**MATLAB Code**

%Experiment 5: Divide and Conquer Approach for DFT %Date: 04/03/2020

%dividenconquer.m

function out = dividenconquer(x)

N = length(x);

l = unique(factor(N));

L = 1;

for i= 1:length(l)

L=L\*l(i);

end

M = N/L;

x = reshape(x,L,M);

for i=1:L

x(i,:) = dft(x(i,:),M);

end

for p = 1:L

for q = 1:M

x(p,q) = x(p,q)\*exp(-1i\*2\*pi\*(p-1)\*(q-1)/N);

end

end

for i=1:M

x(:,i) = dft(x(:,i),L);

end

X = [];

for i = 1:L

X = [X x(i,:)];

end

out = X;

%main.m

clc;

clear all;

close all;

x = cos(2\*[1:200]\*pi/4); %Signal

figure();

subplot(311);

stem(x);

title("Signal: cos(2nPi/4)");

xlabel n;

ylabel x[n];

subplot(312)

stem(dividenconquer(x));

title("DFT using Divide and Conquer Approach");

xlabel n;

ylabel X[n];

subplot(313)

stem(fft(x));

title("DFT using MATLAB inbuilt FFT function");

xlabel n;

ylabel X[n];