

ECE 320 Homework 1

Problem 1:

A load having an impedance of $(39+26j) \Omega$ is fed from a voltage source through a line having an impedance of $(1+4j) \Omega$. The voltage source is 250 V RMS at 60 Hz.

- a- Calculate the load current and the load voltage
- b- Calculate the real and reactive power delivered to the load
- c- Calculate the real power losses in the line
- d- Calculate the real power and reactive power supplied by the source

Problem 2:

Two loads are connected in parallel (see Fig. 1):

- 1- Load 1 absorbs an average of 8kW at a leading power factor of 0.8
 - 2- Load 2 absorbs 20 kVA at a lagging power factor of 0.6
- a- Determine the power factor of the combined two loads in parallel.
 - b- Determine the source current
 - c- If the frequency is 60 Hz, find the value of the capacitor which, if placed in parallel with the two loads, would correct the power factor to 1.00.

Problem 3:

Calculate the RMS values of the currents with the wave forms shown in Fig. 2

Problem 4:

Consider the circuit shown in Fig. 3

- a- Find the currents in each branch of the circuit.
- b- Find the real and reactive power in each element (resistor, inductor, capacitor and source)

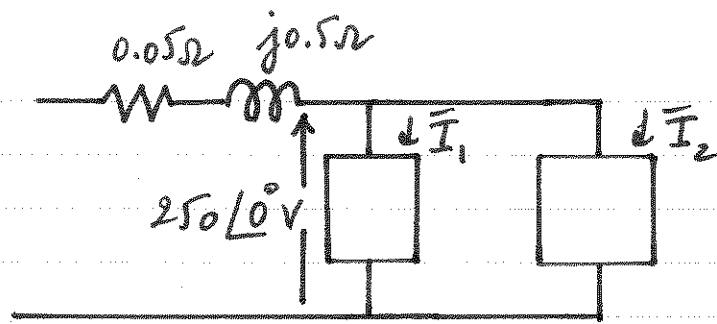


Figure 1.

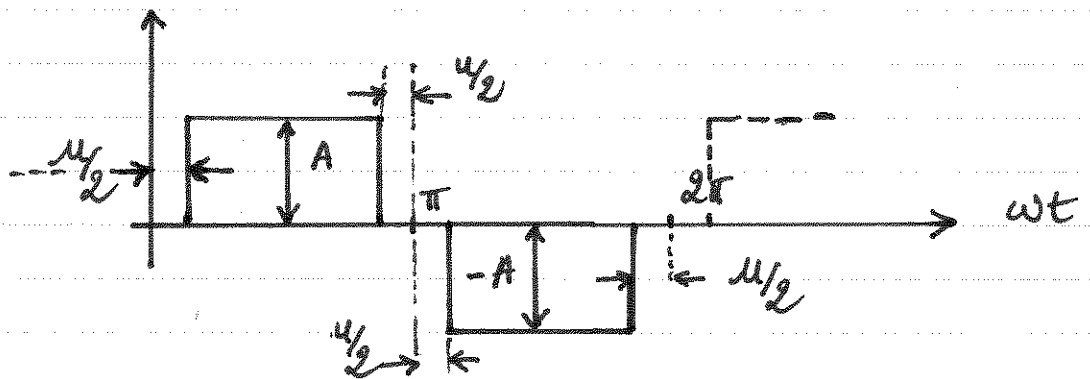
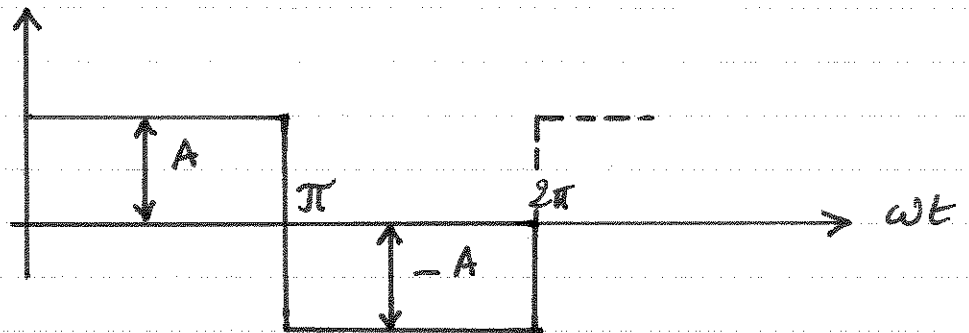


Figure 2

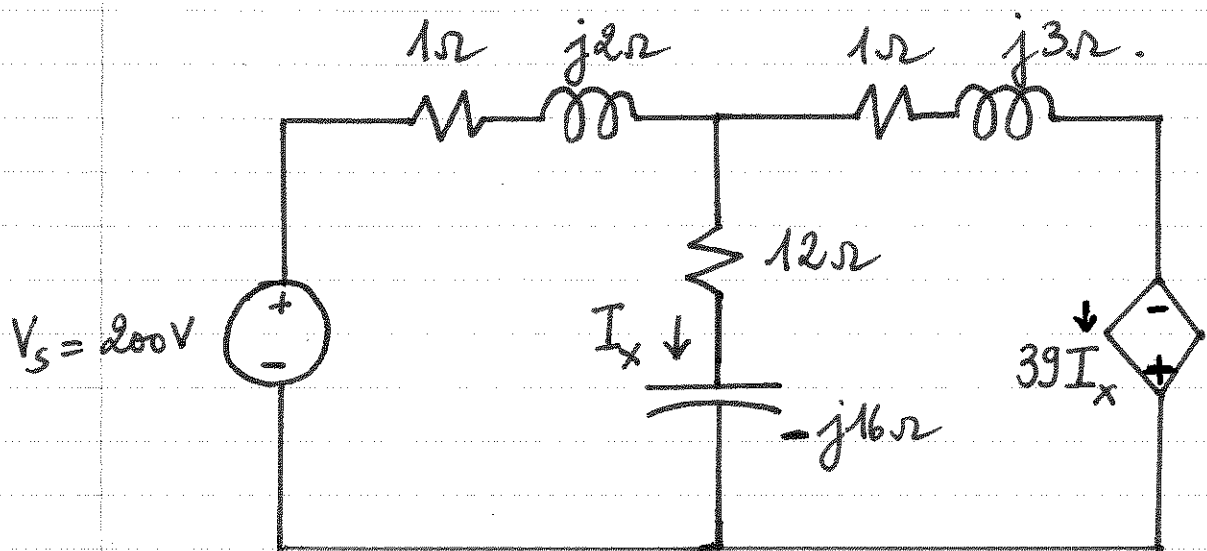


Figure 3