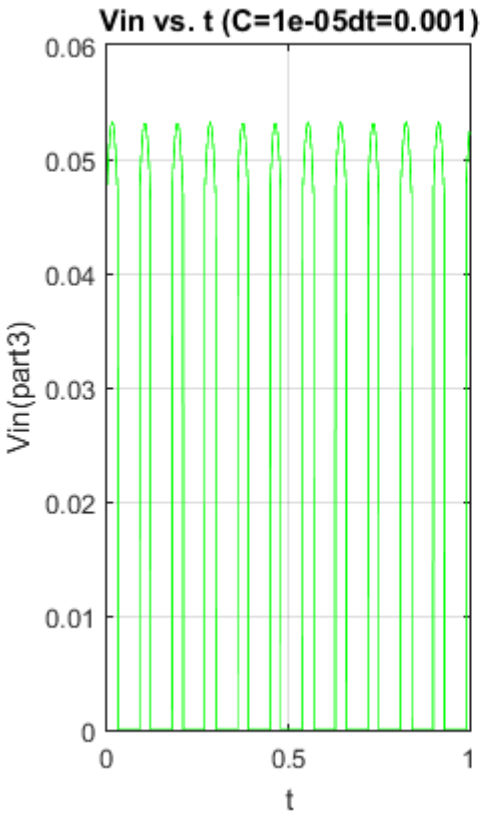
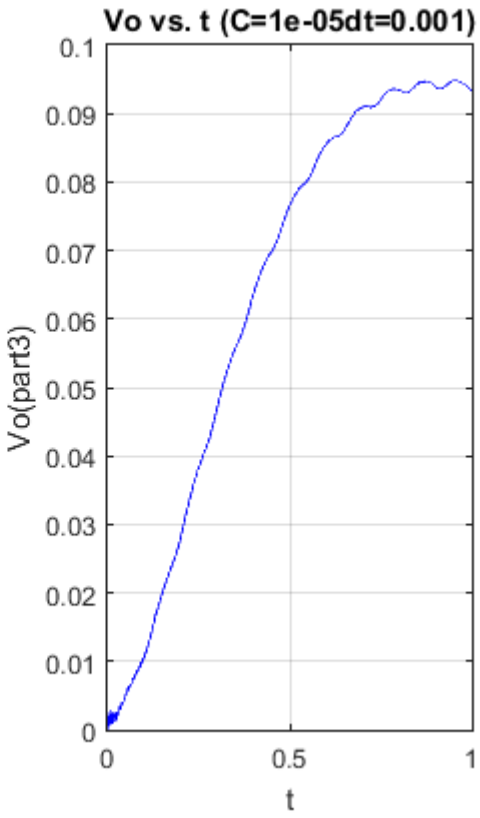
```
% ELEC4700 Assignment 4

% Part 3

% By Huanyu Liu

% 100986552

clear

clc

%

CN=[0.00001,0.001,0.00000005,0.00001,0.00001];

DT=[1/1000,1/1000,1/1000,1/5000,1/2000];

    R1=1;

    c=0.25;

    R2=2;

    L=0.2;

    R3=10;

    alpha=100;

    R4=0.1;

    Ro=1000;

for k=1:5



    cn=CN(k);

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

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

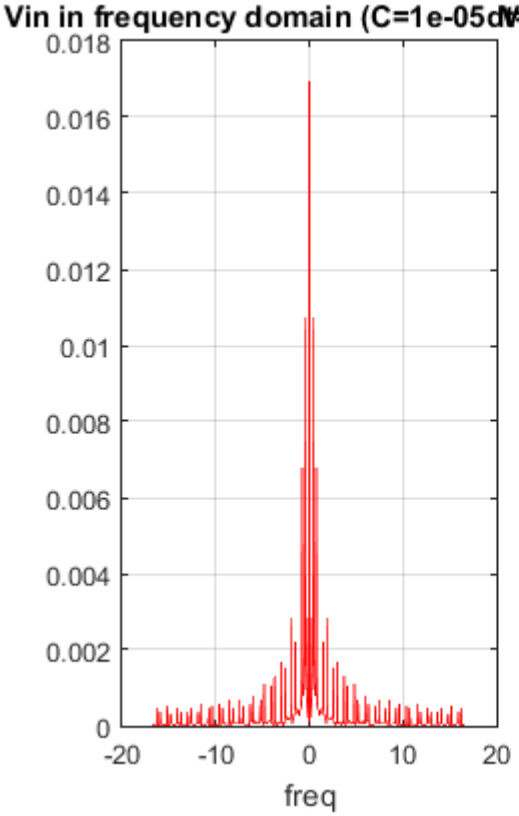
```
%     G=[R3 0 -1 0 0 0;alpha*Ro/(R4+Ro) 0 0 0 -1 0;0 1 0 1/R1+1/R2 0 0;0 0 -1 1 0 0;-1 1 0 0
0 0];
%     C=[0 0 0 0 0 0;0 0 0 0 0 0;0 0 0 c 0 -c/R1;0 -L 0 0 0 0;0 0 cn 0 0 0];
    % % % V=[I3;Iall;V3;V2;Vo;V1];


    t=0;
    dt=DT(k);
    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
```

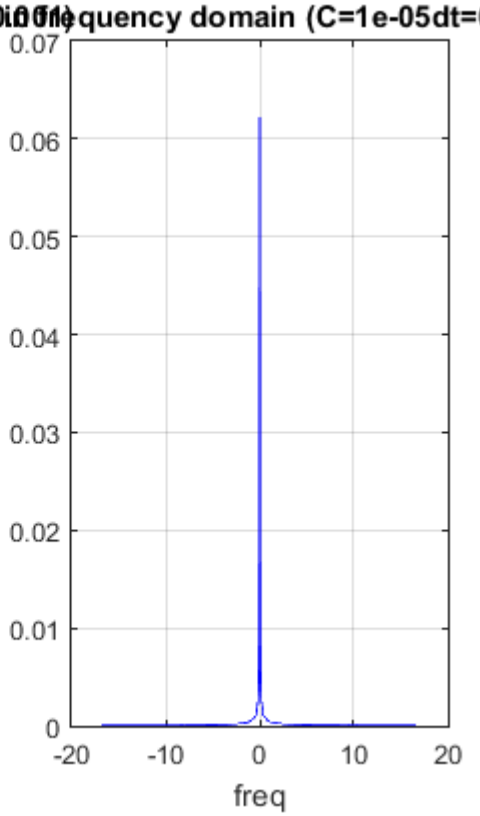
```
end
for j=1:1:1000
    In=normrnd(0.001,0.001); %assume std. deviation is 0.001
    FGa=[0;0;Vinc(j)/R1+c*w*li*Vinc(j);0;In];
    if j==1
        VDC=zeros(6,1); %G\FGa;
    else
        VDC=A\(C*oldV/dt+FGa);
    end
    Voc(j)=abs(VDC(4));
    oldV=VDC;
    A=C/dt+G;
    t=t+dt;
end
figure(2*k-1)
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');
```

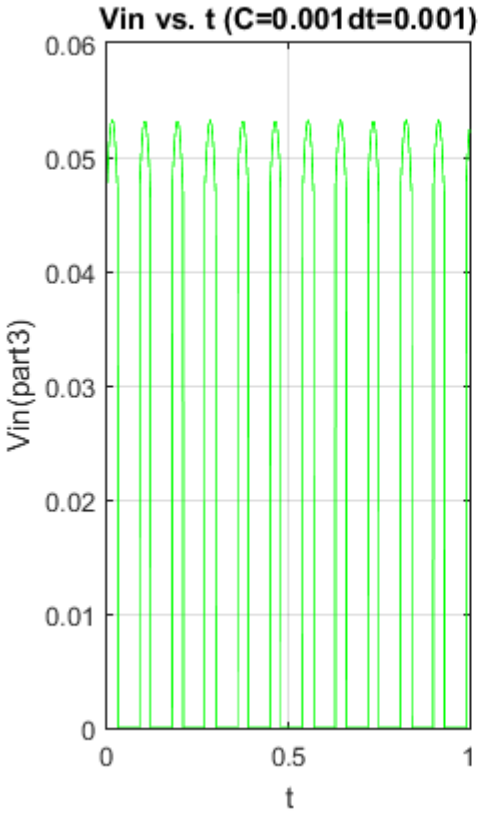
```
    title(['Vo vs. t (C=',num2str(cn),'dt=',num2str(dt),')']);

    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),'r');

    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

end
```

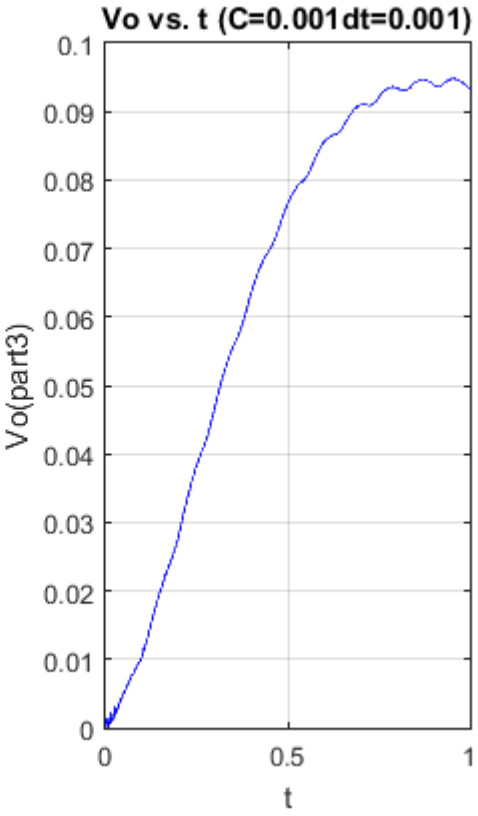

Vin vs. t (C=1e-05dt=0.001)
Vin(part3)
t
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.5
1

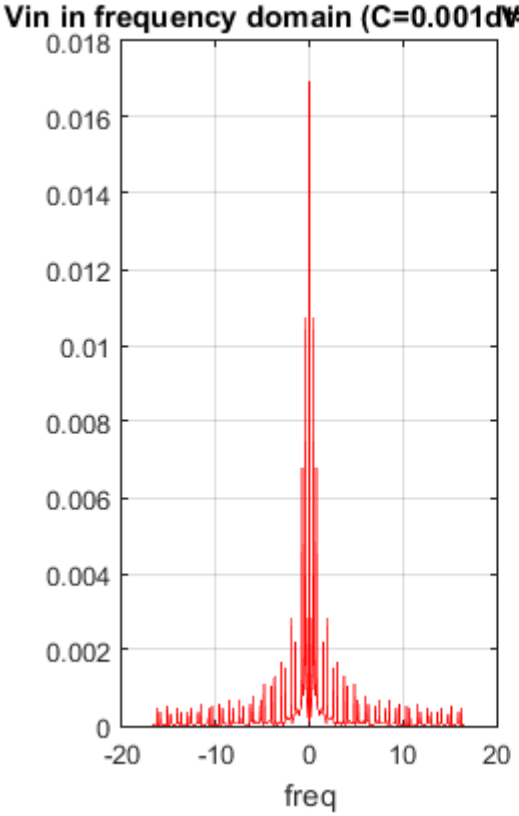

Vo vs. t (C=1e-05dt=0.001)
Vo(part3)
t
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.5
1

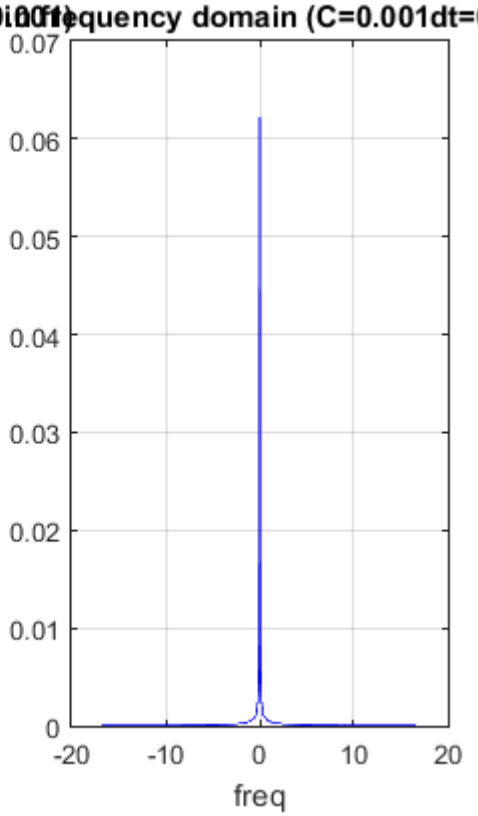

Vin in frequency domain (C=1e-05dt=0.001)
freq
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-20
-10
0
10
20

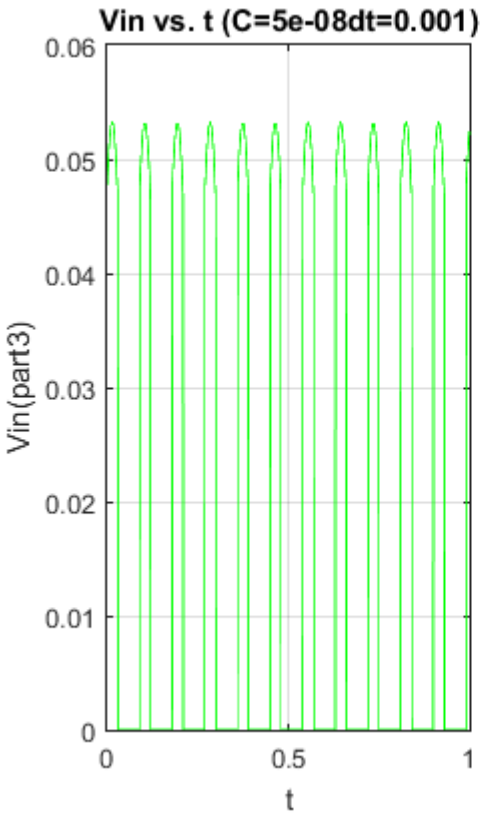

Vo in frequency domain (C=1e-05dt=0.001
freq
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-20
-10
0
10
20

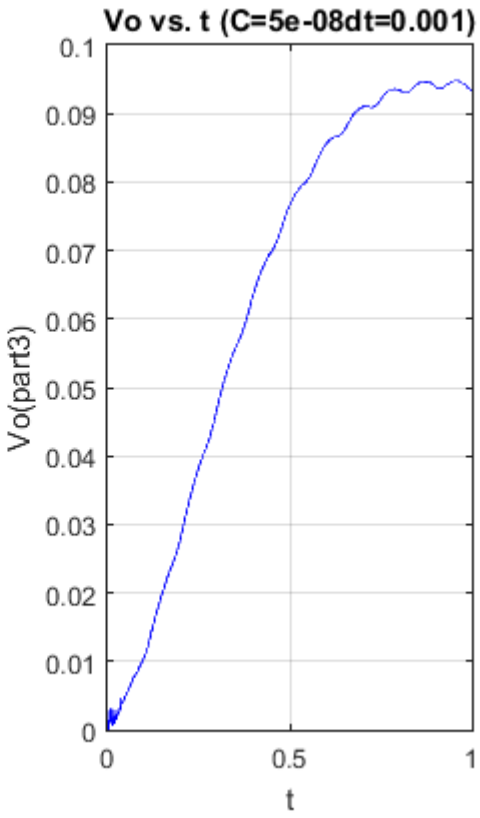

Vin vs. t (C=0.001dt=0.001)
Vin(part3)
t
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.5
1

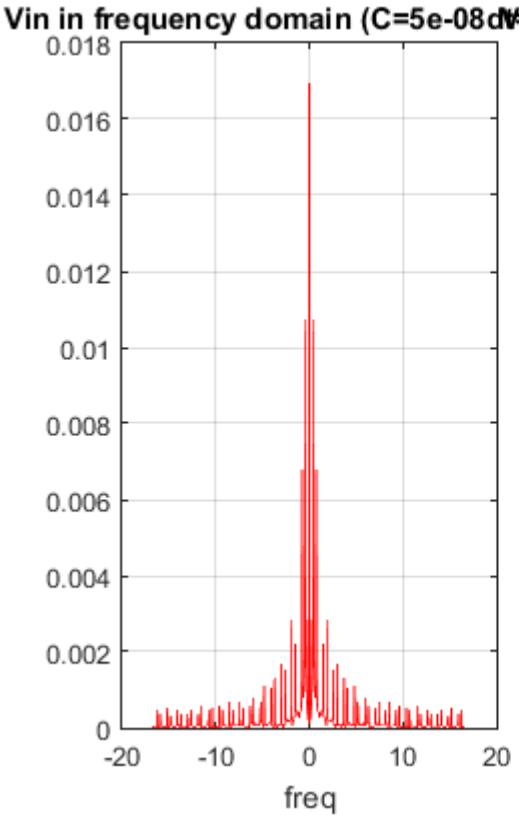

Vo vs. t (C=0.001dt=0.001)
Vo(part3)
t
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.5
1

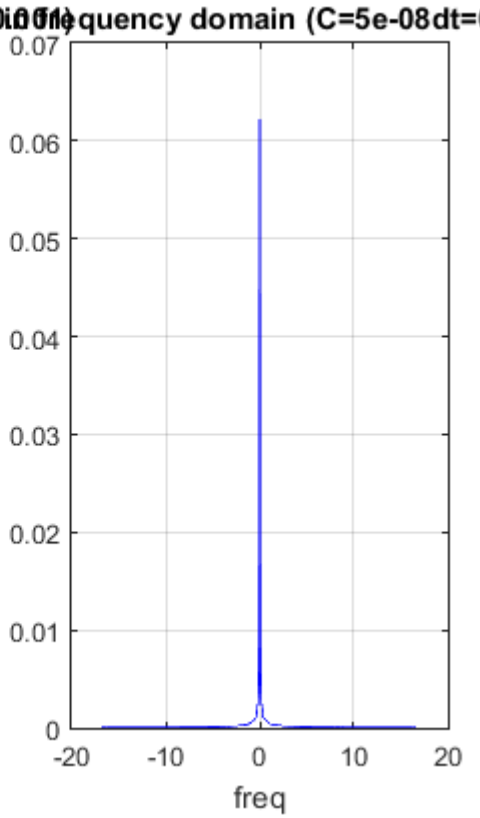

Vin in frequency domain (C=0.001dt=0.001)
freq
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-20
-10
0
10
20

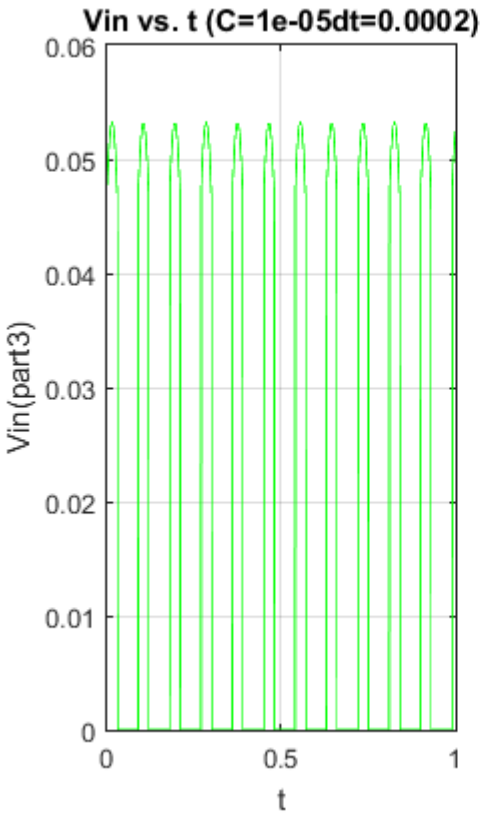

freq
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-20
-10
0
10
20

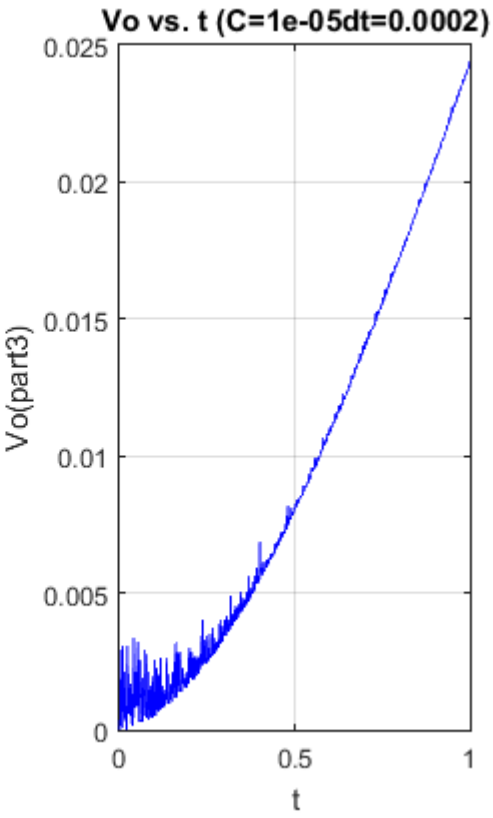

Vin vs. t (C=5e-08dt=0.001)
Vin(part3)
t
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.5
1

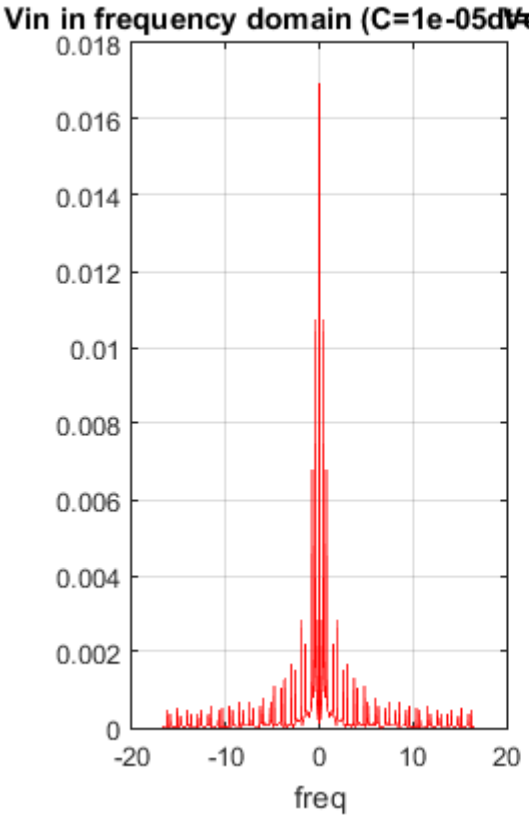

Vo vs. t (C=5e-08dt=0.001)
Vo(part3)
t
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.5
1

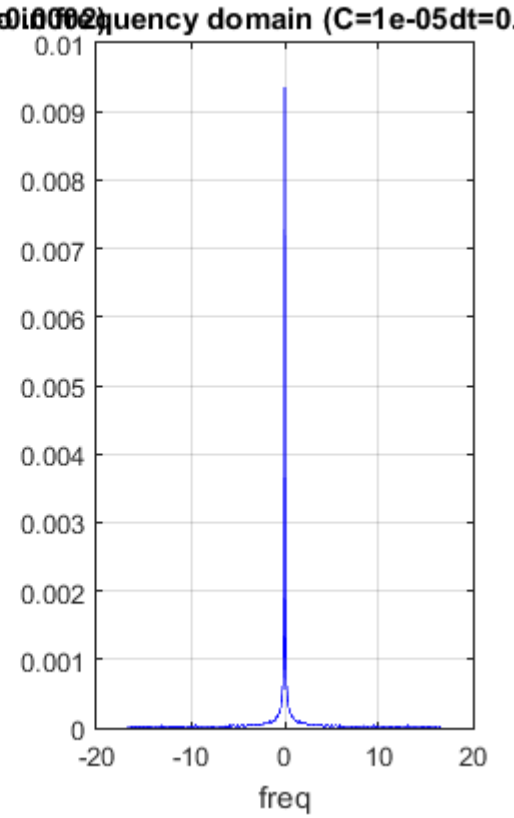

Vin in frequency domain (C=5e-08dt=0.001)
freq
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-20
-10
0
10
20

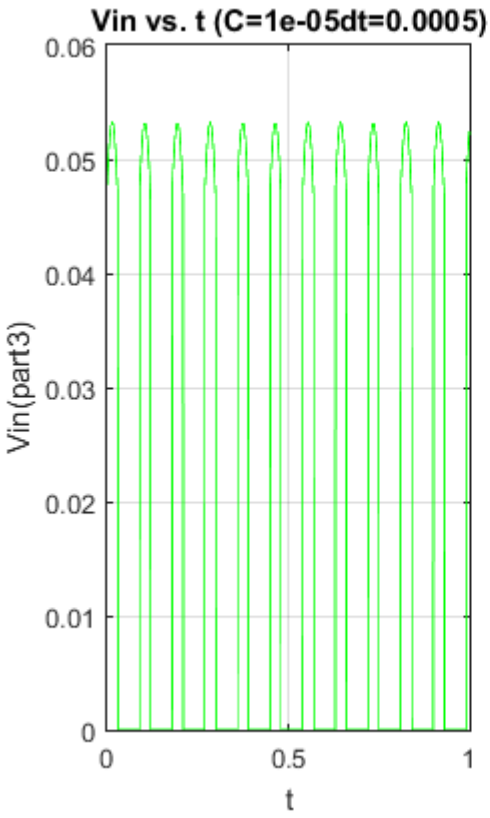

Vo in frequency domain (C=5e-08dt=0.001
freq
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-20
-10
0
10
20

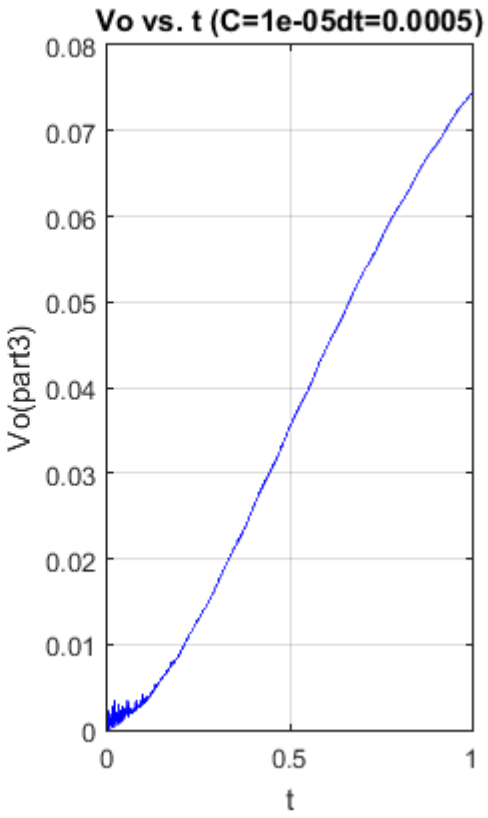

Vin vs. t (C=1e-05dt=0.0002)
Vin(part3)
t
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.5
1

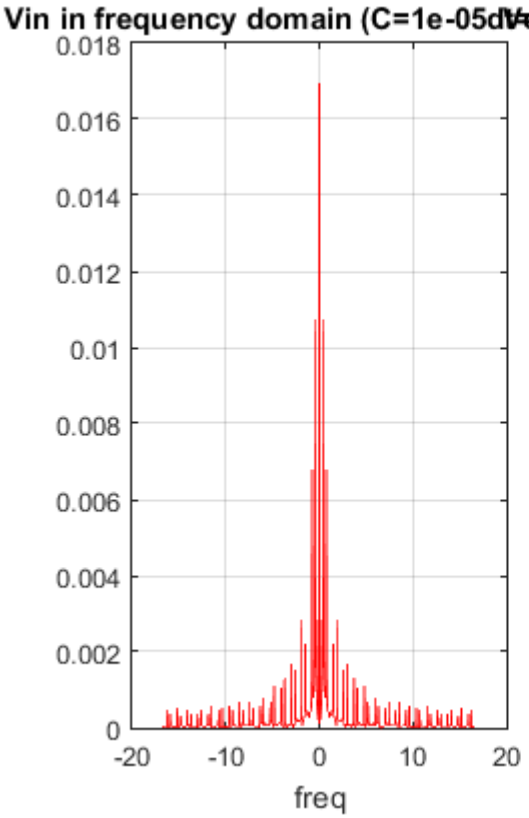

Vo vs. t (C=1e-05dt=0.0002)
Vo(part3)
t
0.025
0.02
0.015
0.01
0.005
0
0
0.5
1

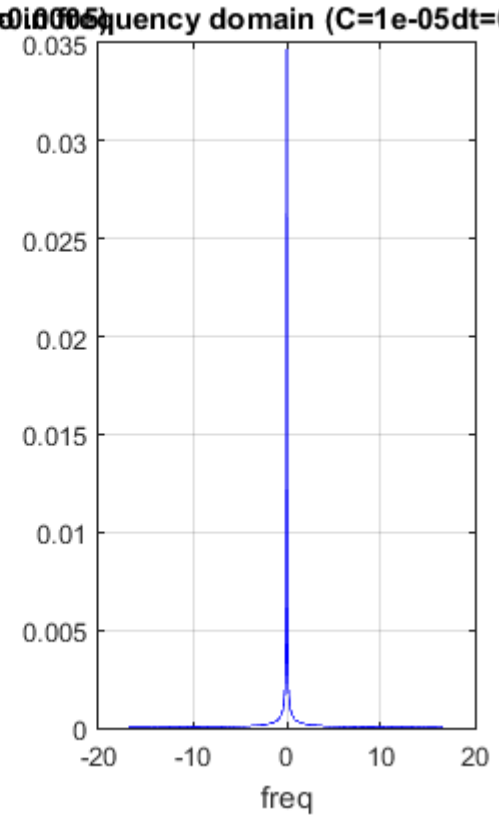

Vin in frequency domain (C=1e-05dt=0.0002)
freq
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-20
-10
0
10
20


freq
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
-20
-10
0
10
20









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