01418385 Digital Image Processing

Department of Computer Science
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Lab 6 Periodic noise
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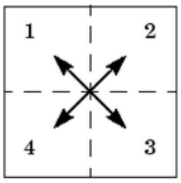
Due Date: Monday, February 24th, 2020

2D Discrete Fourier Transform

MATLAB functions	Example
`Y = fftshift(X)`	`Shift zero-frequency component to center of spectrum.`
`imshow(log(abs(Y)),[]);`	
`X = ifftshift(Y)`	`Inverse FFT shift`



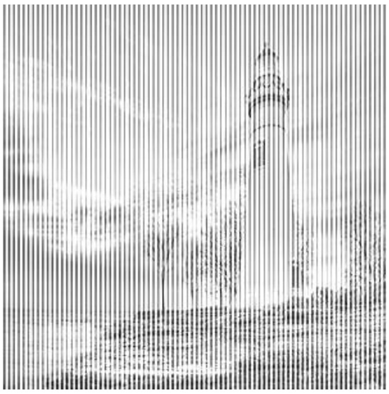
Periodic noise generation

$$f(y,\,x) = 128\ \times (A \cdot cos\left[\frac{2\pi(ux+vy)}{N}\right] + A \cdot \sin\left[\frac{2\pi(ux+vy)}{N}\right] + 1)$$

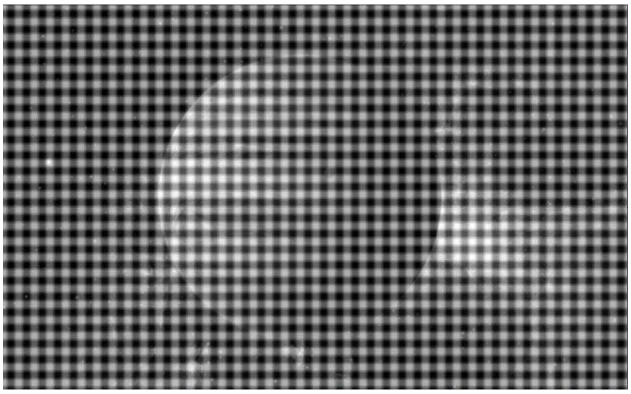
where u and v are x-axis and y-axis spatial frequency parameters, respectively; A is an amplitude; N is a dimension of input image.

For example

u = 40; v = 40; A = 0.70717;



u = 80; v = 0; A = 0.70717;

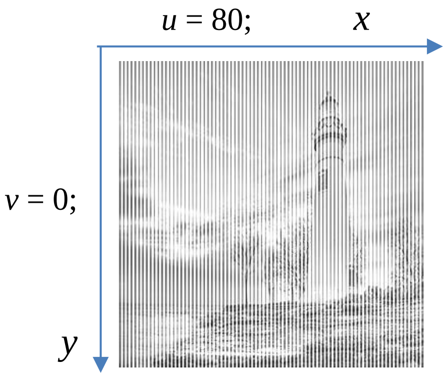


u = 40; v = 0; A = 1;
u = 0; v = 40; A = 1;

READ INPUT :

```
load('jupiterbwnoisy.mat');
fftR = fft2(imNoisy);
figure(1); imshow(imNoisy,[]);
figure(2); imshow(log(abs(fftshift(fftR))),[]);
```

PERIODIC NOISE PATTERN



```
for y=1:N
    for x=1:N
        vertical(y,x) = 128 * (A*cos((2*pi*(u*x + v*y))/N)+
                               A*sin((2*pi*(u*x + v*y))/N)+1);
    end
end

fftA = fft2(double(vertical(1:W,1:H)));
```