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Batch: K5

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**DFT:**

clear all

clc

x\_n = [1,1,1,0];

N= 4;

K = 0:N-1;

X\_k\_inbuilt = fft(x\_n, N);

mag\_X\_k\_in = abs(X\_k\_inbuilt);

phase\_X\_k\_in = angle(X\_k\_inbuilt);

X\_k = zeros(1,N);

for k= 1:N

for n= 1:N

X\_k(1,k) = X\_k(1,k) + x\_n(n)\*exp(-(1j\*2\*pi\*(k-1)\*(n-1))/N);

end

end

mag\_X\_k = abs(X\_k);

phase\_X\_k = angle(X\_k);

subplot(2,3,1)

stem(K,mag\_X\_k\_in)

title('FFT(N=4)')

xlabel('k')

ylabel('Magnitude')

subplot(2,3,4)

stem(K,phase\_X\_k\_in)

title('FFT(N=4)')

xlabel('k')

ylabel('Phase')

subplot(2,3,2)

stem(K, mag\_X\_k)

title('DFT(N=4)')

xlabel('k')

ylabel('Magnitude')

subplot(2,3,5)

stem(K, phase\_X\_k)

title('DFT(N=4)')

xlabel('k')

ylabel('Phase')

hold on

N1=8;

K1=0:N1-1;

X\_k1 = zeros(1,N1)

x\_n1 = [1,1,1,0,0,0,0,0];

for k= 1:N1

for n= 1:N1

X\_k1(1,k) = X\_k1(1,k) + x\_n1(n)\*exp(-(1j\*2\*pi\*(k-1)\*(n-1))/N1);

end

end

mag\_X\_k1 = abs(X\_k1);

phase\_X\_k1 = angle(X\_k1);

subplot(2,3,3)

stem(K1,mag\_X\_k1)

title('DFT(N=8)')

xlabel('k')

ylabel('Magnitude')

subplot(2,3,6)

stem(K1,phase\_X\_k1)

title('DFT(N=8)')

xlabel('k')

ylabel('Phase')

clear all

clc

X\_k = [3+0i,0-1i,1+0i,0+1i];

N= 4;

n1 = 0:N-1;

x\_n\_inbuilt = ifft(X\_k, N);

mag\_x\_n\_in = abs(x\_n\_inbuilt);

phase\_x\_n\_in = angle(x\_n\_inbuilt);

x\_n = zeros(1,N);

for n= 1:N

for k= 1:N

x\_n(1,n) = x\_n(1,n) + X\_k(k)\*exp((1j\*2\*pi\*(k-1)\*(n-1))/N);

end

end

x\_n = x\_n./N;

mag\_x\_n = abs(x\_n);

phase\_x\_n = angle(x\_n);

subplot(2,2,1)

stem(n1,mag\_x\_n\_in)

title('IFFT(N=4)')

xlabel('n')

ylabel('Magnitude')

subplot(2,2,3)

stem(n1,phase\_x\_n\_in)

title('IFFT(N=4)')

xlabel('n')

ylabel('Phase')

subplot(2,2,2)

stem(n1,mag\_x\_n)

title('IFT(N=4)')

xlabel('n')

ylabel('Magnitude')

subplot(2,2,4)

stem(n1,phase\_x\_n)

title('IFT(N=4)')

xlabel('n')

ylabel('Phase')

IFT:

clear all

clc

X\_k = [3+0i,0-1i,1+0i,0+1i];

N= 4;

n1 = 0:N-1;

x\_n\_inbuilt = ifft(X\_k, N);

mag\_x\_n\_in = abs(x\_n\_inbuilt);

phase\_x\_n\_in = angle(x\_n\_inbuilt);

x\_n = zeros(1,N);

for n= 1:N

for k= 1:N

x\_n(1,n) = x\_n(1,n) + X\_k(k)\*exp((1j\*2\*pi\*(k-1)\*(n-1))/N);

end

end

x\_n = x\_n./N;

mag\_x\_n = abs(x\_n);

phase\_x\_n = angle(x\_n);

subplot(2,2,1)

stem(n1,mag\_x\_n\_in)

title('IFFT(N=4)')

xlabel('n')

ylabel('Magnitude')

subplot(2,2,3)

stem(n1,phase\_x\_n\_in)

title('IFFT(N=4)')

xlabel('n')

ylabel('Phase')

subplot(2,2,2)

stem(n1,mag\_x\_n)

title('IFT(N=4)')

xlabel('n')

ylabel('Magnitude')

subplot(2,2,4)

stem(n1,phase\_x\_n)

title('IFT(N=4)')

xlabel('n')

ylabel('Phase')