Final Exam Question 1 Report

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MATLAB CODE:

clc

clear all

format compact

%input data

R1=11;

R2=5;

L1=0.2e-3;

L2=0.07e-3;

C1=0.9e-6;

fmin=1e3;

fmax=100e3;

Vs=1;

df=0.1;

nf=(fmax-fmin)/df+1;

for n=1:nf; % start of frequency loop; n is a counter

f=fmin+df\*n; % f takes the value of fmin +(frequency step) \* (loop number)

om=2\*pi\*f;

ZL1=j\*om\*L1; %regular nodal analysis block. Note that om is a single number\

ZL2=j\*om\*L2;

ZC1=-j/(om\*C1);

Z2=R2+ZL2;

Y=[1/R1+1/ZL1+1/Z2,-1/Z2;...

-1/Z2,1/Z2+1/ZC1];

Is=[Vs/R1;0];

F=Y\Is;

Vout=F(2);

H=Vout/Vs;

M(n)=abs(H); % accumulating M array

MdB(n)=20\*log10(M(n)); % accumulating MdB array

Ph\_deg(n)=angle(H)\*180/pi; % accumulating Phase array

% We also need to remember the f values by accumulating them in f\_plt array

f\_plt(n)=f; % f\_plt array (f value changes every time loop counter increases)

end % after the end of the loop we have arrays of f\_plt, M, MdB and Phase

figure(1)

semilogx(f\_plt,MdB)

title('M, dB')

xlabel('f, Hz')

grid on

figure(2)

semilogx(f\_plt,Ph\_deg)

title('Phase, deg')

xlabel('f, Hz')

grid on

GRAPHS:

Chart, line chart

Description automatically generatedChart, line chart

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