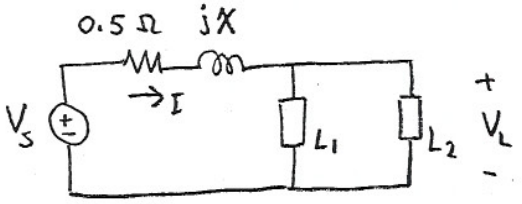
METU/EEED

Spring 2013

EE 202/VPS IV

1)



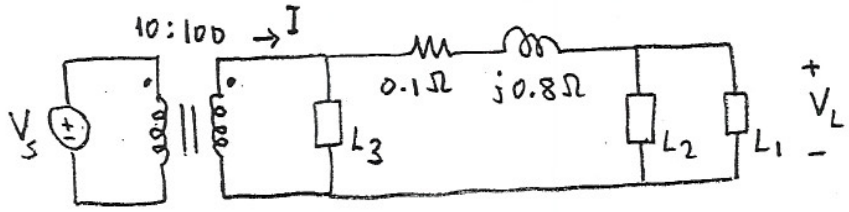
L_1: 4W, resistive

L_2: 5 VA, $pf_2 = 0.6$ leading

$S_s = 9 + j7$ VA

Find I_{eff}, X, $V_{L_{eff}}$, $V_{s_{eff}}$.

2)

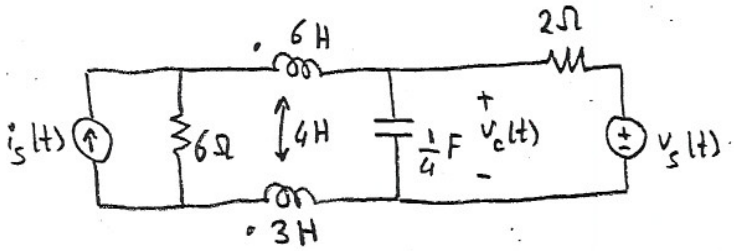


L_1: 0.5 + j0.5 KVA; L_2: 2 KVA, $pf_2 = 0.8$ leading; L_3: 3 KVA, $pf_3 = 0.8$ lagging

$V_{L_{eff}} = 140$ V

Find $V_{s_{eff}}$, I_{eff} and S_s.

3)



$i_s(t) = 10\cos(2t + 30°)$ A.

$v_s(t) = V_m \cos(4t + 45°)$ V

The circuit is in the steady state.

(a) $V_m = 0$. Find

(i) $v_c(t)$,

(ii) The average powers delivered to the resistors and the average stored energies in the dynamic elements,

(iii) The complex power supplied by the current source.

(b) $V_m \neq 0$. The average power delivered to the 6 Ω resistor is 18 W.

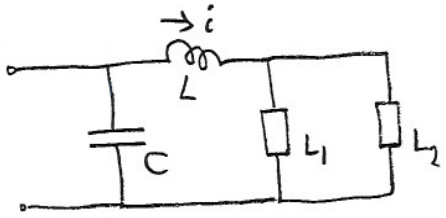
Find

(i) The average power delivered to the 2 Ω resistor and the average stored energies in the dynamic elements,

(ii) The complex power supplied by the voltage source,

(iii) V_m, $v_c(t)$ and $V_{c_{eff}}$.

4)



The circuit is in the sss at $f = 50$ Hz.

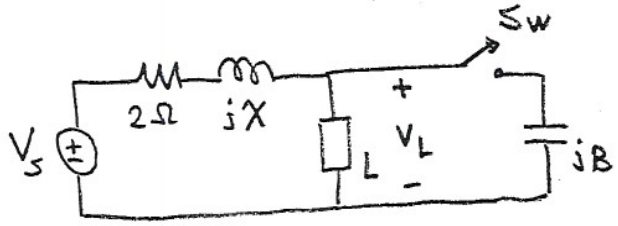
L_1: $\sqrt{29}$ KVA, 5 KW, capacitive

L_2: 3 KVAR, $pf_2 = \frac{1}{\sqrt{2}}$ lagging

$L = \frac{2}{25\pi}$ H, $i_{eff} = 10\sqrt{5}$ A

Determine C so that the power factor of the one-port is $\frac{2}{\sqrt{5}}$ lagging.

5)



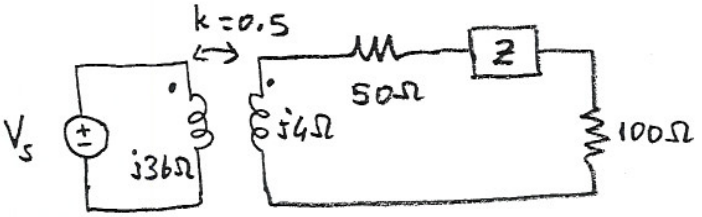
L: 5 VA, inductive, $V_{Leff} = 10$ V

$P_s = 4.5$ W

(a) Sw is open: $V_{seff} = 15$ V. Find X, pf_L and S_s.

(b) Sw is closed: Determine B so that the power factor of load-capacitor combination is 0.96 lagging. Find V_{seff} and S_s.

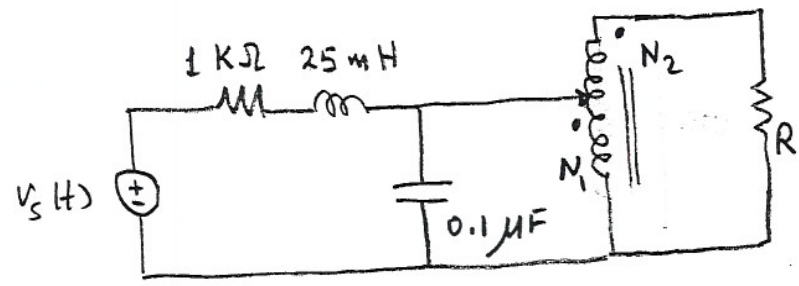
6)



$V_s = 60 \angle 17^\circ$ V

Determine Z so that the average power delivered to the 100 Ω resistor is maximum. Also compute this power.

7)



$v_s(t) = 10\cos(6\times10^4 t)$ V

The circuit is in the sss.

$N_2 = 4000$

$R = 800\sqrt{2}$ Ω

Determine N_1 so that the average power delivered to R is maximum. Also compute this maximum average power.