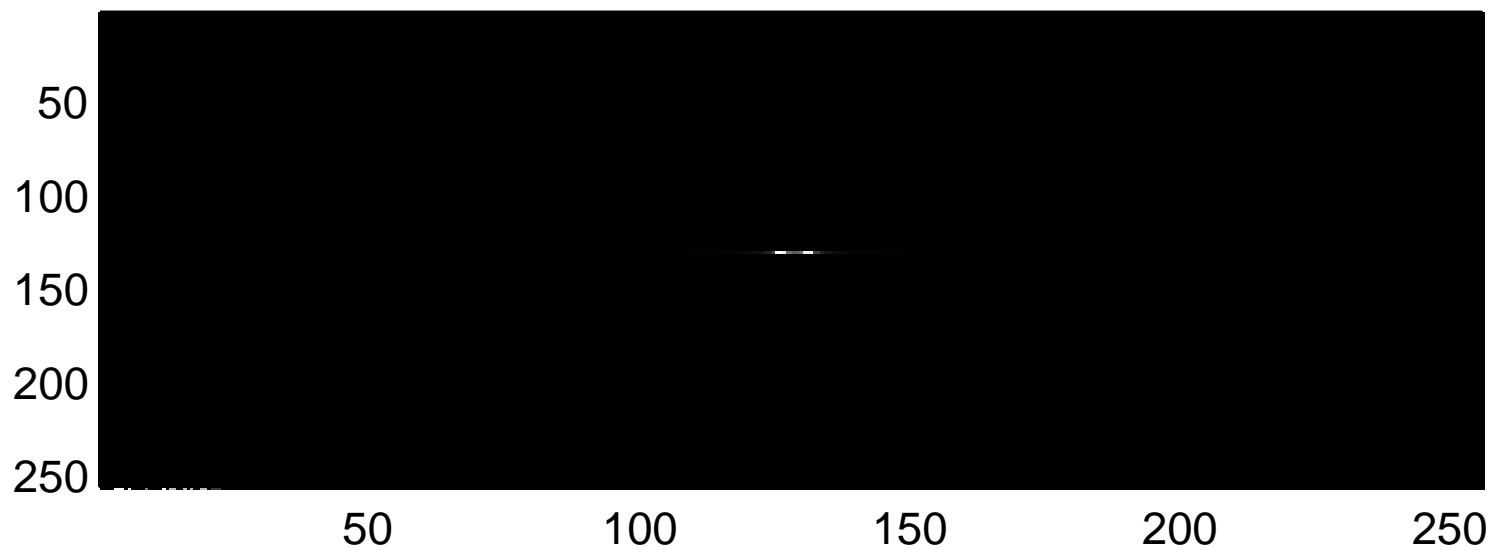


image in space domain, -1 to 1, double

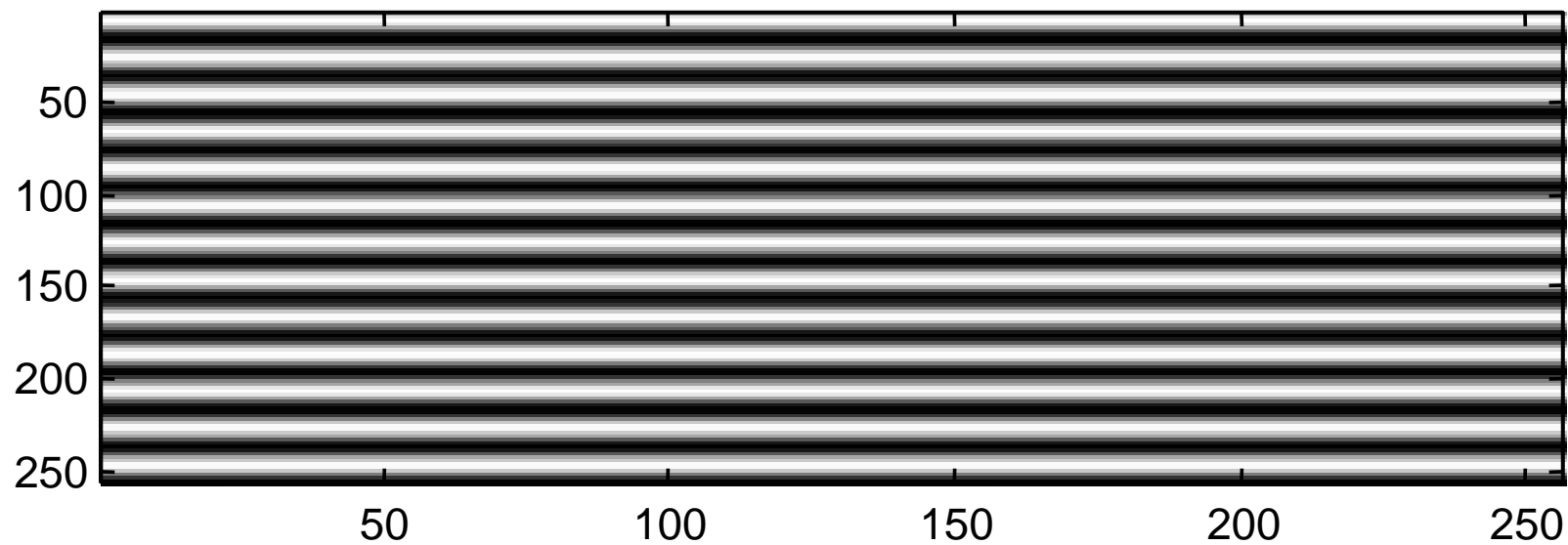


image in Fourier/frequency domain

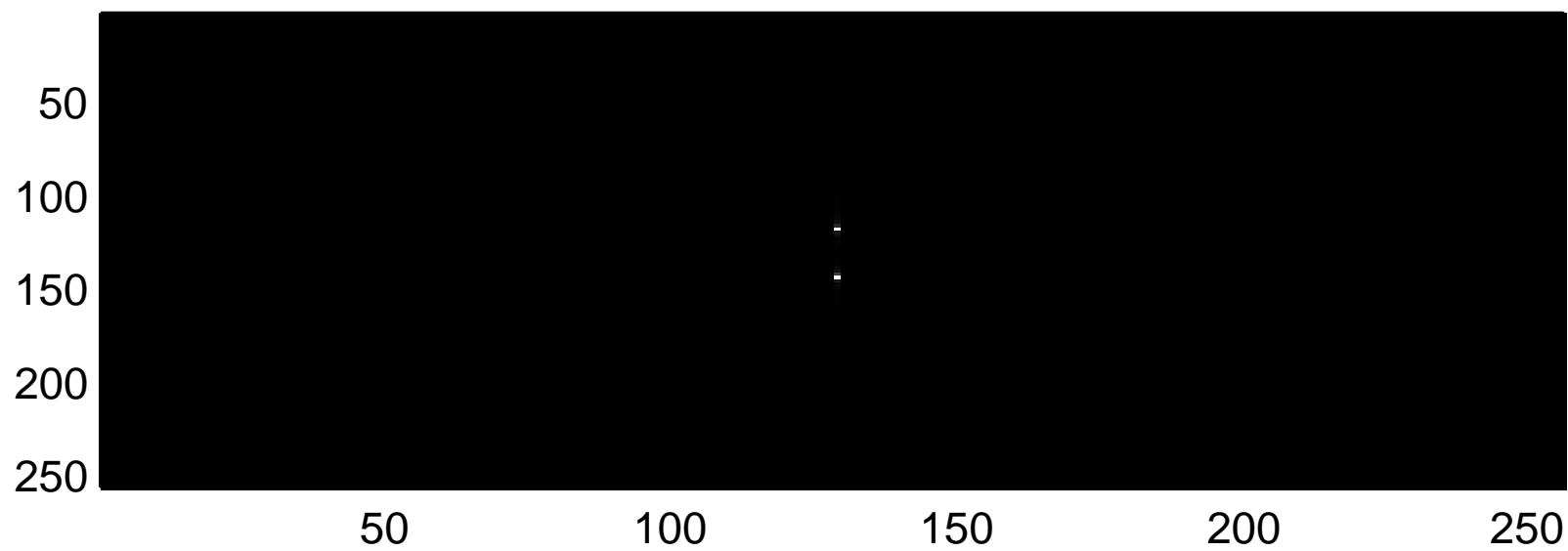


image in space domain, 0-255, uint8

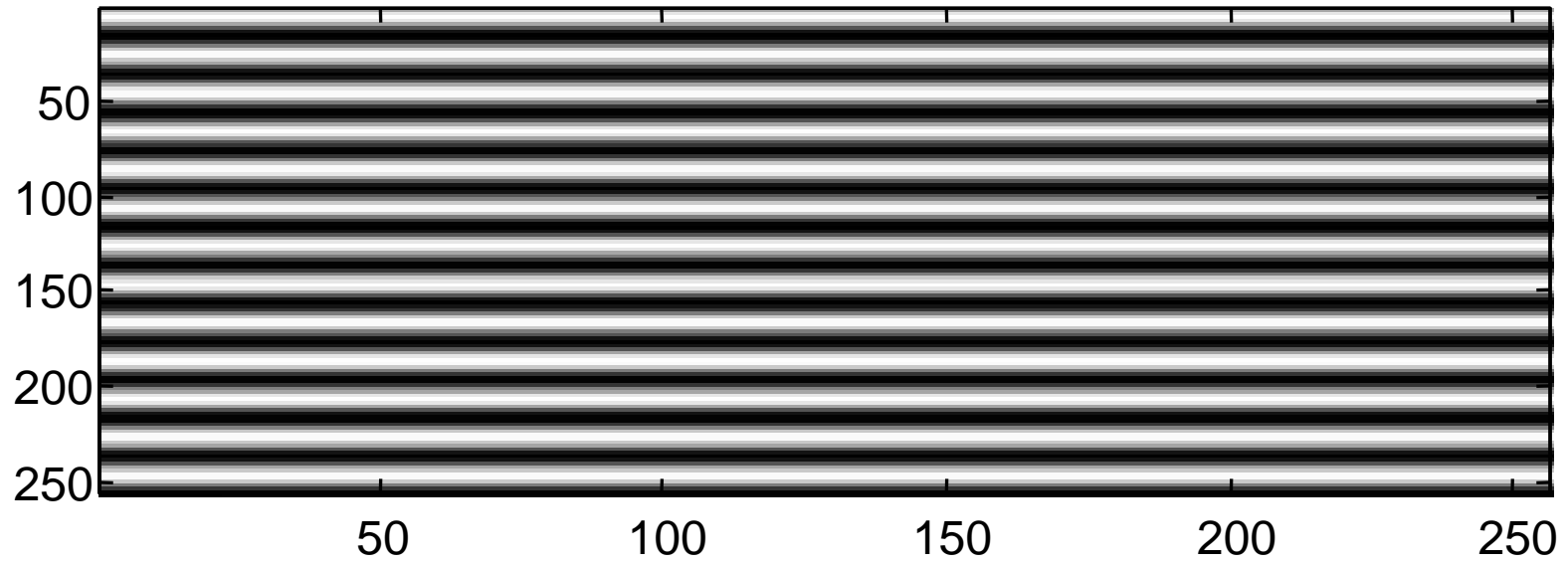


image in Fourier/frequency domain

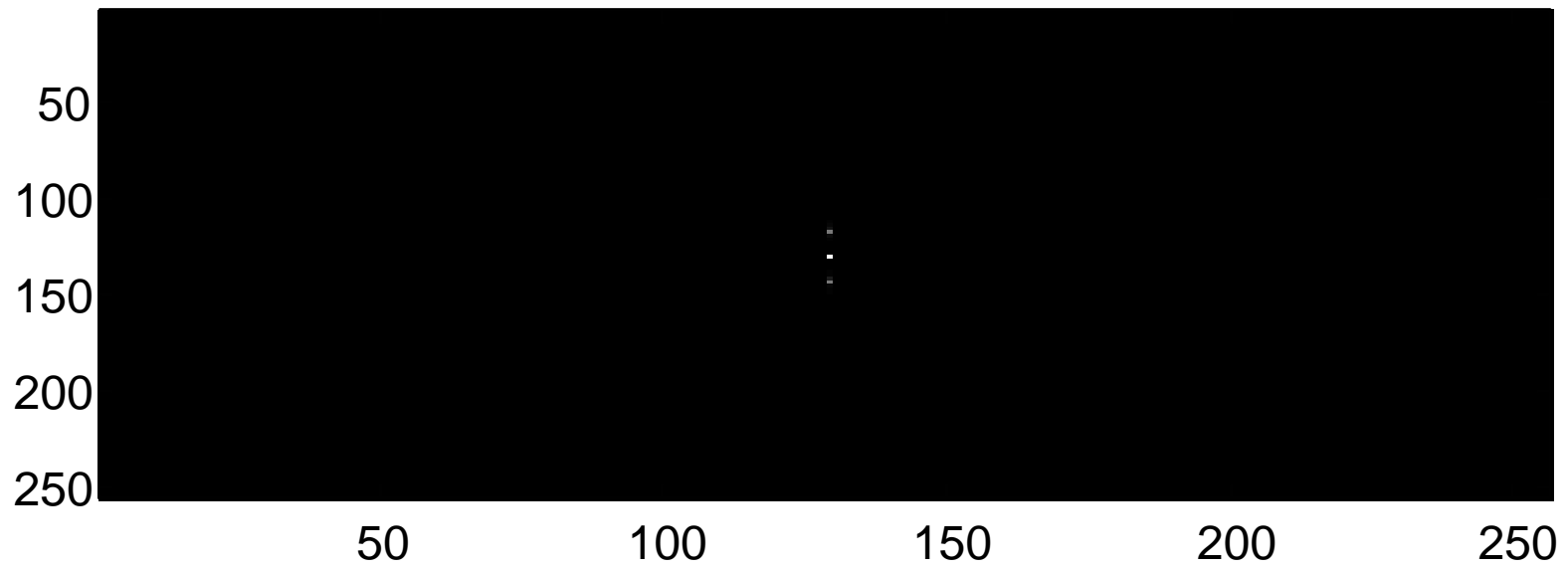


image in space domain (double)

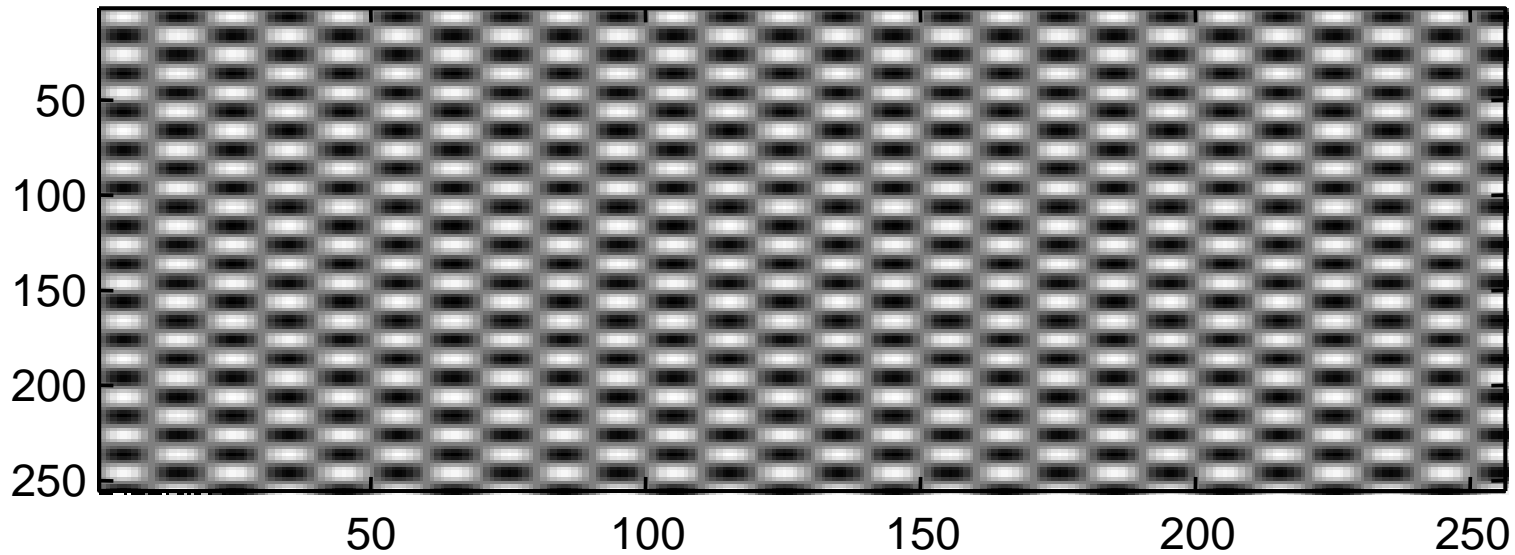


image in Fourier/frequency domain

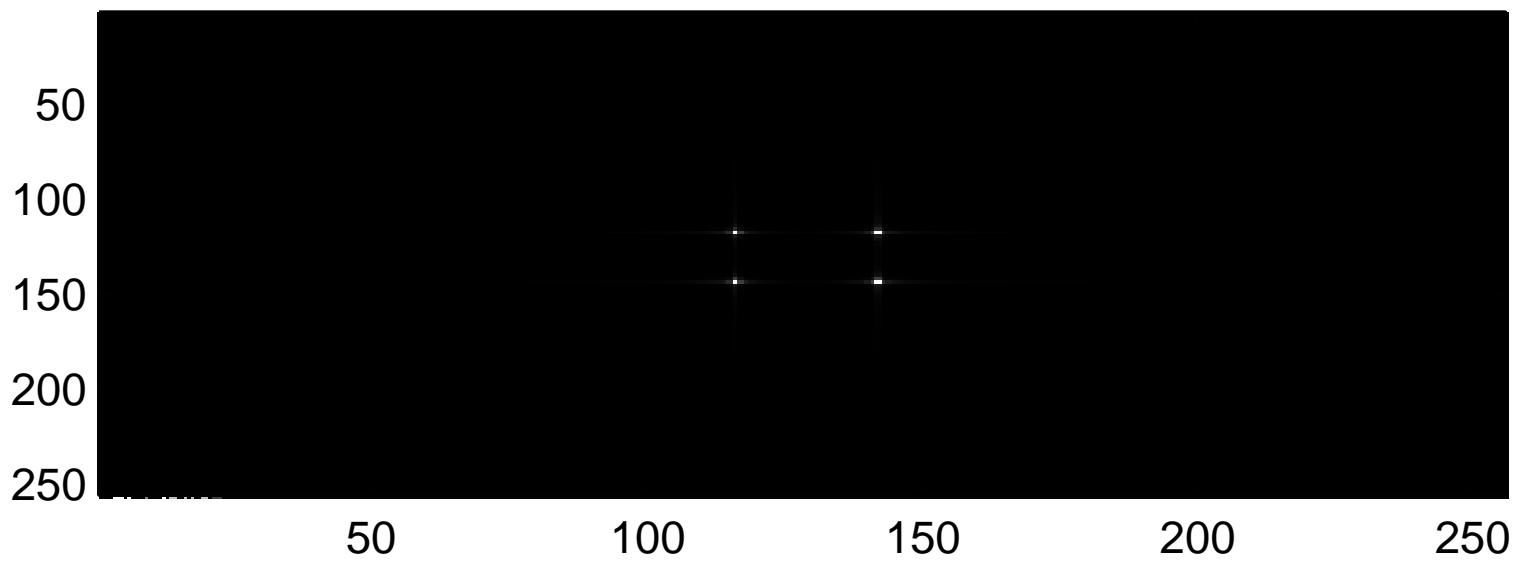


image in space domain (double)

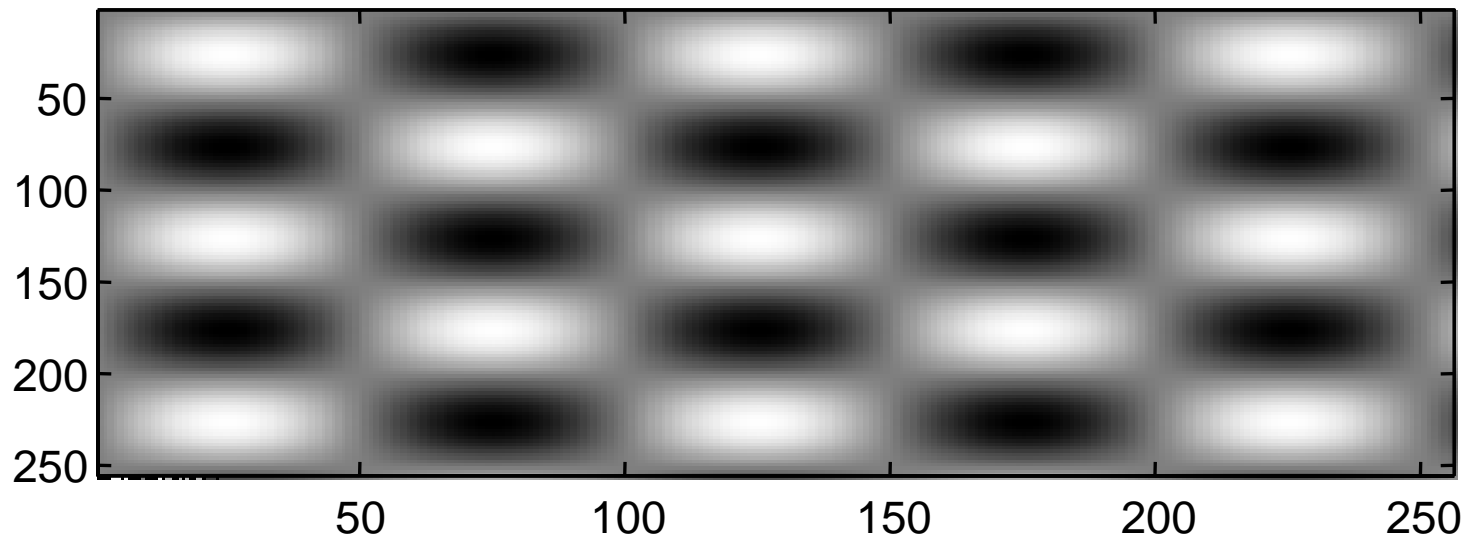


image in Fourier/frequency domain

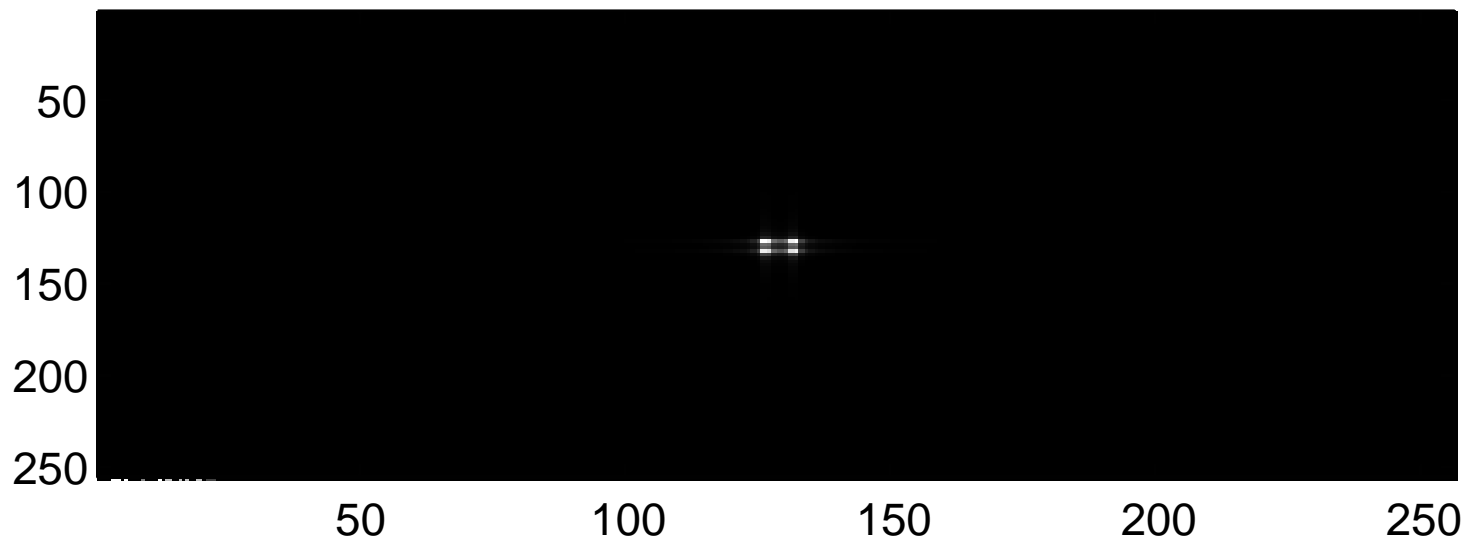


image in space domain, 0-255, uint8

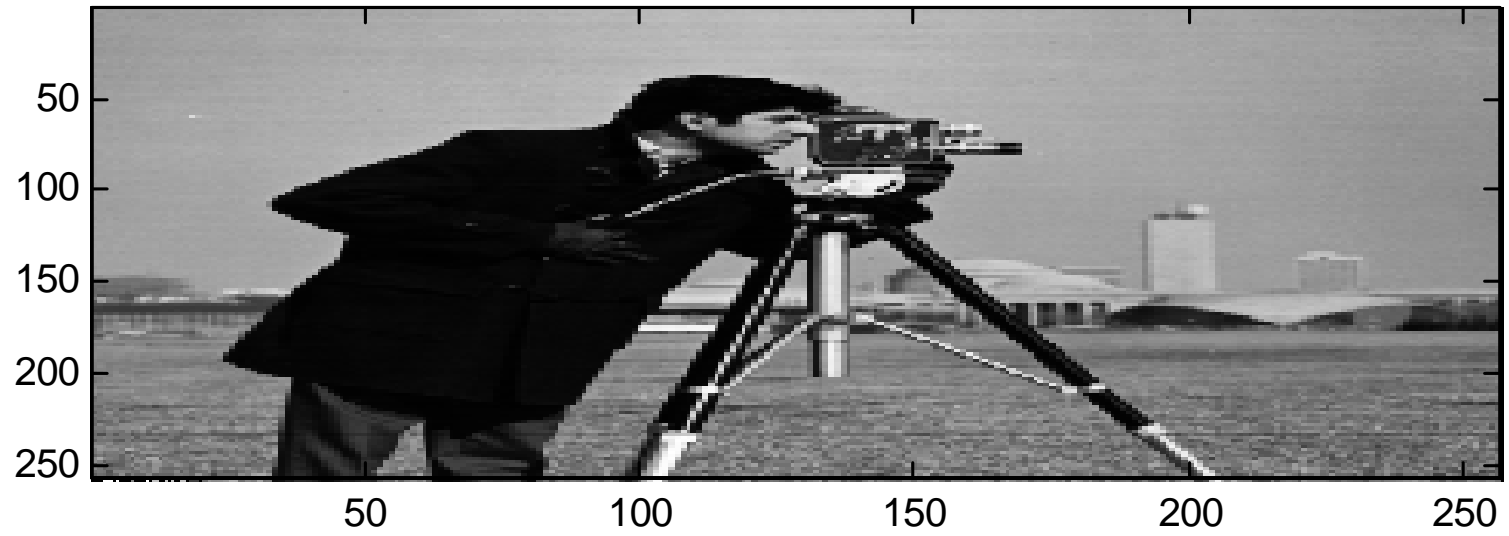
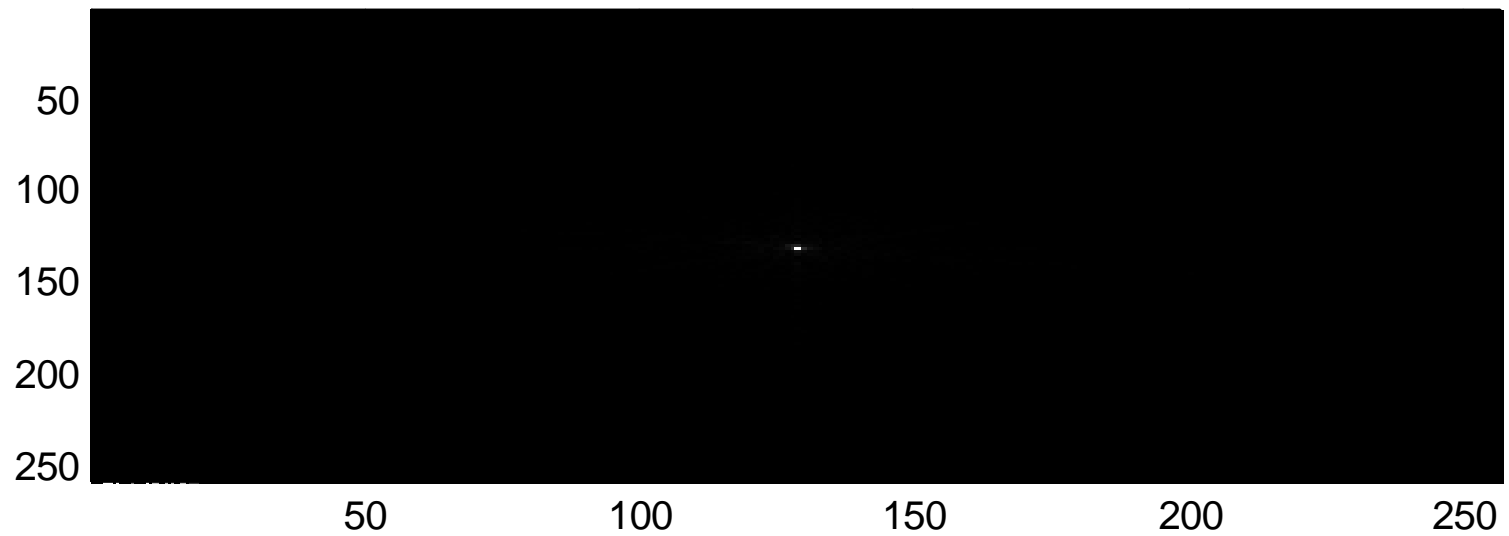


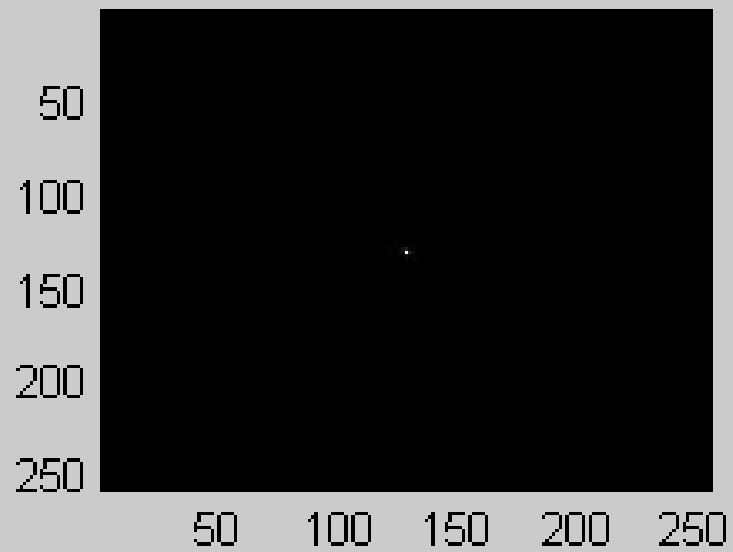
image in Fourier/frequency domain



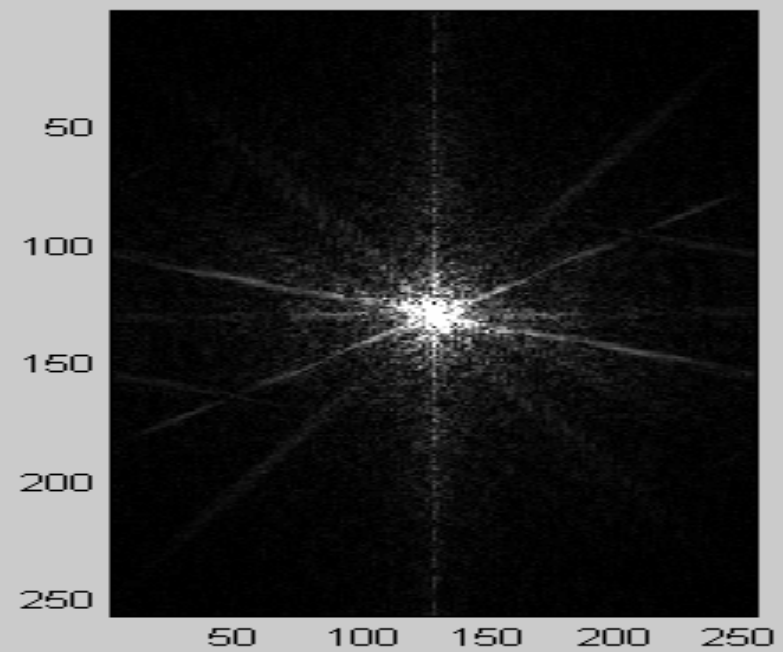
cameraman



cameraman magnitude of FFT



cameraman magnitude of FFT



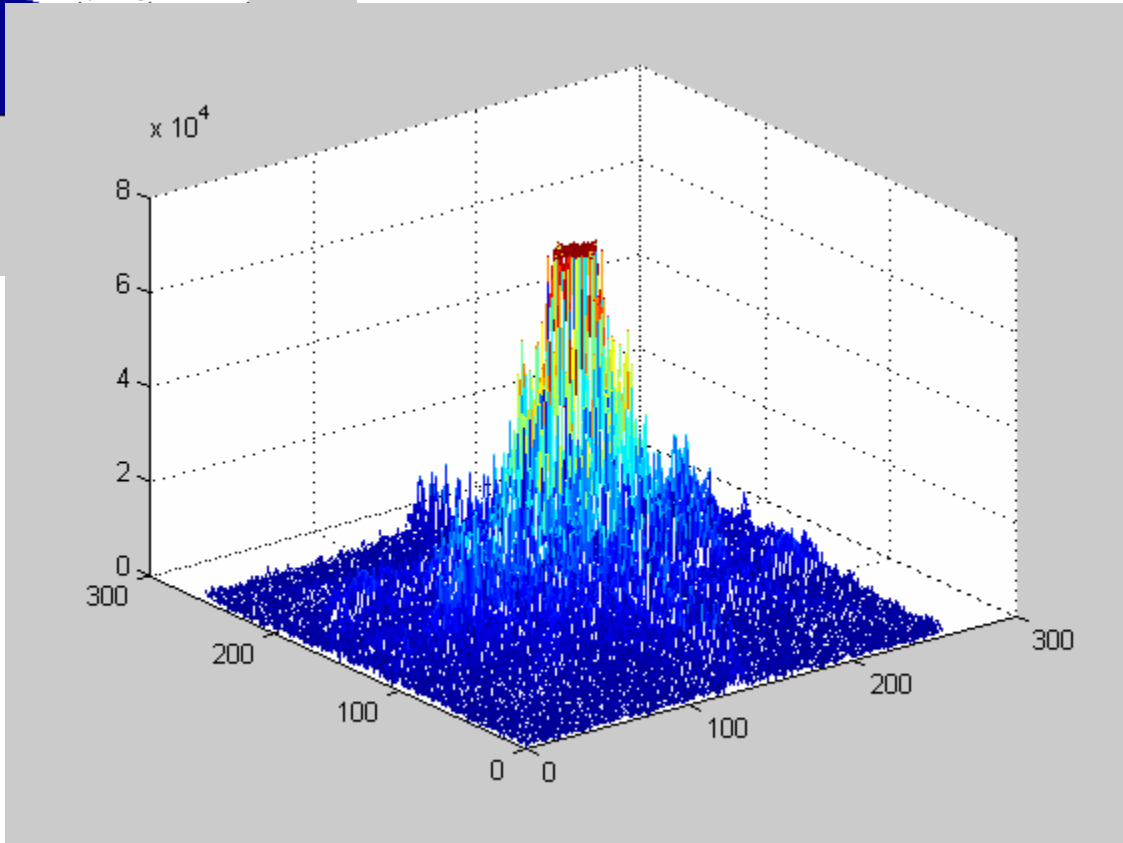
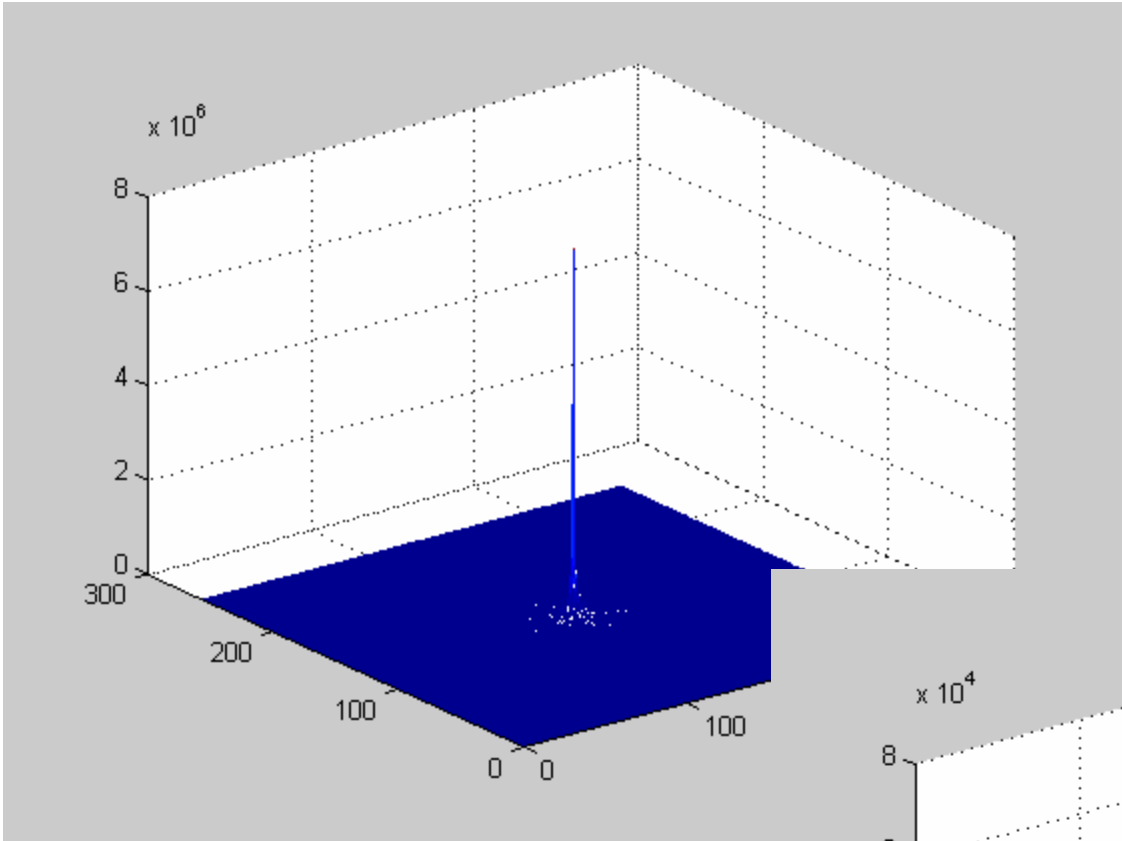


image in space domain, 0-255, uint8

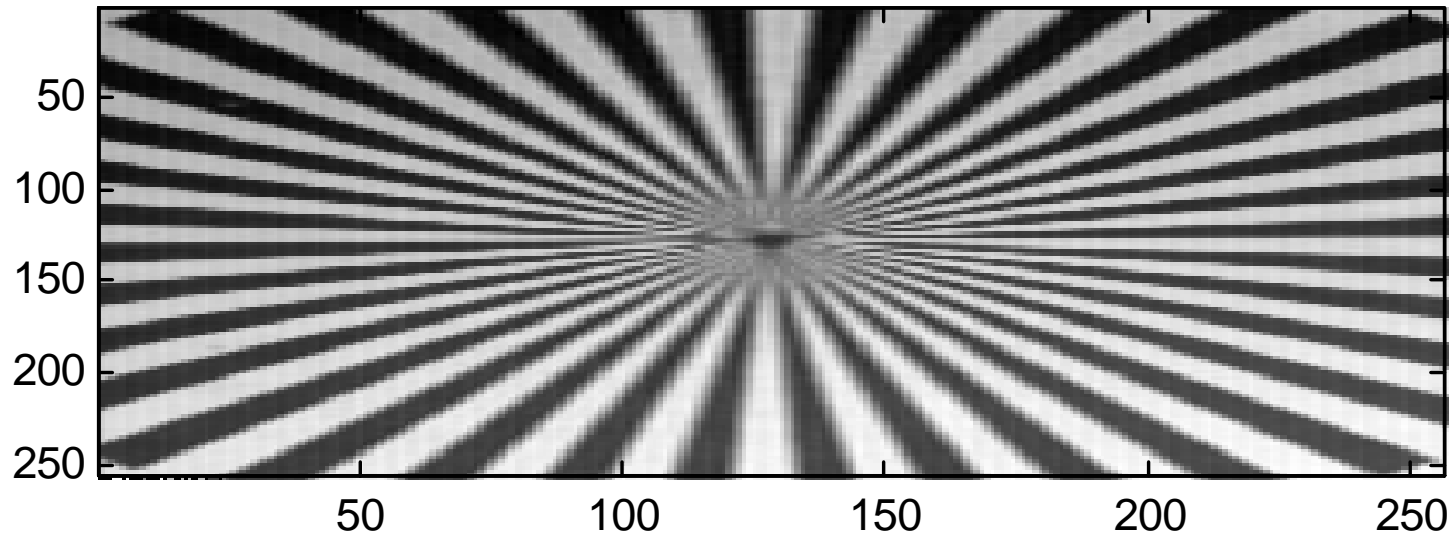


image in Fourier/frequency domain

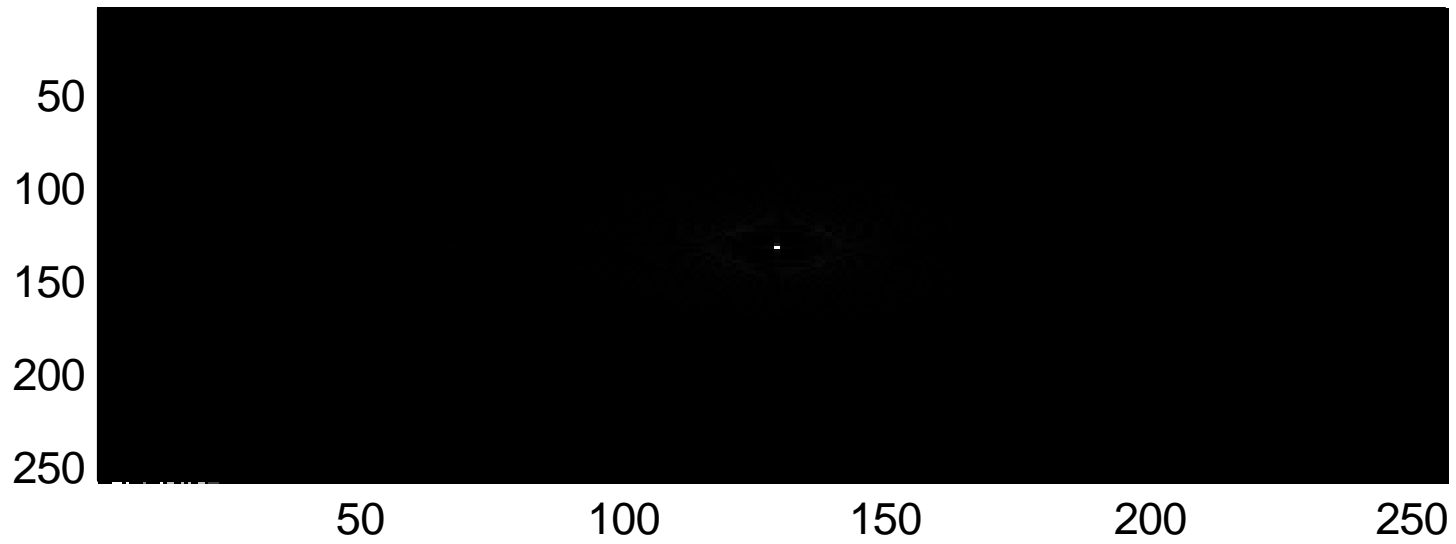
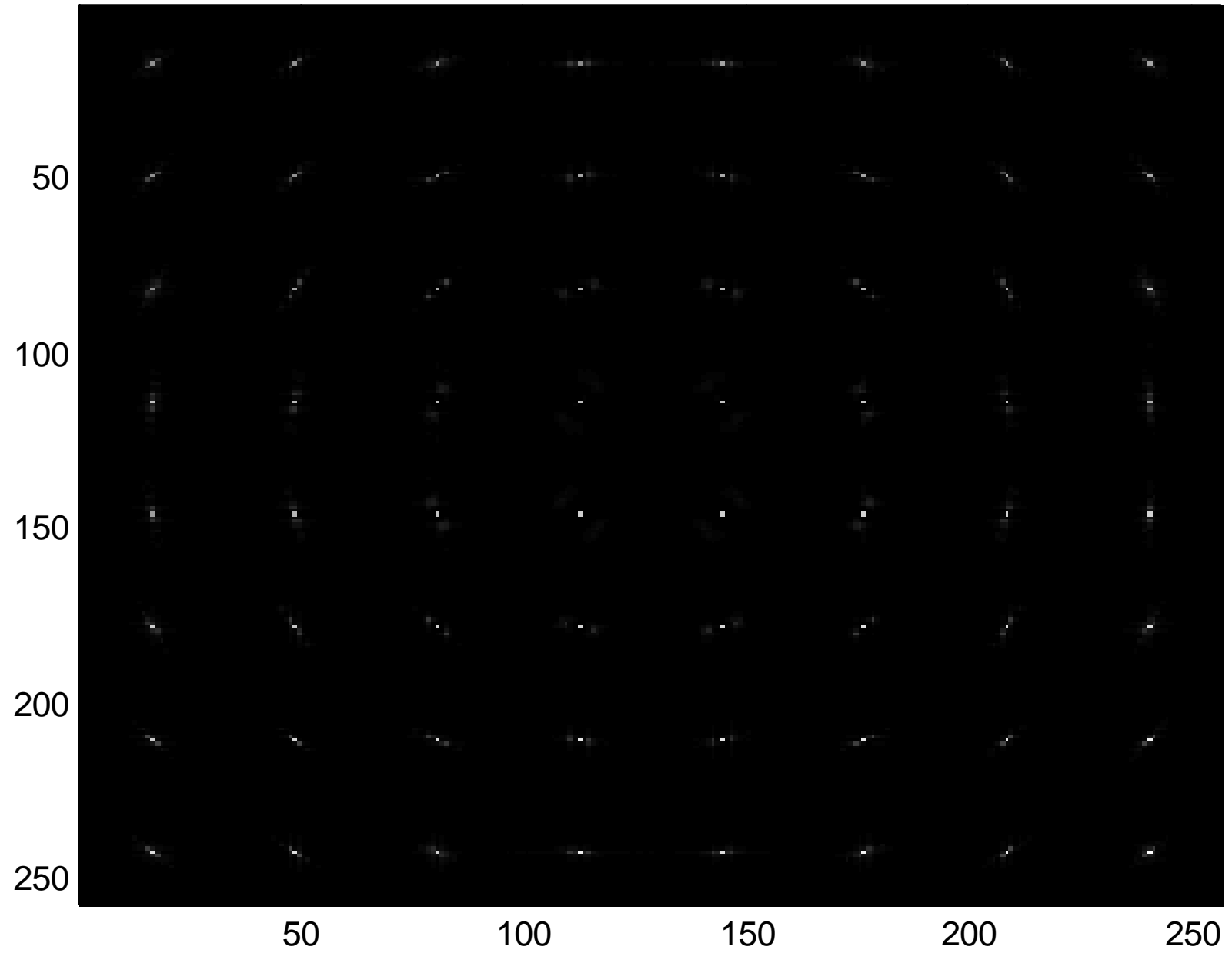


image in Fourier/frequency domain - block processed 32x32



```

clear all; close all;
x=imread('DSC03853.JPG');
x=rgb2gray(x);
figure(1),imagesc(x),title('input image'),colormap('gray');
x=double(x);

xf=fftshift(abs(fft2(x)));
figure(2),imagesc(xf),title('fourier transform of input image');
figure(3),mesh(xf),title('fourier transform of input image');

xf_norm=fftshift(abs(fft2(double(x-mean(mean(x))))));
figure(4),imagesc(xf_norm),title('fourier transform of image with zero mean');
figure(5),mesh(xf),title('fourier transform of image with zero mean');

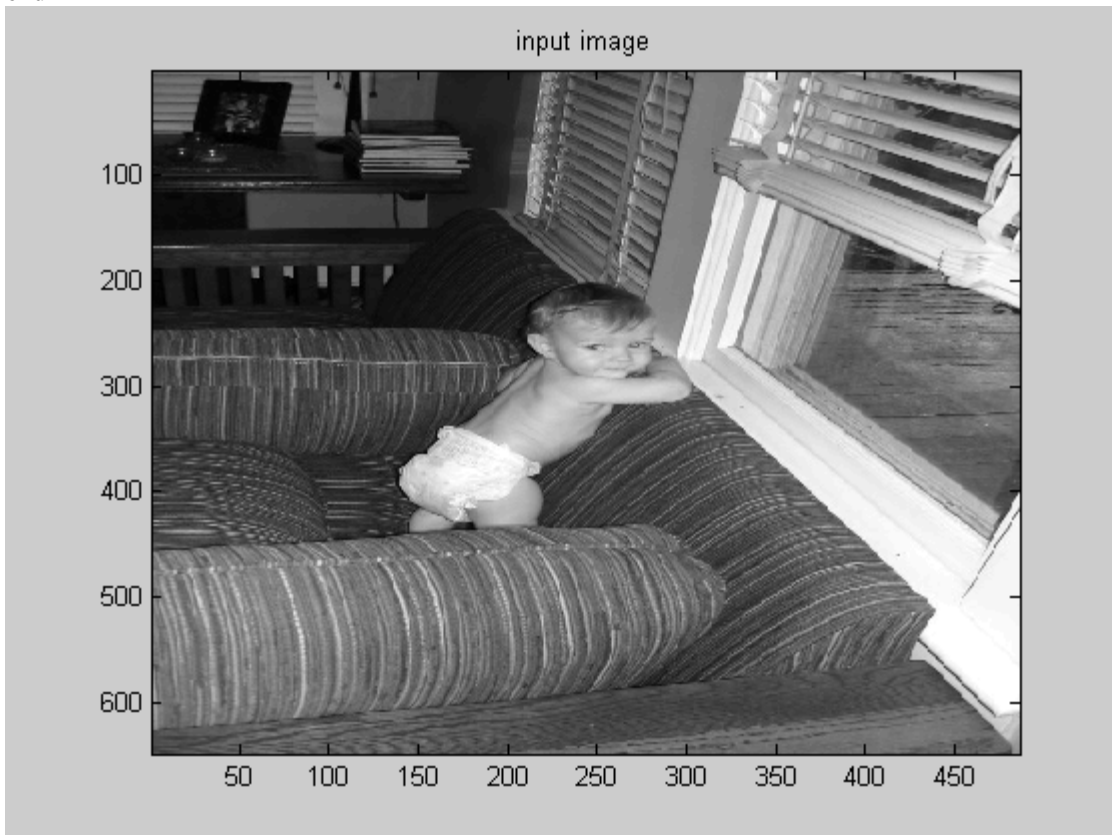
clip_value=0.01;
xf_clip=xf;
locs=find(xf >= clip_value*max(max(xf)));
xf_clip(locs)=clip_value*max(max(xf));
figure(6),imagesc(xf_clip),title('fourier transform of image with zero mean clipped to 0.01 of max');
figure(7),mesh(xf_clip),title('fourier transform of image with zero mean clipped to 0.01 of max');

xf_1=double(x);
fun=@fft2;
xf_64=blkproc(xf_1,[64,64],fun);
figure(8),imagesc(abs(xf_64)),title('64x64 block fourier transform');

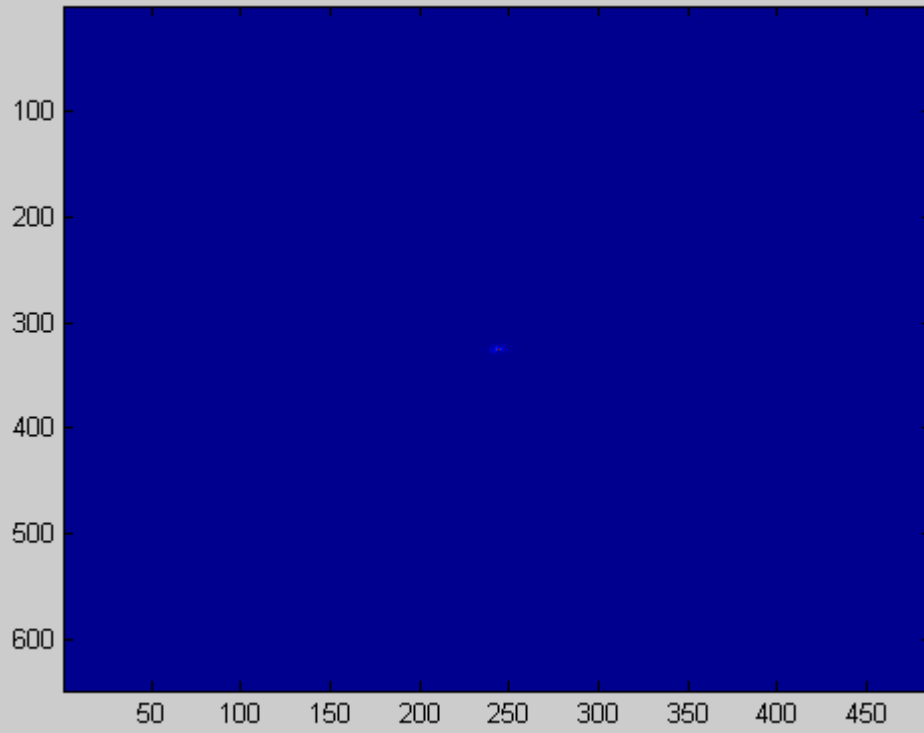
fun=inline('fftshift(abs(fft2(double(x-mean(mean(x))))));
xf2_64=blkproc(xf_1,[64,64],fun);
figure(9),imagesc(xf2_64),title('64x64 block fourier transform of image with zero mean');

for n=[32, 64, 128, 256]
    xf_block=blkproc(xf_1,[n,n],fun);
    figure(n),imagesc(xf_block),title([num2str(n), 'x', num2str(n), ' block fourier transform of image with zero mean']);
    pack
end

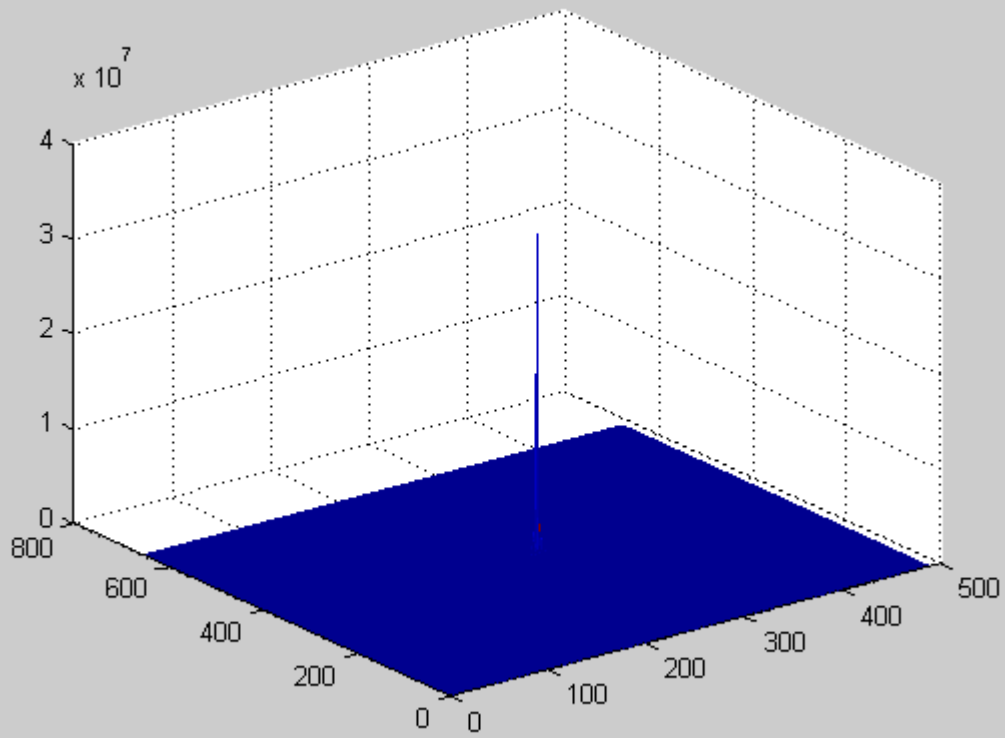
```



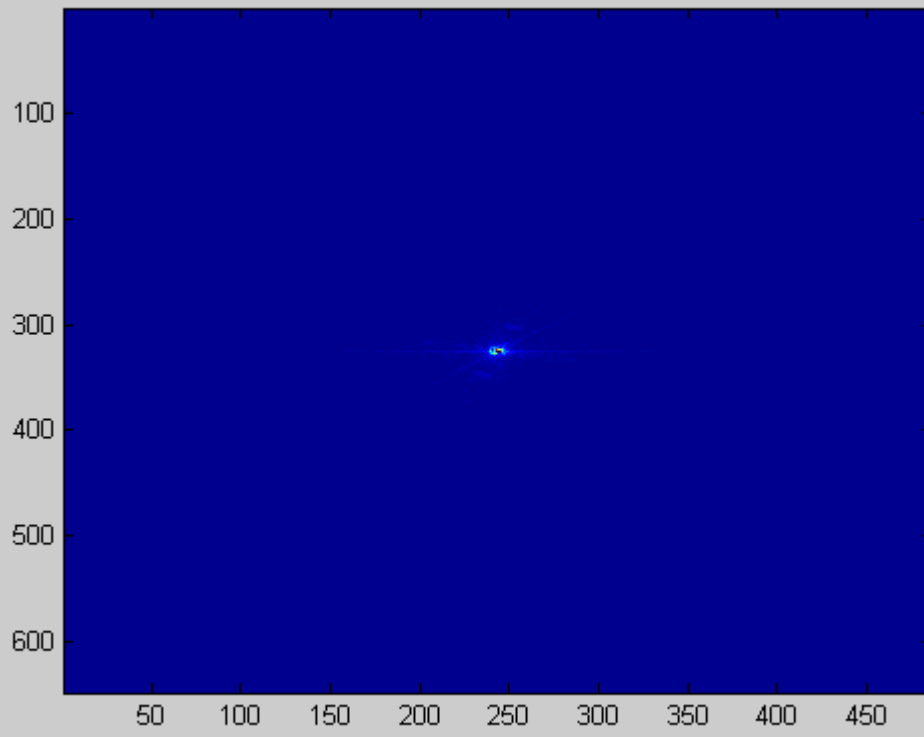
fourier transform of input image



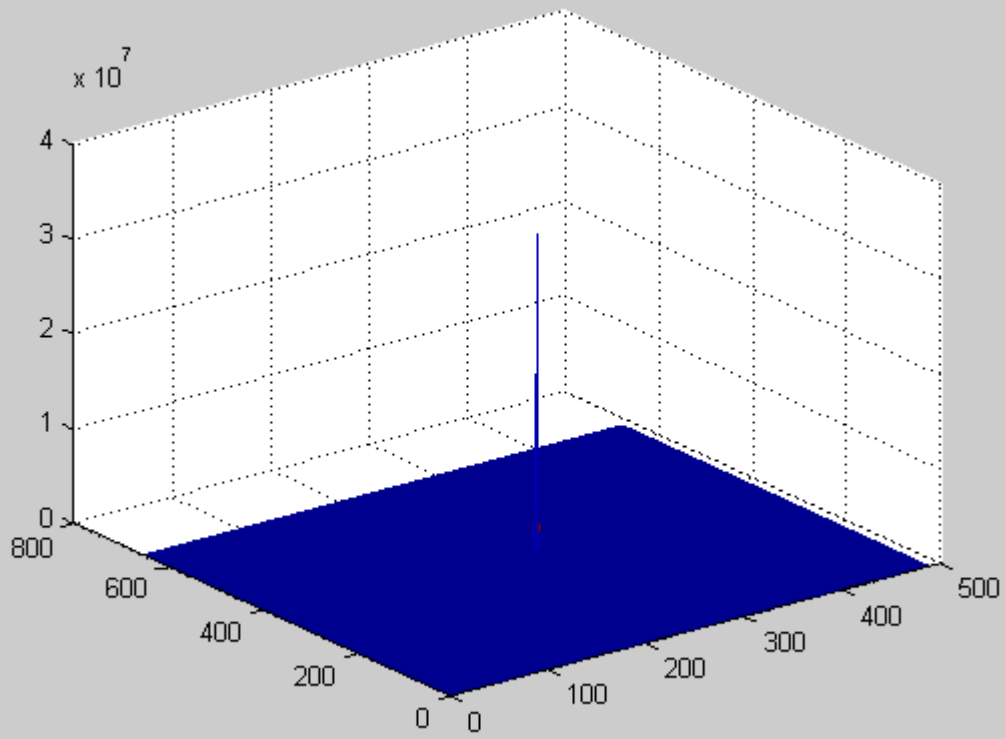
fourier transform of input image



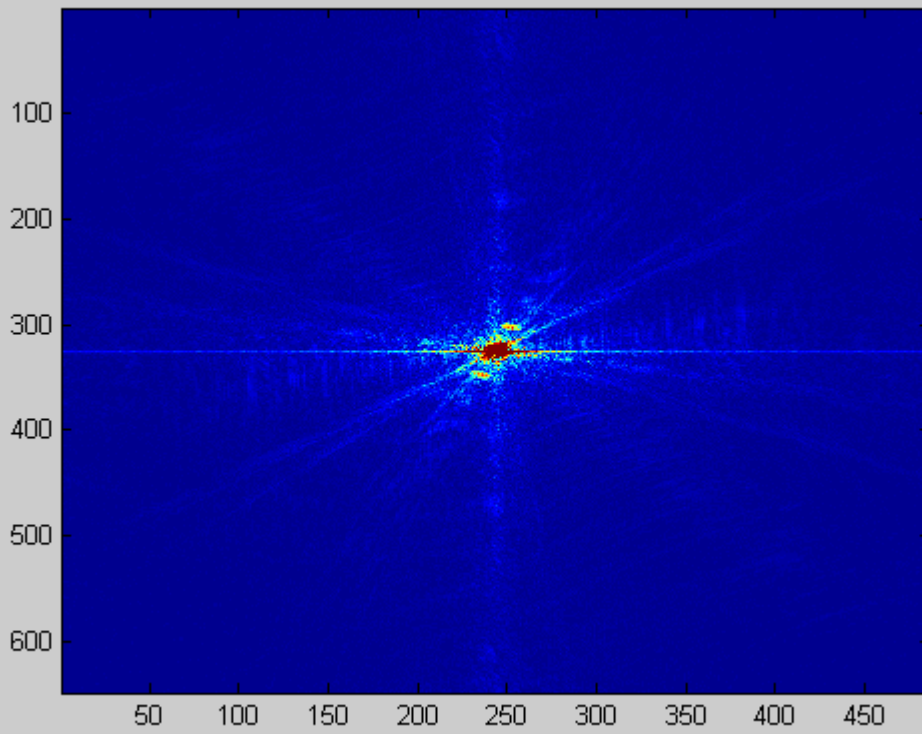
fourier transform of image with zero mean



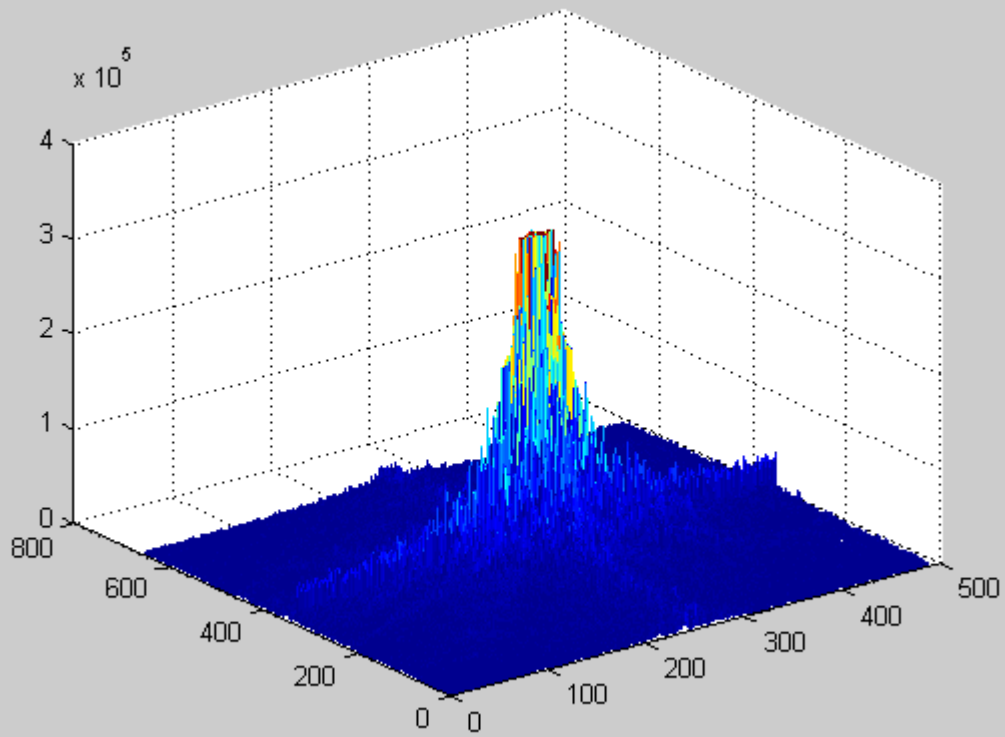
fourier transform of image with zero mean



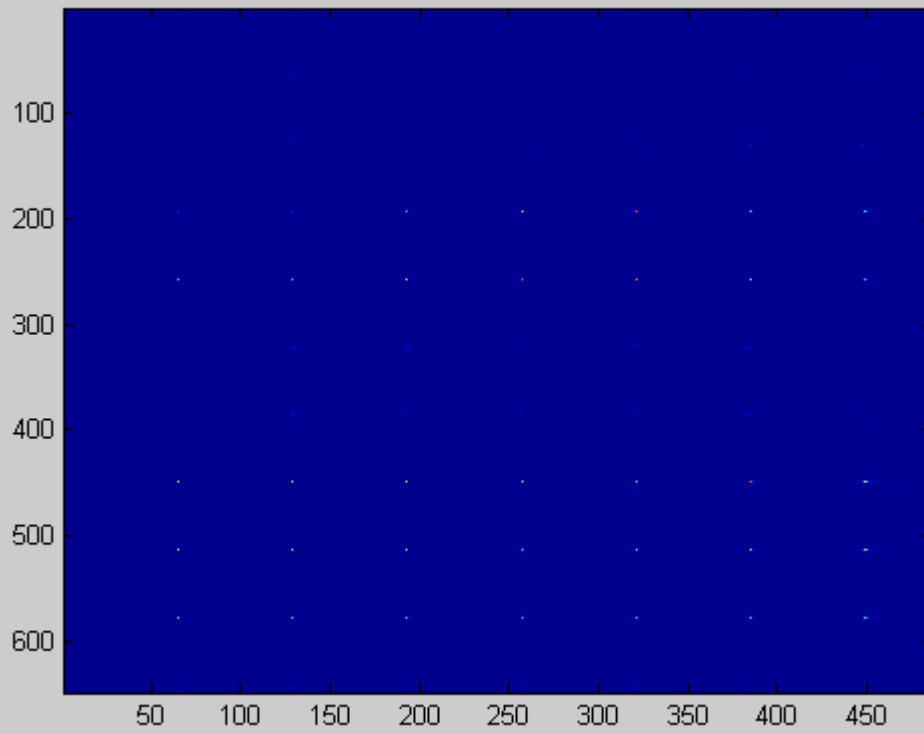
fourier transform of image with zero mean clipped to 0.01 of max



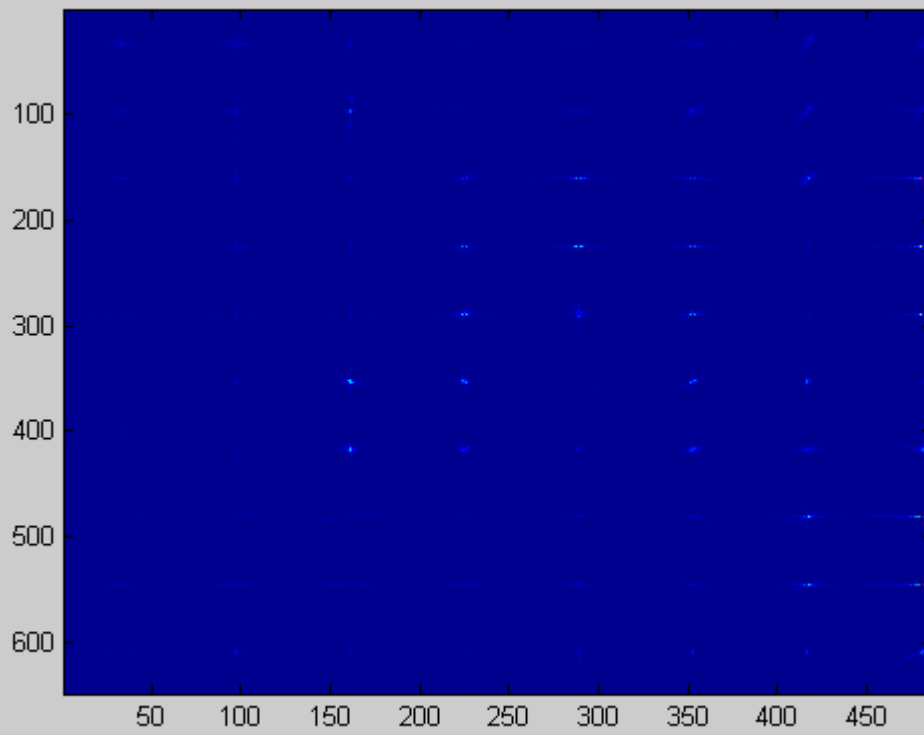
fourier transform of image with zero mean clipped to 0.01 of max



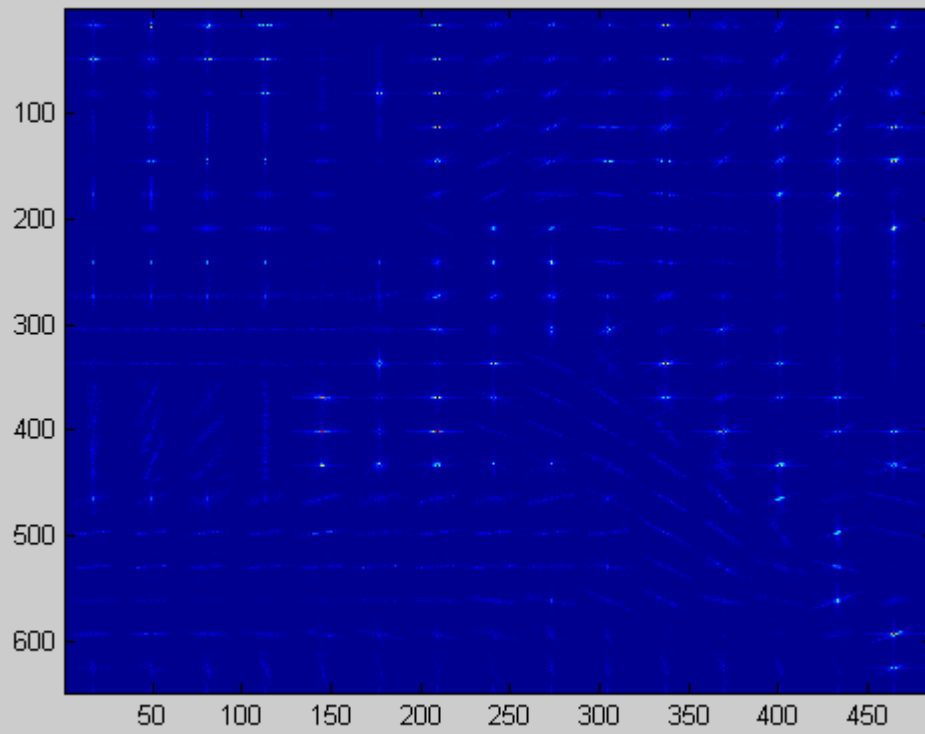
64x64 block fourier transform



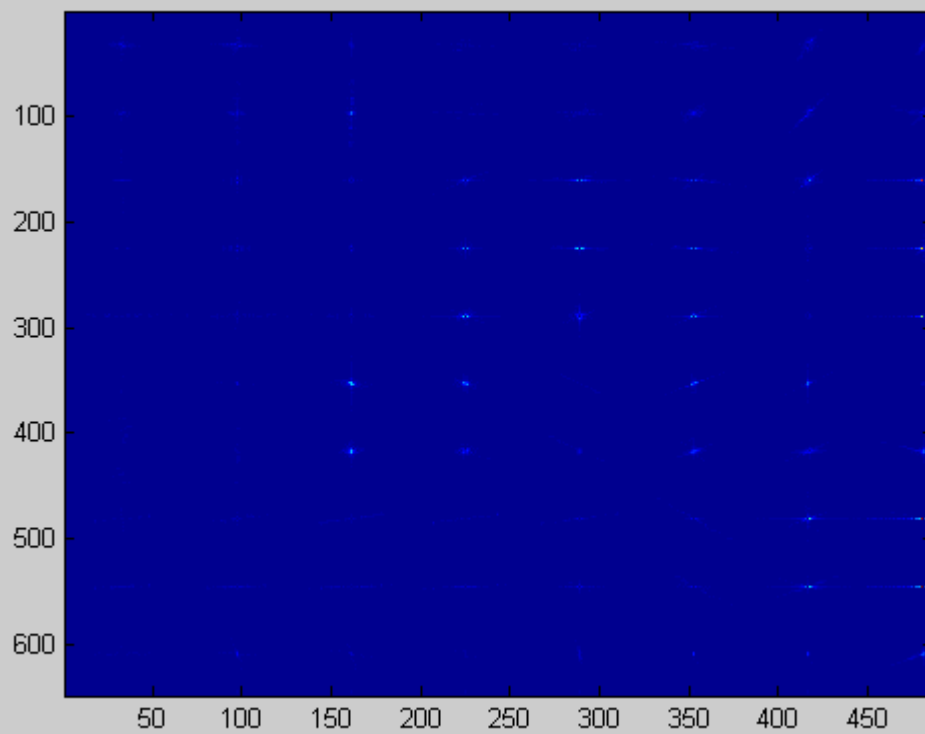
64x64 block fourier transform of image with zero mean



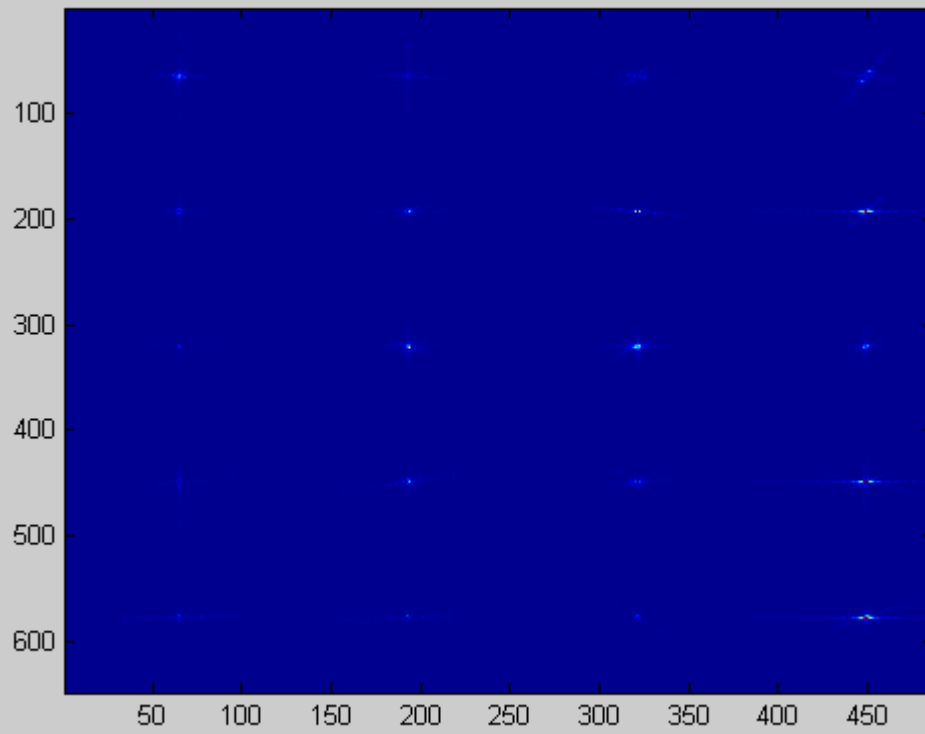
32x32 block fourier transform of image with zero mean



64x64 block fourier transform of image with zero mean



128x128 block fourier transform of image with zero mean



256x256 block fourier transform of image with zero mean

