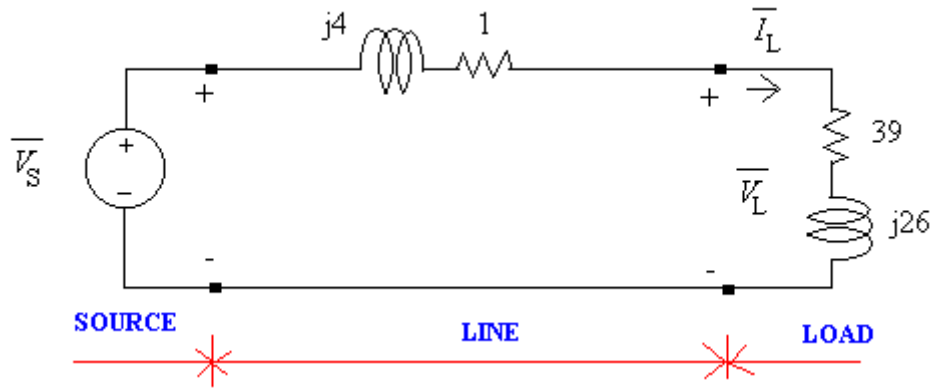
EECE301 NETWORK ANALYSIS II **Dr. Charles Kim**

Note 13: phase power example problems

1. As shown below, a voltage source of 250∠0° (rms) is supplying a load of 39+j26 via a line which has an impedance of 1+j4.

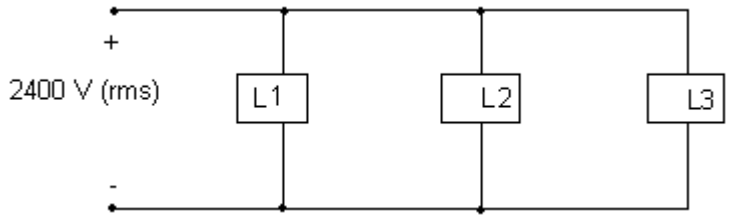
(a) Find the phasor current and phasor voltage at the load, $\bar{I}_L$ and $\bar{V}_L$, respectively.
(b) Calculated power delivered to the load
(c) Calculate (real) power loss in the line
(d) Calculated power supplied by the source



SOLUTION

2. Three loads are connected in parallel across a 2400 V (rms) line, as shown below. Load 1 absorbs 18kW and 24 kVar. Load 2 absorbs 60kVA at 0.6 pf (leading). Load 3 absorbs 18kW 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.



SOLUTION

3. A factory has an electrical load of 1800kW at a lagging power factor of 0.6. An additional variable power factor load is to be added to the factory. The new load will add 600kW to the real power load of the factory. The power factor of the added load is to be adjusted so that the overall power factor of the factory (with the load and the new load) is 0.96 lagging. Assume that the rms voltage at the input to the factory is 4800V.

(a) What is the rms magnitude of the current into the factory BEFORE the new load is added to the factory?

(b) Find the reactive power of the added load.

(c) What is the power factor of the new load?

(d) What is the rms magnitude of the current into the factory AFTER the new load is added to the factory?

SOLUTION