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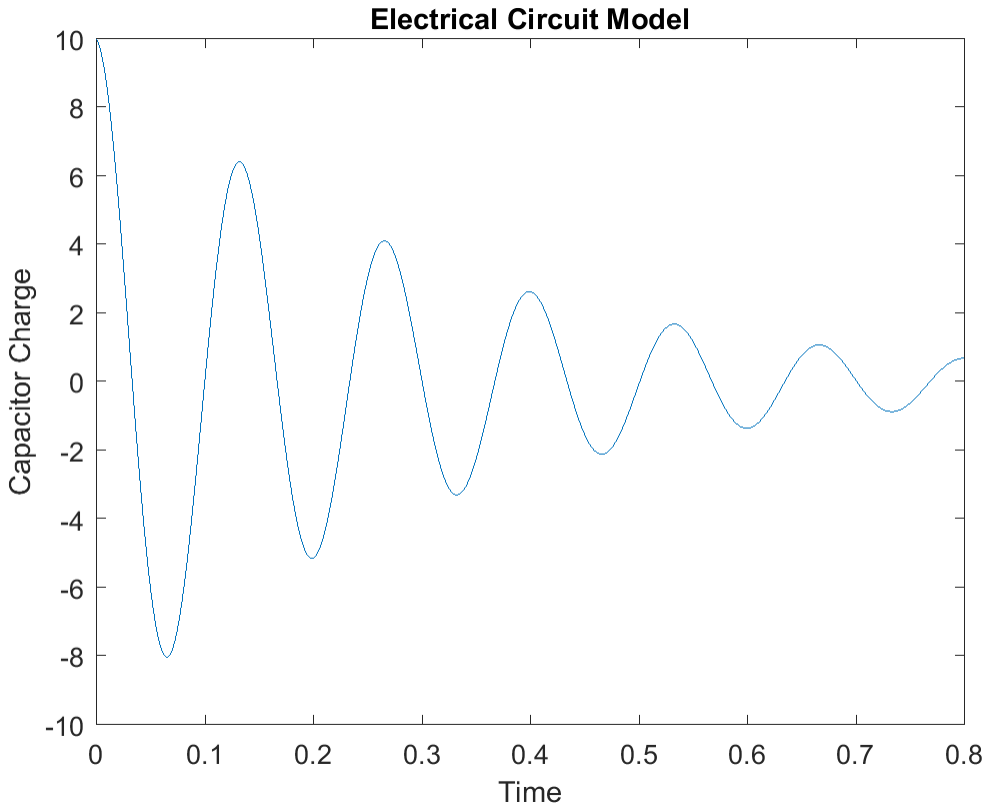
MECH 105: Homework 2 Revision D 8/25/2017

Problem 1

```
clc
clear
% Section 1.1
q=10; % Inital Charge
R=60; % Resistance
L=9; % Inductance
C=0.00005; % Capacitance
t=0:0.001:0.8; % time from 0 to 0.8
% Charge on capacitor qt as a function of time
qt=q.*exp((-R.*t)./(2*L)).*cos(sqrt((1./(L.*C))-((R./(2*L)).^2)).*t);
plot(t,qt)
title('Electrical Circuit Model');
xlabel('Time');
ylabel('Capacitor Charge');
```



Section 1.2

```
c2=0.0005;
% Charge on capacitor qt as a function of time with c 10x larger
qt2=q.*exp((-R.*t)./(2*L)).*cos(sqrt((1./(L.*c2))-((R./
(2*L)).^2)).*t);
subplot(2,1,1);
plot(t,qt)
title('Electrical Circuit Model C=0.00005');
xlabel('Time');
ylabel('Capacitor Charge');
subplot(2,1,2);
plot(t,qt2)
title('Electrical Circuit Model C=0.0005');
xlabel('Time');
ylabel('Capacitor Charge');
```

Section 1.3

As the capacitance increases the period of the function also increases. This is because the angle of cosine is increased.

Problem 2

```
clc
```

```
clear
close all
tk=10:10:60; %known time intervals in minutes
ck=[3.4 2.6 1.6 1.3 1.0 0.5]; %known concentration in ppm
t=0:10:70; % Time in minutes
c=4.84.*exp(-0.034*t); % Concentration in ppm
% Plot of experimental data vs theoretical data
plot(tk,ck,'rd',t,c,'g--')
title('Photodegradation of Aqueous Bromine')
xlabel('Time [min]')
ylabel('Concentration [ppm]')
legend('Experimental','Theoretical')
```

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