

# ECE 311 Lab 5

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1 function [ X ] = myFFT( x )
3 N = length(x); % get length
4 if(N>= 2)
5     if(mod(N,2)) % base case
6         X = myDFT(x);
7     else
8         Xe = myFFT(x(1:2:N-1));
9         Xo = myFFT(x(2:2:N));
10        X = [Xe, Xe] + exp(-1i*2*pi*(0:N-1)/N) .* [Xo,Xo];
11    end
12 else
13     X = myDFT(x);
14 end
15 end
16 function [ K ] = myDFT( n )
17 K = zeros(1,size(n,2)); % default K to size of n initialized to
18     zero
19 for f = 0:(size(n,2) -1 ) % k loop
20     for j = 0:(size(n,2) -1 ) % n loop
21         K(f+1) = K(f+1) + (n(j + 1) * exp((-1i*2*pi*f*j)/size(
22             n,2)));
23     end
24 end
25 end

```

myFFT.m

Above is the recursive Fast Fourier Transform that runs in  $O(n \log(n))$  rather than the original DFT which ran in  $O(n^2)$