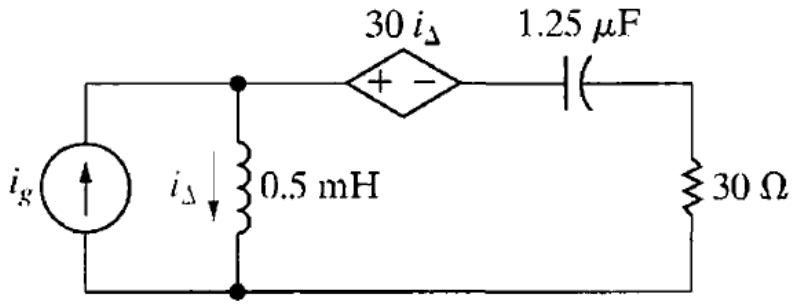
ENEE2301 CH10 PROBLEMS

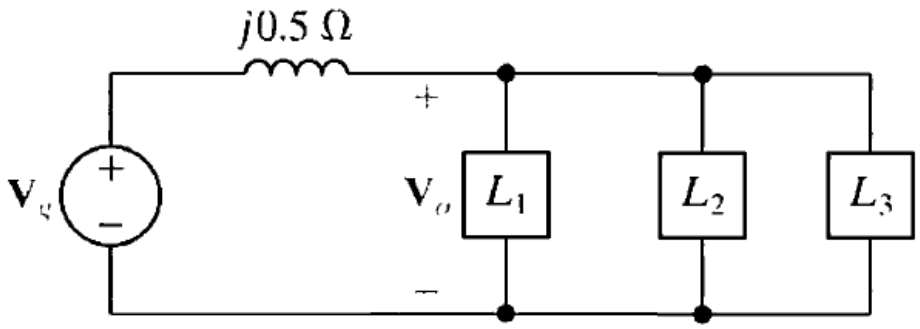
10.6 PSPICE MULTISIM Find the average power dissipated in the 30 Ω resistor in the circuit seen in Fig. P10.6 if $i_g = 6 \cos 20{,}000t$ A.

Figure P10.6



10.25 The three parallel loads in the circuit shown in Fig. P10.25 can be described as follows: Load 1 is absorbing an average power of 7.5 kW and 9 kVAR of magnetizing vars; load 2 is absorbing an average power of 2.1 kW and generating 1.8 kVAR of magnetizing reactive power; load 3 consists of a 48 Ω resistor in parallel with an inductive reactance of 19.2 Ω. Find the rms magnitude and the phase angle of $\mathbf{V}_g$ if $\mathbf{V}_o = 480\angle 0°$ V (rms).

Figure P10.25

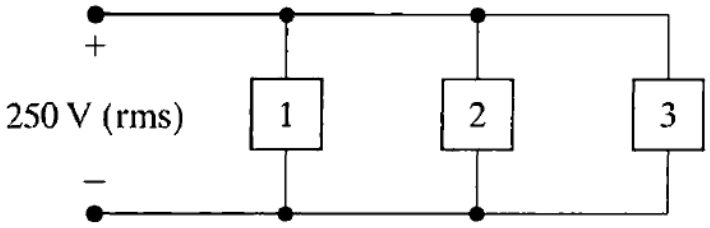


10.27 Three loads are connected in parallel across a 250 V (rms) line, as shown in Fig. P10.27. Load 1 absorbs 16 kW and 18 kVAR. Load 2 absorbs 10 kVA at 0.6 pf lead. Load 3 absorbs 8 kW at unity power factor.

a) Find the impedance that is equivalent to the three parallel loads.

b) Find the power factor of the equivalent load as seen from the line's input terminals.

Figure P10.27



10.34 A group of small appliances on a 60 Hz system requires 20 kVA at 0.85 pf lagging when operated at 125 V (rms). The impedance of the feeder supplying the appliances is $0.01 + j0.08\ \Omega$. The voltage at the load end of the feeder is 125 V (rms).

a) What is the rms magnitude of the voltage at the source end of the feeder?

b) What is the average power loss in the feeder?

c) What size capacitor (in microfarads) across the load end of the feeder is needed to improve the load power factor to unity?

d) After the capacitor is installed, what is the rms magnitude of the voltage at the source end of the feeder if the load voltage is maintained at 125 V (rms)?

e) What is the average power loss in the feeder for (d)?

10.46 The load impedance Z_L for the circuit shown in Fig. P10.46 is adjusted until maximum average power is delivered to Z_L.

a) Find the maximum average power delivered to Z_L.

b) What percentage of the total power developed in the circuit is delivered to Z_L?

Figure P10.46