DIT-FFT

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```
clc();
clear;
close all;
```

Q1.

```
%Compute the 4-point DFT of the given sequence x(n) using DIT-FFT
 algorithm. Consider the sequence x(n)={1,2,3,4}.

%xn=input('Enter Input Sequence: ');
xn=[1 2 3 4 5]
N=power(2,ceil(log2(length(xn))));
z=fft(xn,N);
xn=[xn zeros(1,N-length(xn))];
xnM=bitrevorder(xn);
xKDITFFT=zeros(1,N);

for i=1:log2(N)
    count=1;
    flag=1;
    for a=1:N
        if (flag)
            xKDITFFT(1,a)=xnM(1,a)+(xnM(1,a
+(2^(i-1)))*exp(-1j*((2*pi*(count-1))/2^i)));
        else
            xKDITFFT(1,a)=xnM(1,a-(2^(i-1)))-
(xnM(1,a)*exp(-1j*((2*pi*(count-1))/2^i)));
        end
        count=count+1;
        if(mod(count,(2^(i-1))+1)==0)
            count=1;flag=~flag;
        end
    end
    xnM=xKDITFFT;
    fprintf('After Stage %d :',i);
    disp(xKDITFFT);

end
fprintf('DIT FFT Values are :');
disp(xnM);
fprintf('DIT FFT Values using FFT are:');
disp(z);


xn =

     1     2     3     4     5
```

```
After Stage 1 :      6     -4      3      3      2      2      4      4

After Stage 2 :   Columns 1 through 4

   9.0000 + 0.0000i   -4.0000 - 3.0000i   3.0000 + 0.0000i   -4.0000 +
 3.0000i

  Columns 5 through 8

   6.0000 + 0.0000i   2.0000 - 4.0000i   -2.0000 + 0.0000i   2.0000 +
 4.0000i

After Stage 3 :   Columns 1 through 4

  15.0000 + 0.0000i   -5.4142 - 7.2426i   3.0000 + 2.0000i   -2.5858 -
 1.2426i

  Columns 5 through 8

   3.0000 + 0.0000i   -2.5858 + 1.2426i   3.0000 - 2.0000i   -5.4142 +
 7.2426i

DIT FFT Values are :   Columns 1 through 4

  15.0000 + 0.0000i   -5.4142 - 7.2426i   3.0000 + 2.0000i   -2.5858 -
 1.2426i

  Columns 5 through 8

   3.0000 + 0.0000i   -2.5858 + 1.2426i   3.0000 - 2.0000i   -5.4142 +
 7.2426i

DIT FFT Values using FFT are:   Columns 1 through 4

  15.0000 + 0.0000i   -5.4142 - 7.2426i   3.0000 + 2.0000i   -2.5858 -
 1.2426i

  Columns 5 through 8

   3.0000 + 0.0000i   -2.5858 + 1.2426i   3.0000 - 2.0000i   -5.4142 +
 7.2426i
```

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