function [ DFT\_vector ] = DFT( y )

one = ones(size(y))';

y\_2D = (one\*y)';

N = length(y);

n = 0:N-1;

k = n';

e = exp(-i\*k\*n\*2\*pi/N);

Y = y\_2D .\* e;

DFT\_vector = sum(Y);

end

>>y = 0:1000;

>> tic;

>> profile on;

>> our\_function = DFT(y);

>> profile viewer

>> toc;

>> tic;

>> fft\_function = fft(y);

>> toc;

>> fs=8000;

>> To=0.004;

>> Ts=1/fs;

>> N=32;

>> y=1:32;

>> y=y\*Ts;

>> z=rect(y);

>> Y=fft(z);

>> x=linspace(0,To,N);

>> stem(x,z);

>> stem(x,Y);

>> stem(x,abs(Y));

function [ outp ] = rect( x )

max = 2/1000;

outp = x<=max;

end

>> hfile='C:\Program Files\MATLAB\R2014a\touchtone1.wav';

>> [y,Fs]=audioread(hfile);

>> soundsc(y,Fs);

C

>> Ts=1/Fs;

>> N=length(y)-1;

>> To=N\*Ts;

>> n=0:Ts:To;

>> n=n.\*Ts;

>> plot(n,y);

D

>> f0=1/To;

>> X=0:f0:Fs;

>> subplot(2,1,1);

>> plot(X,abs(fft(y)));

>> subplot(2,1,2);

>> plot(X,abs(fft(y)));

>> xlim([0,4096]);