Sheet (8)... AC and DC transient (Advanced)

1. A series RLC circuit with R - 3000 ohms, L = 10 h and C = 200 μf has a constant voltage V = 50 volts applied at t = 0. Find the current transient and the maximum value of the current if the capacitor has no initial charge.

2. A series RL circuit with R = 50 ohms and L = 0.2 H has a sinusoidal voltage source v = 150 sin (500t + Ø) applied at a time when Ø = 0. Find the complete current.

3. A series RC circuit with R = 100 ohms and C = 25 μf has a sinusoidal voltage source v = 250 sin (500t + Ø) applied at a time when Ø = 0°. Find the current, assuming there is no initial charge on the capacitor.

4. In the RC circuit shown in Fig. 1, the sinusoidal voltage source v = 250 sin (500t + Ø) is applied by closing the switch at a time when Ø = 45°. There is an initial charge q= 5000 X 10^{-6} coulomb on the capacitor with polarity shown on the diagram. Find the complete current.

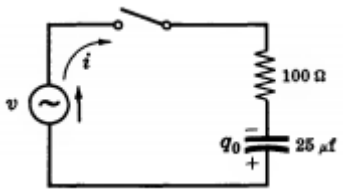

Fig.1

5. The series RLC circuit shown in Fig. 2 has a sinusoidal voltage source v = 100 sin (1000t + Ø). If the switch is closed when Ø = 90°, find the current assuming zero initial charge on the capacitor.

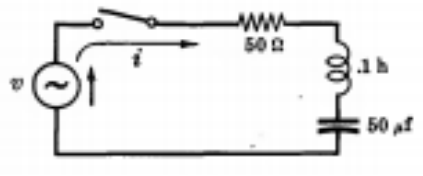

Fig.2

6. In the two-mesh network shown in Fig.3 the switch is closed at t = 0. Find the transient mesh currents i1 and i2 shown in the diagram, and the transient capacitor voltage vc.

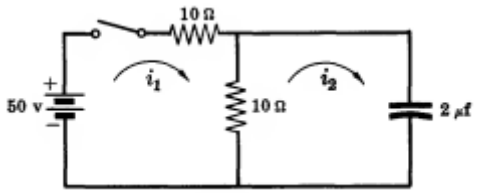

Fig.3

Good Luck

Dr. Basem ElHalawany