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| **Roll No.**  **3575 Date of Performance: -** |
| **Title : Verifying DFT Properties Date of Checking: -** |

**Program:**

%Verifying Properties of DFT

clear all

clc

x=input('enter the input values:');

N=input('enter the N:');

L=length(x);

disp('1)Time Reversal')

disp('x((-n))N--DFT-->X((-k))')

xr=fliplr(x);

xs=circshift(xr,[1,1]);%x((-n))N-LHS

y=fft(xs,N);%DFT[LHS]=RHS

disp('DFT of LHS')

disp(y)

X=fft(x,N);

Xr=fliplr(X);

Xs=circshift(Xr,[1,1]);%X((-k))N-RHS

disp('RHS')

disp(Xs)

disp('2)Time Shift')

disp('x((n-a))N--DFT-->exp(-j2piak/N)\*X(k)')

xtsh=circshift(x,[1,2]);%LHS

xtd=fft(xtsh,N); %DFT of LHS

disp('DFT of LHS')

disp(xtd)

for k=1:N

Xtsh(k)=X(k)\*exp(((-1)\*j\*2\*pi\*2\*(k-1))/N);%RHS

end

disp('RHS')

disp(Xtsh)

disp('3)Frequency Shift')

disp('x(n)\*exp(j2pian/N)--DFT-->X((k-a))N')

for n=1:N

xtsh(n)=x(n)\*exp((j\*2\*pi\*2\*(n-1))/N);%LHS

end

disp('LHS')

xtsh

Xtsh=circshift(X,[1,2]);%RHS

Xtd=ifft(Xtsh,N);%IDFT of RHS

disp('IDFT of RHS')

disp(Xtd)

**Command Window:**

enter the input values:[1 2 3 4]

enter the N:4

1)Time Reversal

x((-n))N--DFT-->X((-k))

DFT of LHS

Columns 1 through 3

10.0000 + 0.0000i -2.0000 - 2.0000i -2.0000 + 0.0000i

Column 4

-2.0000 + 2.0000i

RHS

Columns 1 through 3

10.0000 + 0.0000i -2.0000 - 2.0000i -2.0000 + 0.0000i

Column 4

-2.0000 + 2.0000i

2)Time Shift

x((n-a))N--DFT-->exp(-j2piak/N)\*X(k)

DFT of LHS

Columns 1 through 3

10.0000 + 0.0000i 2.0000 - 2.0000i -2.0000 + 0.0000i

Column 4

2.0000 + 2.0000i

RHS

Columns 1 through 3

10.0000 + 0.0000i 2.0000 - 2.0000i -2.0000 - 0.0000i

Column 4

2.0000 + 2.0000i

3)Frequency Shift

x(n)\*exp(j2pian/N)--DFT-->X((k-a))N

LHS

xtsh =

Columns 1 through 3

1.0000 + 0.0000i -2.0000 + 0.0000i 3.0000 - 0.0000i

Column 4

-4.0000 + 0.0000i

IDFT of RHS

1 -2 3 -4

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