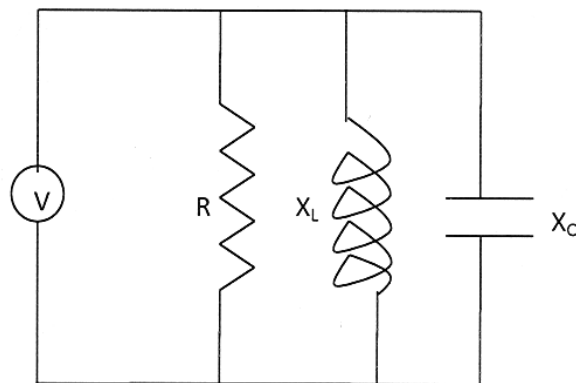


Exercise – 1.1

Write a **MATLAB m-code** to plot the following in the given system:

- i. Source voltage
- ii. Instantaneous current drawn by the R, L and C loads
- iii. Instantaneous current supplied by the source
- iv. Instantaneous power drawn by the R, L and C loads
- v. Instantaneous power supplied by the source
- vi. Source power factor



Case 1:	$V = 10 \angle 0^\circ$	$R = 5 \Omega$	$X_L = j 5 \Omega$	$X_C = -j 5 \Omega$
Case 2:	$V = 10 \angle -90^\circ$	$R = 5 \Omega$	$X_L = j 10 \Omega$	$X_C = -j 5 \Omega$
Case 3:	$V = 10 \angle 90^\circ$	$R = 5 \Omega$	$X_L = j 5 \Omega$	$X_C = -j 10 \Omega$

M-code:

```
% 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

    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');

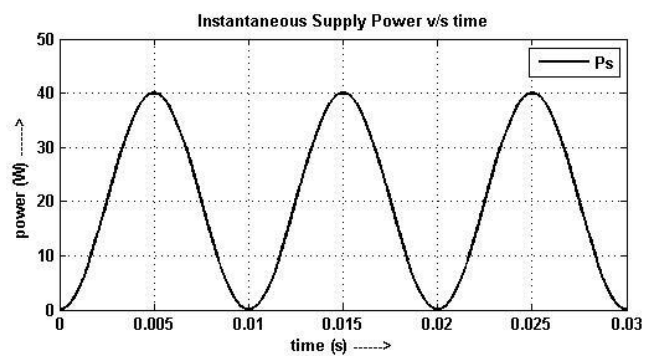
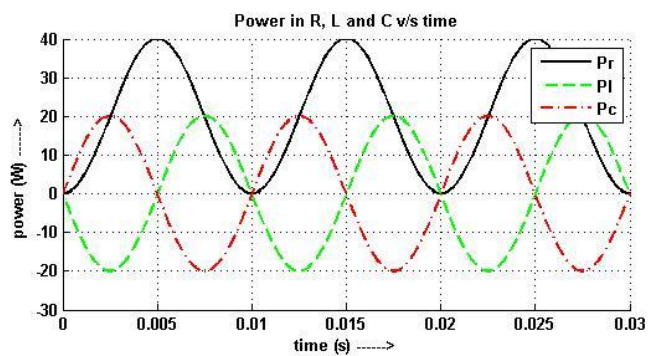
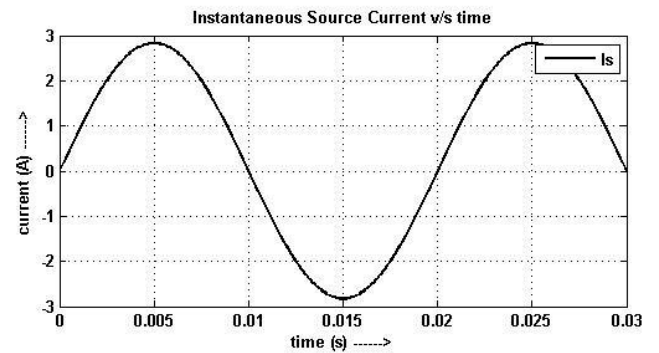
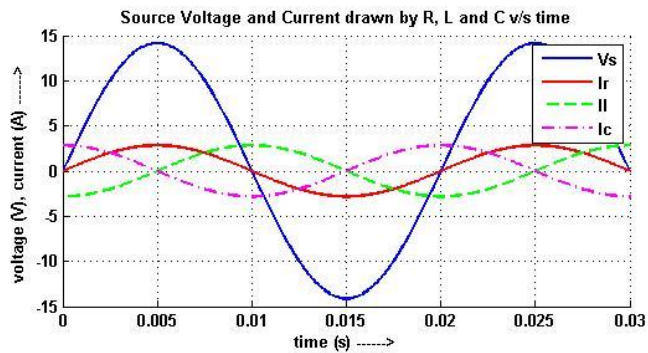
ch = menu('Would you like to run it all over again?','Yes','No');

clc
clear all;
close all;

end
```

Terminal Display:

Waveforms:



:

Results: