Quiz 3 Results for Stephen Giang

Score for this quiz: **6** out of 11
Submitted Nov 18 at 3:09pm
This attempt took 25 minutes.

Question 1   1 / 1 pts

An image consists of a single row f(x) with value f(0)=f(1)=f(3) =0 and f(2)= 120. Which of the following is the Fourier Transform F(1) of the image?

F(u)=(1/n) sum_(x=0) to (x=n-1) f(x)e^(-j2piux/n)

Correct!   ⦿ F(1)=-30

○ F(1)=30j

○ F(1)=30(1+j)

○ F(1)=-30

○ F(1)=-30 j
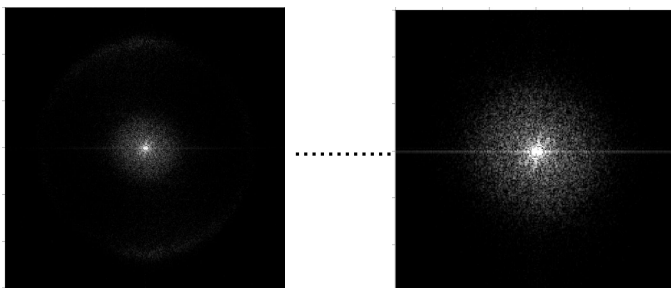
○ F(1=30 (1-j)

Question 2   1 / 1 pts

Fa(u,v)   Fb(u,v)

Fa(u,v) and Fb(u,v) above are the Fourier Transform display of the same image f(x,y). Which of the following is correct?

○ Fb(u,v) = 64*Fa(u,v)

○ Fb(u,v) = Fa(u,v)+log(Fa(u,v))

○ Fa(u,v)=log(Fb(u,v)+1)

Correct!

◉ Fb(u,v) = log(Fa(u,v)+1)

Question 3

0 / 2 pts

Which of the following statement(s) is (are) correct? Chose all correct answers.

You Answered

☑ Suppose that the Fourier transform of an image f(x,y) is F(u,v). However, f(x,y) has been accidentally deleted. We can recover f(x,y) by taking the inverse Fourier transform of magnitude of F(u,v).

☐ Fourier magnitude |F(u,v)| is obtained from Fourier transform by setting the imaginary part of F(u,v) to zero.

☐ Suppose F(u,v) and H(u,v) are the Fourier transforms of the image and the filter, respectively. Then to get the Fourier transform of the filtered image, F(u,v) must be convolved with H(u,v).

Correct!

☑ Fourier Transform of an image is periodic and symmetric

Correct!

☑ To bring the Fourier spectrum to the center of the (u,v) plane, the image f(x,y) must be multiplied by -1 if (x+y) is odd before taking the transform.

You Answered

☑ Fourier transform symmetry implies that F(u,v)=-F(u,v).

Question 4

0 / 1 pts

Which of the following answers is the main reason for bit reversal in FFT?

○ The bits representing the value of f(x,y) are not in correct order.

○ Fourier transform is periodic and symmetric.

◉ Recursion used in FFT causes the bits representing F(u,v) become out of order.

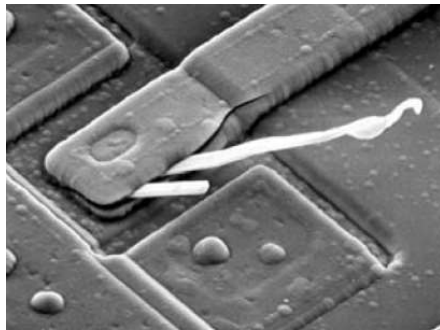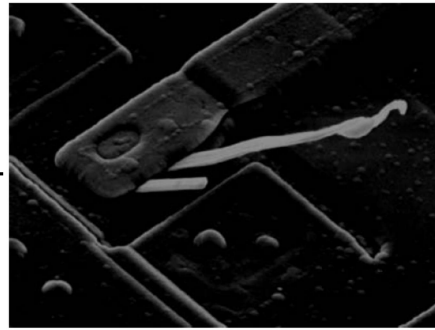○ The appropriate elements of f(x,y) are not adjacent after decomposition of F(u,v) into odd and even functions.

Question 5

1 / 2 pts

Image B is obtained from image A by applying the filter H(0,0)=0, and H(u,v)= 1 for all other u and v. Which of the following is (are) correct about these images. Choose all correct answers.

A   ....   B

☐ B is obtained from A by applying Sobel edge detection to A

☐ B is a low passed version of A

☐ B is obtained from A by first getting the average value of pixels in A, and then subtracting this average from every pixel of A.

☐ B is obtained from A by first blurring it using an average filter then applying edge detection to the blurred image.

Correct! ☑ B is a high passed version of A

Question 6

⚠ **This question has been regraded.**

Consider the filter described by
$H(u, v) = \cos(u^2 + v^2)$ for $u^2 + v^2 < \frac{\pi}{2}$ and $H(u, v) = 0$ $otherwise$

The above filter is a

☐ High pass filter

Correct! ☑ Low pass filter

☐ Band pass filter

☐ Band Stop filter

Question 7

1 / 1 pts

The ringing effect appear in the filtered image as a result of applying

○ Butterworth low pass filter

○ Gaussian high pass filter with a low cutoff frequency

Correct! ⦿ A filter H(u,v) with the characteristics H(u,v) =1 for r1^2<(u^2+v^2)<r2^2 and zero elsewhere; where r1 and r2 are some integers and ^ denotes "to the power of".

○ Butterworth bandpass filter with a low cutoff frequency

Question 8

An image is filtered by a lowpass filter. Which of the following(s) is (are) true about Fourier power spectrum? Select all correct answers.

Correct Answer
☐ By taking the more power, the filtered image becomes less blurry.

Correct!
☑ The power is a measure of the information contents of the image.

Correct Answer
☐ The power increases as the radius of the lowpass filter increases.

Correct!
☑ The power is the addition of square of real part of F(u,v) and the square of the imaginary part of F(u,v) summed over for all u and v.

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