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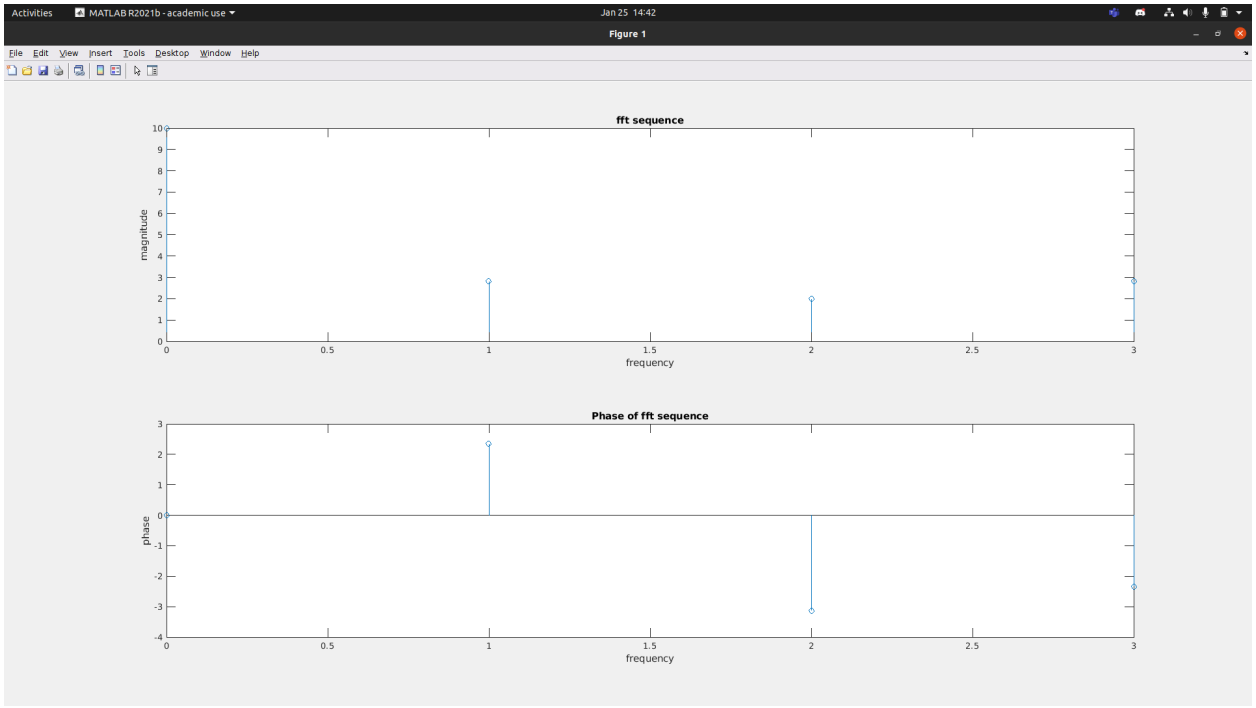
DTFT:

Code :

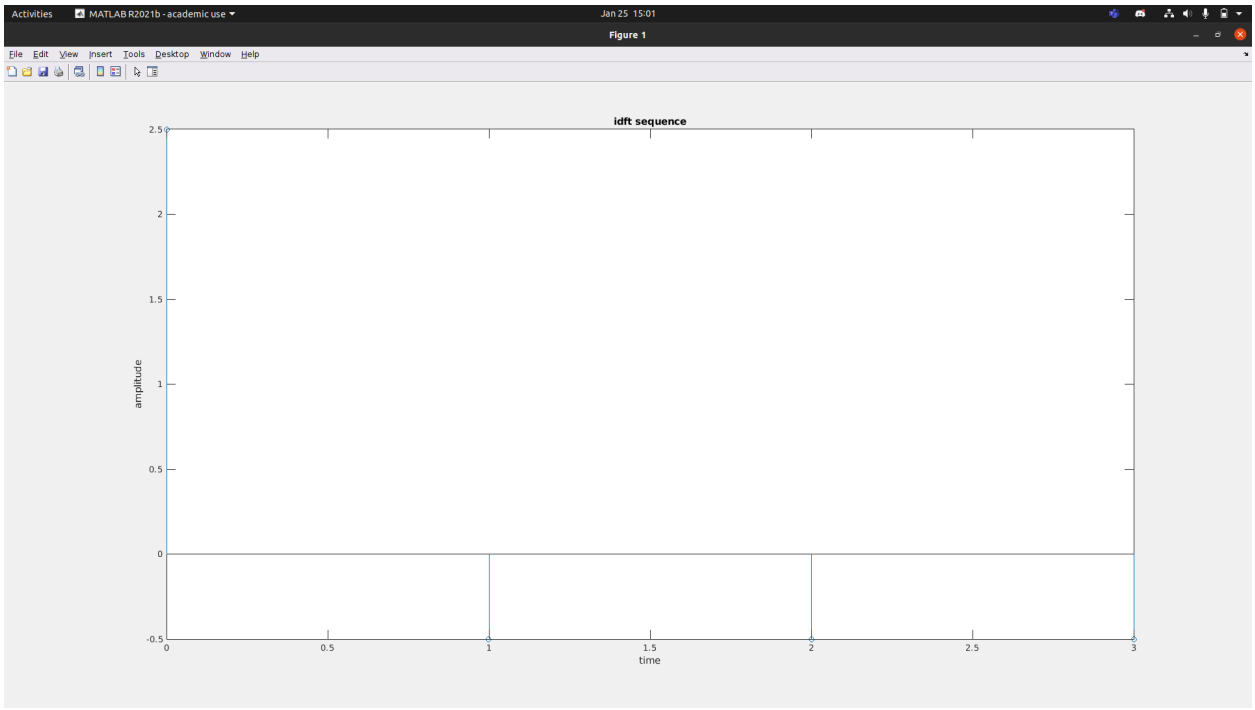
```
clc;
clear;
close all;
xn=input('enter the input sequence');
N=input('enter the no. of points');
Xk=calcdft(xn,N); %calling a function named calcdft
disp('DFT X(k)=')
disp(Xk)
magXk=abs(Xk); %magnitude of dft
phaseXk=angle(Xk);
k=0:N-1;
subplot(2,1,1);
stem(k,magXk);
title('fft sequence');
xlabel('frequency');
ylabel('magnitude');
subplot(2,1,2);
stem(k,phaseXk);
title('Phase of fft sequence');
xlabel('frequency');
ylabel('phase');
function [Xk] = calcdft(xn,N) %definition of calcdft function
L=length(xn);
if(N<L)
   error('N must be >= L');
end
x1=[xn zeros(1,N-L)]; %appending zeroes to the left over places
for k=0:1:N-1 %to keep track of values taken by k
for n=0:1:N-1 %to keep track of values taken by n
p=exp(-1i*2*pi*n*k/N); % value of (wn)^kn
T(k+1,n+1)=p; %T is the transformation matrix
end
end
disp('Transformation Matrix of DFT')
disp(T);
Xk=T*x1.'
end
```



IDFT:

```
clc;
clear;
close all;
Xk=input('enter the input sequence');
xn=calcidft(Xk);
N=length(xn);
disp('x[n]=');
disp(xn);
n=0:N-1;
stem(n,xn);
title('idft sequence');
xlabel('time');
ylabel('amplitude');
function [xn]=calcidft(Xk)
N=length(Xk);
for k=0:1:N-1
for n=0:1:N-1
p=exp(1i*2*pi*n*k/N); % value of (wn)^kn
IT(k+1,n+1)=p; %T is the transformation matrix
end
end
disp('Transformation Matrix of IDFT')
disp(IT);
```

```
xn = (IT*(Xk.'))./N;
end
```


Activities
MATLAB R2021b - academic use
Jan 25 15:01
Figure 1
File Edit View Insert Tools Desktop Window Help
idft sequence
amplitude
time
2.5
2
1.5
1
0.5
0
-0.5
0
0.5
1
1.5
2
2.5
3