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% ELEC4700 Assignment 4

% Part 4

% By Huanyu Liu

% 100986552



% If alpha, beta, gama are known

% Then update alpha*I3*Ro/(R4+Ro)=Vo with

% (alpha*I3+beta*I3^2+gama*I3^3)*Ro/(R4+Ro)

% use I3, I3^2, I3^3 as parameters in V vector



% Assume alpha=100, beta=50, gama=4



R1=1;

c=0.25;

R2=2;

L=0.2;

R3=10;

alpha=100;

beta=50;

gama=4;

R4=0.1;

Ro=1000;
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    G=[R3 0 -1 0 0 0 0 0;R3 0 0 -1 0 0 0 0;alpha*Ro/(R4+Ro) 0 0 0 -1 0 beta*Ro/(R4+Ro)
gama*Ro/(R4+Ro);0 1 0 (1/R1+1/R2) 0 0 0 0;0 0 0 0 0 1 0 0];

    C=[0 0 0 0 0 0 0 0;0 L 0 0 0 0 0 0;0 0 0 0 0 0 0 0;0 0 0 c 0 -c/R1 0 0;0 0 0 0 0 0 0 0];




    t=0;

    dt=1/1000;

    f=1/0.03;

    w=2*pi*f;

    Vinc=zeros(1,1000);

    Voc=zeros(1,1000);

    Vinc(1:30)=normpdf(0.001:0.001:0.03,0.015,0.03);

    [index,m]=max(Vinc(1:30));

    M=m/0.06;

    Vinc(1:30)=Vinc(1:30)/M;

    for m=91:1000

        z=mod(m,90);

        if z==0

            Vinc(m)=0;

        else

            Vinc(m)=Vinc(z);

        end

    end
```

```
for j=1:1:1000
    In=normrnd(0.001,0.00001); %assume std. deviation is 0.00001
    FGa=[0;0;Vinc(j)/R1+c*w*1i*Vinc(j);0;In];
    if j==1
        VDC=zeros(8,1); %G\FGa;
    else
        VDC=A\(C*oldV/dt+FGa);
    end
    Voc(j)=abs(VDC(4));
    oldV=VDC;
    A=C/dt+G;
    t=t+dt;
end
figure(2*k-1)
t=linspace(0,1,1000);
subplot(1,2,1),plot(t,Vinc,'g');
title(['Vin vs. t (C=',num2str(cn),'dt=',num2str(dt),')']);
xlabel('t');
ylabel('Vin(part3)');
grid on
subplot(1,2,2),plot(t,Voc,'b');
title(['Vo vs. t (C=',num2str(cn),'dt=',num2str(dt),')']);
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xlabel('t');

ylabel('Vo(part3)');

grid on



n=2^nextpow2(1000);

m5=fftshift(fft(Vinc,n+1));

m6=fftshift(fft(Voc,n+1));

f=1/0.03*((-n/2):(n/2))/n;

figure(2*k)

subplot(1,2,1),plot(f,abs(m5/n),'ro');

title(['Vin in frequency domain (C=',num2str(cn),'dt=',num2str(dt),')']);

xlabel('freq');

grid on

subplot(1,2,2),plot(f,abs(m6/n),'b*');

title(['Vo in frequency domain (C=',num2str(cn),'dt=',num2str(dt),')']);

xlabel('freq');

grid on
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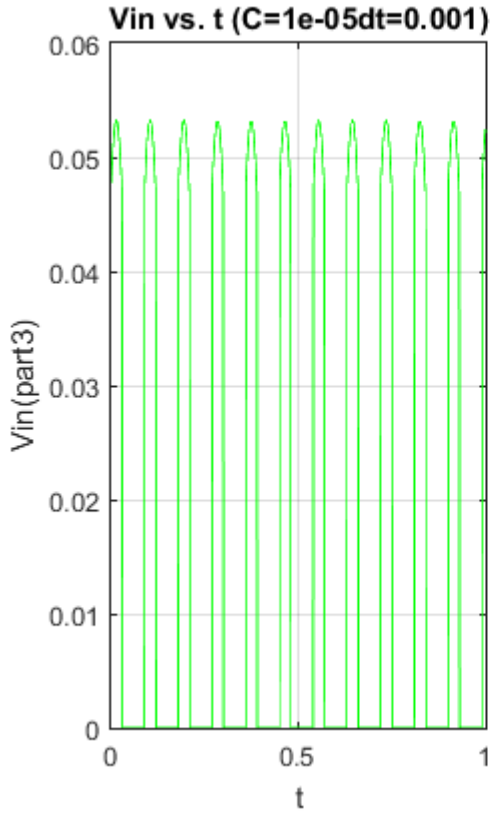

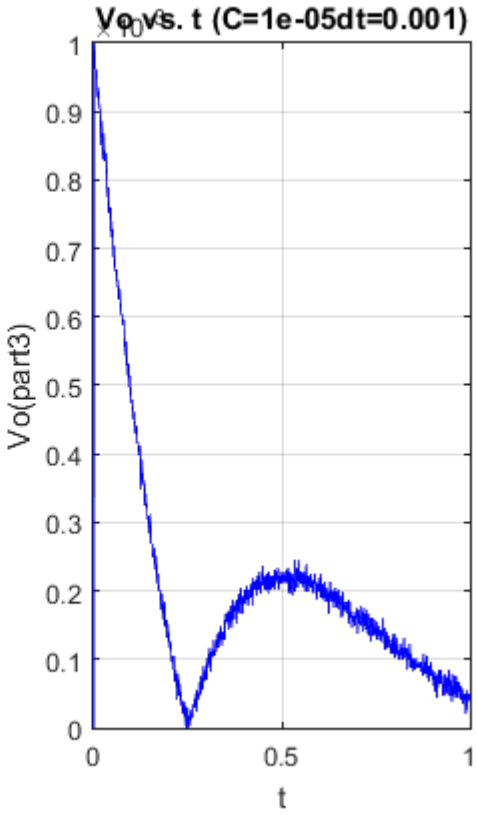

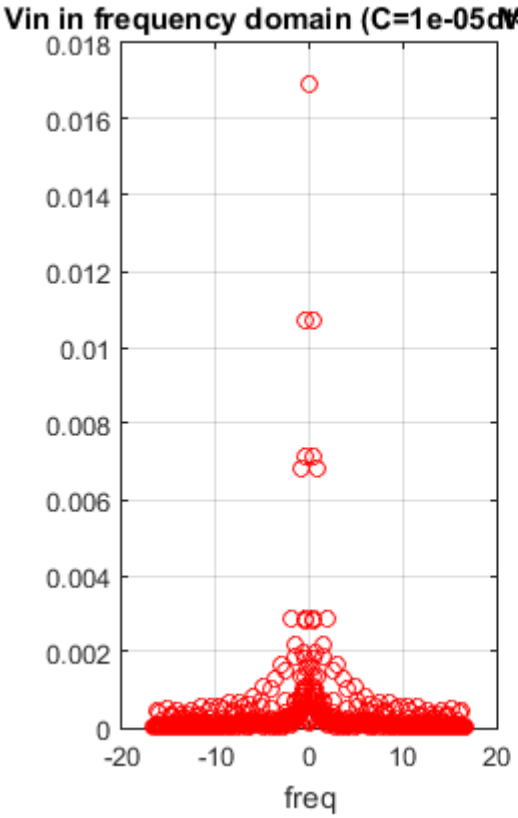

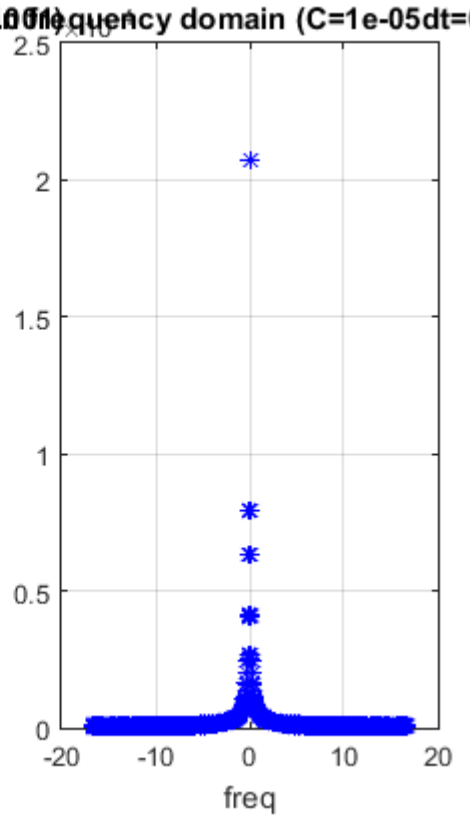

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