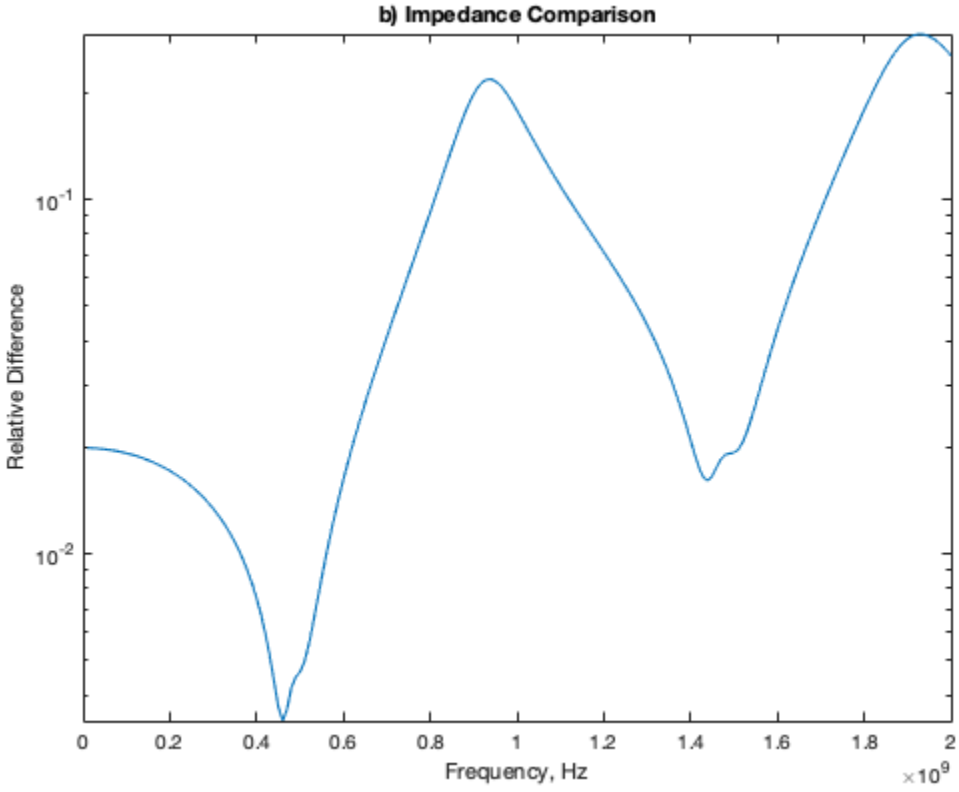
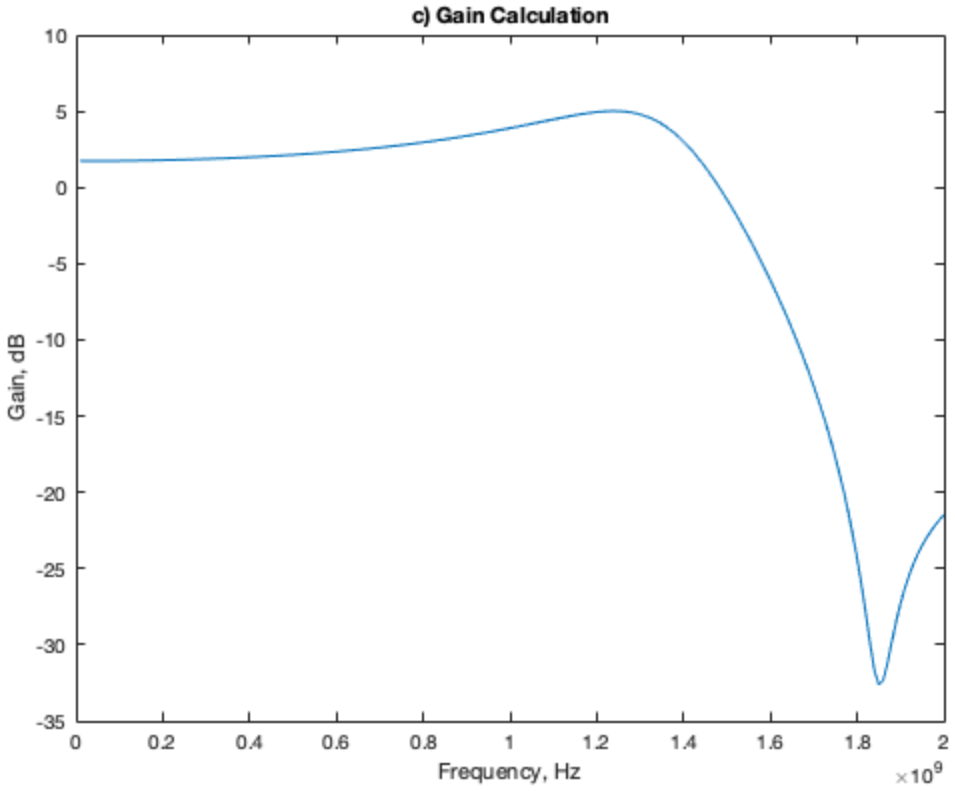
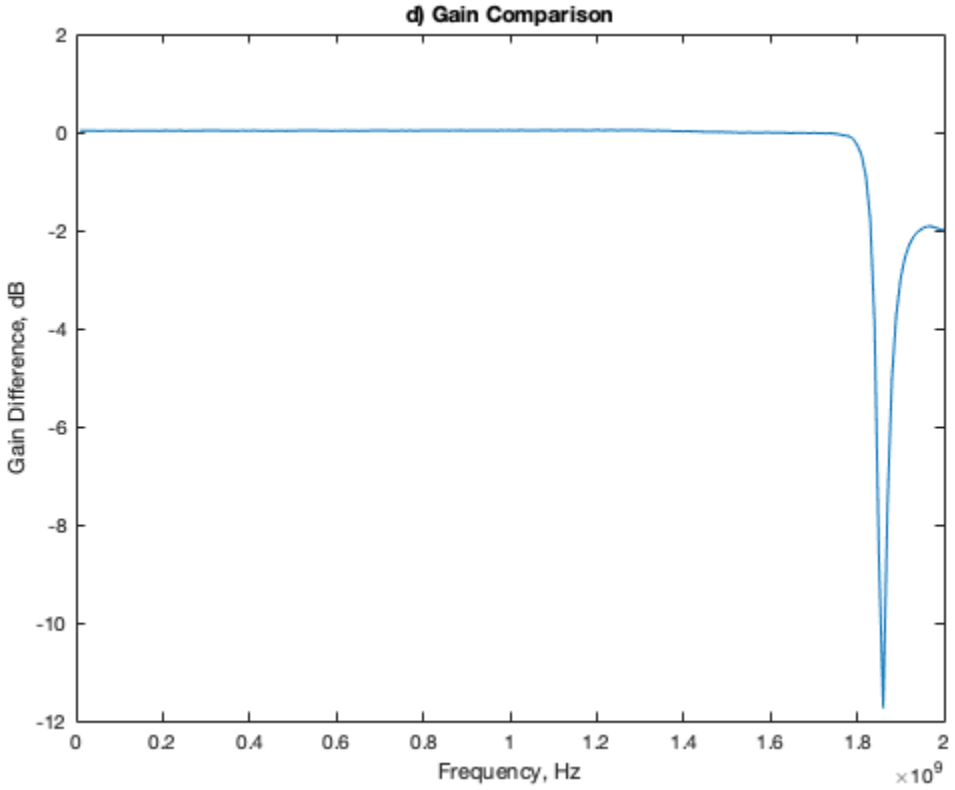
ECE 6370 - Homework 5.2

Caitlyn Caggia

```
clear all; close all;
addpath('../Problem1/Matlab_NEC')

d = dipole('Length',30/100,'Width',2*0.2/1000);

% Part A: Impedance
freq = 10e6:10e6:2e9;

figure;
Zmat = impedance(d,freq);

% Part B: Impedance Comparison
load NecValues.mat Z gain_t
R = abs((Z-Zmat) ./ (Z+Zmat));

figure;
semilogy(freq, R);
title('b) Impedance Comparison');
xlabel('Frequency, Hz');
ylabel('Relative Difference');

% Part C: Gain
Gmat = zeros(1,length(freq));
for i = 1:length(freq)
    [Gmat(i),~,~] = pattern(d,freq(i),0,0);
end

figure;
plot(freq,Gmat);
title('c) Gain Calculation');
xlabel('Frequency, Hz');
ylabel('Gain, dB');

% Part D: Gain Comparison
deltaG = gain_t - Gmat;

figure;
plot(freq,deltaG);
title('d) Gain Comparison');
xlabel('Frequency, Hz');
ylabel('Gain Difference, dB');
```


b) Impedance Comparison
Relative Difference
10^{-1}
10^{-2}
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Frequency, Hz
$\times 10^9$


c) Gain Calculation
Gain, dB
Frequency, Hz
×10^9
10
5
0
-5
-10
-15
-20
-25
-30
-35
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2


d) Gain Comparison
Gain Difference, dB
Frequency, Hz
×10^9
2
0
-2
-4
-6
-8
-10
-12
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2

Published with MATLAB® R2018a