clear

clc

clf

%values for our low pass filter%

r = 50; %ohms%

c = 1\*(10^-9); %farads%

% freq = (0:0.1:10); %100 increments for accuracy

freq = linspace(0, 10, 101);

w = freq\*2\*(pi)\*(10^6);

res = 1./(1+(j\*(w\*r\*c)));

res2 = repelem(0.5,101);

plot(freq,real(res),'r',freq,res2,'--')

xlabel('Frequency((10^6)Hz)');

ylabel('Gain [v0/vi] (V)');

title('The Gain of a Low Pass Filter');

%grid minor; % Optional

grid;

clear

clc

% clf

%values for our low pass filter%

r = 50; %ohms%

c = 1\*(10^-9); %farads%

% freq = (0:0.1:10); %100 increments for accuracy

freq = linspace(0, 10, 101);

w = freq\*2\*(pi)\*(10^6);

res = 1./(1+(j\*(w\*r\*c)));

res2 = repelem(0.5,101);

%plot(freq,real(res),'r',freq,res2,'--')

X1=[freq]; %X doesnt change

YMatrix1=[res;res2]; %Stack them like this

createfigure1(X1,YMatrix1)

function createfigure1(X1, YMatrix1)

%CREATEFIGURE1(X1, YMatrix1)

% X1: vector of x data

% YMATRIX1: matrix of y data

% Auto-generated by MATLAB on 14-Jan-2020 21:53:57

% Create figure

figure1 = figure;

% Create axes

axes1 = axes('Parent',figure1);

hold(axes1,'on');

% Create multiple lines using matrix input to plot

plot1 = plot(X1,YMatrix1);

set(plot1(1),'Color',[1 0 0]);

set(plot1(2),'LineStyle','--');

% Create ylabel

ylabel('Gain [v0/vi] (V)');

% Create xlabel

xlabel('Frequency((10^6)Hz)');

% Create title

title('The Gain of a Low Pass Filter');

box(axes1,'on');

grid(axes1,'on');

% Create textarrow

annotation(figure1,'textarrow',[0.501785714285714 0.380357142857143],...

[0.665666666666667 0.530952380952381],'String',{'Gain of 0.5'});

end

%Ece2412 lab 1

clear

clc

clf

close all

%values for our low pass filter%

r = 50; %ohms%

c = 1\*(10^-9); %farads%

% freq = (0:0.1:10); %100 increments for accuracy

freq = linspace(0, 10, 101);

w = freq\*2\*(pi)\*(10^6);

res = 1./(1+(1j\*(w\*r\*c)));

res2 = repelem(0.5,101);

%freq = log(freq);

semilogx(freq,real(res),'r',freq,res2,'--')

xlabel('Frequency MHz');

ylabel('Gain [v0/vi] (V)');

title('The Gain of a Low Pass Filter');

%grid minor; % Optional

grid;

%Ece2412 lab 1, case B part 1

clear

clc

clf

close all

%values for our low pass filter%

r = 50; %ohms%

c = 1\*(10^-9); %farads%

% freq = (0:0.1:10); %100 increments for accuracy

freq = linspace(0, 10, 101);

w = freq\*2\*(pi)\*(10^6);

res = 1./(1+(1j\*(w\*r\*c)));

res2 = repelem(0.5,101);

X1 = freq;

YMatrix1 = [res;res2];

createfigure(X1, YMatrix1)

%grid minor; % Optional

% grid;

function createfigure(X1, YMatrix1)

%CREATEFIGURE(X1, YMatrix1)

% X1: vector of x data

% YMATRIX1: matrix of y data

% Auto-generated by MATLAB on 15-Jan-2020 15:35:30

% Create figure

figure1 = figure;

% Create axes

axes1 = axes('Parent',figure1);

hold(axes1,'on');

% Create multiple lines using matrix input to semilogx

semilogx1 = semilogx(X1,YMatrix1);

set(semilogx1(1),'Color',[1 0 0]);

set(semilogx1(2),'LineStyle','--');

% Create ylabel

ylabel('Gain [v0/vi] (V)');

% Create xlabel

xlabel('Frequency MHz');

% Create title

title('The Gain of a Low Pass Filter');

box(axes1,'on');

grid(axes1,'on');

% Set the remaining axes properties

set(axes1,'XMinorTick','on','XScale','log');

% Create textarrow

annotation(figure1,'textarrow',[0.817857142857143 0.721428571428571],...

[0.706142857142857 0.528571428571429],'String',{'Gain of 0.5'});

end

%Ece2412 lab 1

clear

clc

clf

close all

%values for our low pass filter%

r = 50; %ohms%

c = ((1:6).\*(10^-9))';

freq = (0:0.1:10); %100 increments for accuracy

w = freq\*2\*(pi)\*(10^6);

res = 1./(1+(1j\*(w.\*r.\*c)));

res2 = repelem(0.5,101);

plot(freq,real(res),freq,res2,'-.')

xlabel('Frequency((10^6)Hz)');

ylabel('Gain [v0/vi] (V)');

title('The Gain of a Low Pass Filter');

%grid minor; % Optional

grid;

% lab 1 Part II, Case A

clear

clc

clf

%close all

f = 198\*(10^12);%THz

w = f\*2\*pi; %converting frequency to angular v and accounting for Tera

s = 2\*10^8; %speed of propagation

b = w/s; %phase shift coefficient

Eo = 1.0; %Initial condition (V/m)

z= 0:0.01:10; %position (10^-6m)

t= 0;

E = Eo\*exp(j\*((w\*t)-(b\*(z\*10^-6))));

plot(z,real(E),'r');

xlabel('Position along length of fiber (10^-6 m)');

ylabel('E (V/m)');

title('Electrical Field Intensity');

grid minor;

grid;

% Description: part2 B

clear

clc

clf

%close all

f = 198\*(10^12);%THz

T=1/f;

p1=T/10;

pf=2\*T;

w = f\*2\*pi; %converting frequency to angular v and accounting for Tera

s = 2\*10^8; %speed of propagation

b = w/s; %phase shift coefficient

Eo = 1.0; %Initial condition (V/m)

z= 0:(0.01\*10^-6):(10\*10^-6); %position (10^-6m)

for(t=0:p1:pf)

E = Eo\*exp(j\*((w\*t)-(b\*z)));

plot(z,real(E),'m');

pause(0.5)

end

xlabel('Position along length of fiber (10^-6 m)');

ylabel('E (V/m)');

title('Electrical Field Intensity');

grid;

grid minor;

% Description: part2 C

clear

clc

clf

%close all

f = 198\*(10^12);%THz

T=1/f;

p1=T/10;

pf=2\*T;

w = f\*2\*pi; %converting frequency to angular v and accounting for Tera

s = 2\*10^8; %speed of propagation

b = w/s; %phase shift coefficient

Eo = 1.0; %Initial condition (V/m)

z= 0:(0.01\*10^-6):(10\*10^-6); %position (10^-6m)

for(t=0:p1:pf)

E = Eo\*exp(j\*((w\*t)+(b\*z)));

plot(z,real(E),'m');

pause(0.5)

end

xlabel('Position along length of fiber (10^-6 m)');

ylabel('E (V/m)');

title('Electrical Field Intensity');

grid;

grid minor;

% Description: part2b

clear

clc

clf

%close all

f = 198\*(10^12);%THz

T=1/f; %Period

p1=T/10; %Step Size (1/10th of Period)

pf=2\*T; %End at 2 Periods

w = f\*2\*pi; %Converting frequency to angular v and accounting for Tera

s = 2\*10^8; %Speed of propergation

b = w/s; %Phase shift coefficient

Eo = 1.0; %Initial condition (V/m)

z= 0:(0.01\*10^-6):(10\*10^-6); %position (10^-6m)

for(t=0:p1:pf)

E1 = Eo\*exp(j\*((w\*t)+(b\*z)));

E2 = Eo\*exp(j\*((w\*t)-(b\*z)));

Et=abs(real(E1)+real(E2));

subplot(3,1,1)

plot(z,real(E1));

% hold on

xlabel('Position along length of fiber (10^-6 m)');

ylabel('E (V/m)');

title('Forward Electrical Field Intensity');

grid;

subplot(3,1,2)

plot(z,real(E2));

% hold on

xlabel('Position along length of fiber (10^-6 m)');

ylabel('E (V/m)');

title('Reverse Electrical Field Intensity');

grid;

subplot(3,1,3)

plot(z,real(Et));

% hold on

xlabel('Position along length of fiber (10^-6 m)');

ylabel('E (V/m)');

title('Total Electrical Field Intensity');

grid;

pause(0.5)

end