
QUESTION 3

```
clear all
close all
R1 = 1;
C = 0.25;
R2 = 2;
L = 0.2;
R3 = 10;
a = 100;
R4 = 0.1;
Ro = 1000;
Cn = 0.00001;

% V = [V1 V2 V3 V4 V5 i1 iL i3];
G = [-1/R1 1/R1 0 0 0 1 0 0;
      1/R1 (-1/R1)-(1/R2) 0 0 0 0 -1 0;
      0 0 -1/R3 0 0 0 1 0;
      0 0 0 -1/R4 1/R4 0 0 1;
      0 0 0 1/R4 (-1/R4)-(1/Ro) 0 0 0;
      1 0 0 0 0 0 0 0;
      0 1 -1 0 0 0 0 0;
      0 0 a/R3 1 0 0 0 0];

% V = [V1 V2 V3 V4 V5 i1 iL i3];
CM = [-C C 0 0 0 0 0 0;
       C -C 0 0 0 0 0 0;
       0 0 -Cn 0 0 0 0 0;
       0 0 0 0 0 0 0 0;
       0 0 0 0 0 0 0 0;
       0 0 0 0 0 0 0 0;
       0 0 0 0 0 0 -L 0;
       0 0 0 0 0 0 0 0];

tstep = 0.001;
time = 0;

for i = 1:300

    In = randn*0.01;
    Vin = exp(-(time-0.06).^2/(2*(0.03)^2));

    F = [0 0 In 0 0 Vin 0 0];
    V = G\F';
    Vo(i) = V(5);

    time = tstep*i;
end

figure(8)
plot(tstep:tstep:time,Vo)
```

```
figure(9)
X = abs(fft(Vo));
plot(-(time/2-tstep):tstep:time/2,X)
title('fft')
```

G =

Columns 1 through 7

-1.0000	1.0000	0	0	0	1.0000	0
1.0000	-1.5000	0	0	0	0	-1.0000
0	0	-0.1000	0	0	0	1.0000
0	0	0	-10.0000	10.0000	0	0
0	0	0	10.0000	-10.0010	0	0
1.0000	0	0	0	0	0	0
0	1.0000	-1.0000	0	0	0	0
0	0	10.0000	1.0000	0	0	0

Column 8

0
0
0
1.0000
0
0
0
0
0

CM =

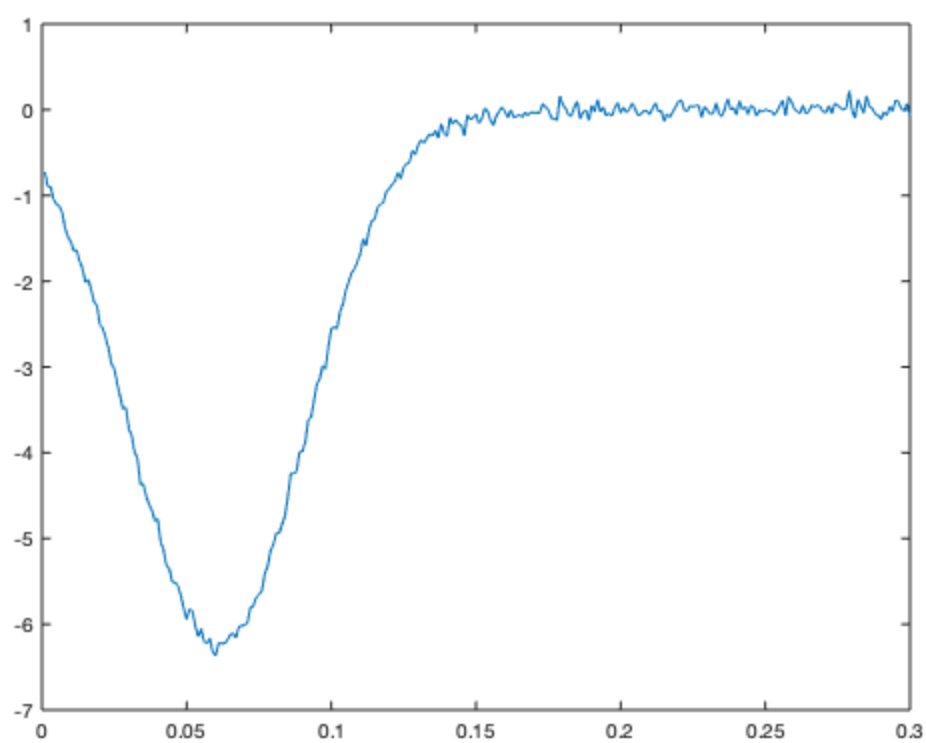
Columns 1 through 7

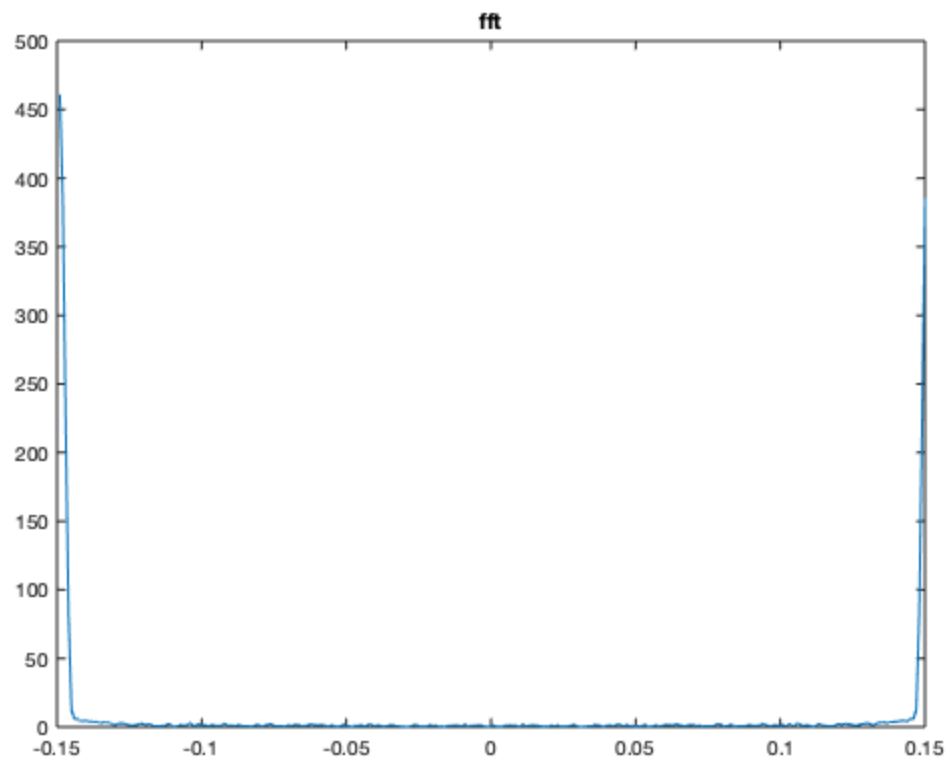
-0.2500	0.2500	0	0	0	0	0
0.2500	-0.2500	0	0	0	0	0
0	0	-0.0000	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	-0.2000
0	0	0	0	0	0	0

Column 8

0
0
0
0
0
0
0
0

0





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