% Ex-1.1 (Parallel RLC circuit)

% Sambhav R Jain

% 107108103

clc;

clear all;

close all;

fprintf('Ex-1.1 Parallel RLC Circuit\n');

fprintf(' - Sambhav R Jain (107108103)\n\n');

ch = 1;

while ch~=2

clc

clear all;

close all;

fprintf('Enter the supply voltage\n');

v1 = input('magnitude (volt): ');

v2 = input('phase angle (degree): ');

R = input('Enter the resistance (R): ');

Xl = input('Enter the inductive reactance (Xl): ');

Xc = input('Enter the capacitive reactance (Xc): ');

f = input('Enter the supply frequency (Hz): ');

% theta in degrees

t = 0:0.0001:30e-3;

theta = 2\*pi\*f.\*t;

% Complex quantities

v = complex(v1\*cosd(v2),v1\*sind(v2));

ir = v/R;

il = v/(1i\*Xl);

ic = v/(-1i\*Xc);

is = ir+il+ic;

pr = v\*ir;

pl = v\*il;

pc = v\*ic;

% Calculations

V = abs(v)\*sqrt(2)\*sin(theta+angle(v));

IR = abs(ir)\*sqrt(2)\*sin(theta+angle(ir));

IL = abs(il)\*sqrt(2)\*sin(theta+angle(il));

IC = abs(ic)\*sqrt(2)\*sin(theta+angle(ic));

IS = abs(is)\*sqrt(2)\*sin(theta+angle(is));

Pr = V.\*IR;

Pl = V.\*IL;

Pc = V.\*IC;

Ps = V.\*IS;

pf = cos(angle(v)-angle(is))

% Plots

subplot(2,2,1);

grid on;

hold on;

plot(t,V);

plot(t,IR,'r');

plot(t,IL,'g');

plot(t,IC,'m');

xlabel('time (s) ------>');

ylabel('voltage (V), current (A) ------>');

title('Source Voltage and Current drawn by R, L and C v/s time');

legend('Vs','Ir','Il','Ic');

subplot(2,2,2);

plot(t,IS);

grid on;

xlabel('time (s) ------>');

ylabel('current (A) ------>');

title('Instantaneous Source Current v/s time');

legend('Is');

subplot(2,2,3);

grid on;

hold on;

plot(t,Pr,'r');

plot(t,Pl,'g');

plot(t,Pc,'b');

xlabel('time (s) ------>');

ylabel('power (W) ------>');

title('Power in R, L and C v/s time');

legend('Pr','Pl','Pc');

subplot(2,2,4);

plot(t,Ps);

grid on;

xlabel('time (s) ------>');

ylabel('power (W) ------>');

title('Instantaneous Supply Power v/s time');

legend('Ps');

ch = menu('Would you like to run it all over again?','Yes','No');

end

