Tutorial 3

Fri 14/08/2015 (5PM – 6:30PM) EE101

1. A two element series circuit has the following voltage and current for ω = 2000 rad/sec, V = $150\angle -45^0$ and I = $4.746\angle -116.6^0$. A second voltage source results in an angle of 30^0between the voltage and current. Determine ω of this second source. What change in frequency would result in a phasor current of 6 Amps? With unlimited variation in frequency, what is the maximum possible phasor current?
2. Find the power factor of a station supplying the following loads:
   250 KW at unity power factor,
   1500 KW at power factor 0.9 lag,
   1000 KW at 0.8 lag,
   700 KW at 0.9 lead.
   If all the loads be carried by the same feeder cable, find what load at unity factor the cable could carry with the same cable heating.

3. For the circuit shown in Fig. 1 determine the total impedance and the angle between voltage phasor and current phasor. f = 50Hz.

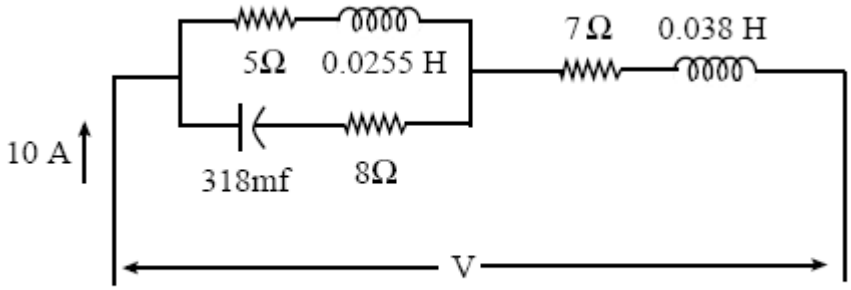

Figure 1

4. A resistor of R = 5Ω and an unknown capacitor are in series. The voltage across the resistor is v = 25 sin(2000t + 30^0) V. If the current leads the applied voltage by 60◦, what is the unknown capacitance C?

5. A single phase load takes a current of 40 A at power factor 0.7 lagging from 440 V, 50 Hz supply. What value must a shunting capacitor is required to improve the power factor to 0.9 lagging, the load remaining the same.

6. Using Theveinin's theorem for the network shown in Fig. 2, find V2 such that the current through the (2 + j3)Ω impedance is zero

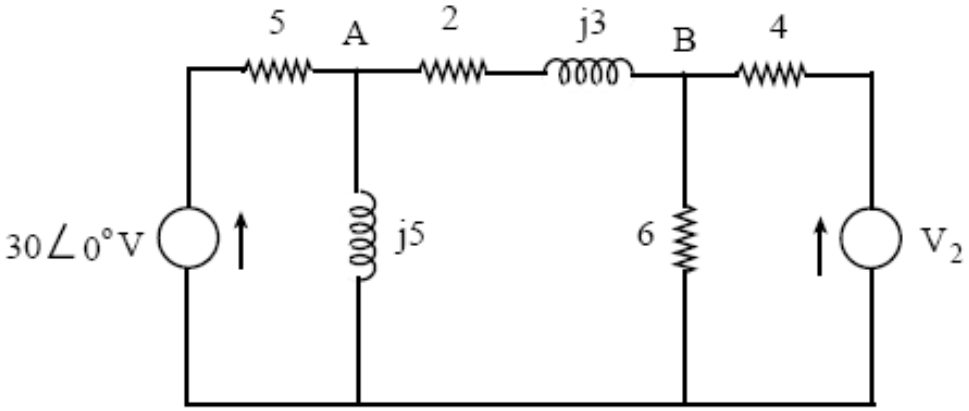

Fig.2

7. The total current entering the parallel circuit shown in Fig. 3 is given by I = 186∠45◦. Determine the potential difference between A and B

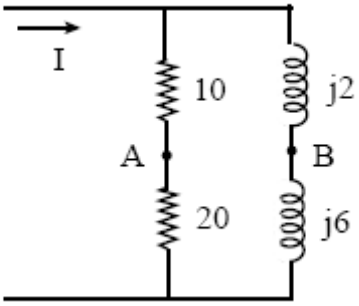

Fig.3

8. Calculate the active and reactive current components in each phase of star connected 10000V, 3 phase generator supplying 5000kW at a power factor of 0.8. If the total current remains the same when the load power factor is raised to 0.9, find the new output.(Note:- Although this has not been taught in class, the students are encouraged to read up on this topic from wiki star-delta transformation)