EXPERIMENT 1
Introduction to CLC MATLAB Material

Objectives:

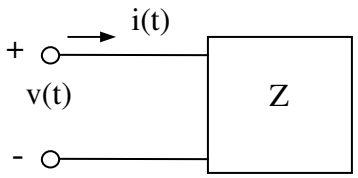
Learn to use MATLAB for performing basic power system computations.

Statement of the problem:

Solve basic power systems using MATLAB. Learn the use of MATLAB to plot curves of various power system variables.

See Section 2.2 of Glover and Sarma text. In particular, understand the derivation of P and Q for a generic RLC load in Eq. 2.2.10 on Page 46.

For the circuit shown in the figure to the right:



(a) $v = 120\sqrt{2}\cos(120\pi t)\ V; \qquad z = 2.5\angle 0°\ \Omega$

(b) $v = 120\sqrt{2}\cos(120\pi t)\ V; \qquad z = 2.0\angle 60°\ \Omega$

(c) $v = 120\sqrt{2}\cos(120\pi t)\ V; \qquad z = 1.5\angle -30°\ \Omega$

(i) For each load above, plot *i(t), v(t), p(t), p_R(t), p_x(t)*

(ii) For each of the above, estimate the real and reactive power and draw conclusions regarding the sign of the reactive power.

(iii) Using phasors, calculate P, Q, and load kVA

(iv) If all the above three loads are connected in series, find P, Q and load kVA.

(v) If all the above three loads are connected in parallel, find P, Q and load kVA.

In your report:

Describe your solution to the problems assigned

Results obtained: Show your results, including graphs (plotted curves) and a listing of your program after modification.

Discussion of Results: Write a discussion of the results you obtained. Include answers to the following questions:

1. You should be an expert now in plotting curves. What difficulties (problems) did you face to solve?

2. How did you verify your results with respect to reasonableness and accuracy? Remember that most of the power system values are complex numbers, which have a phasor representation.