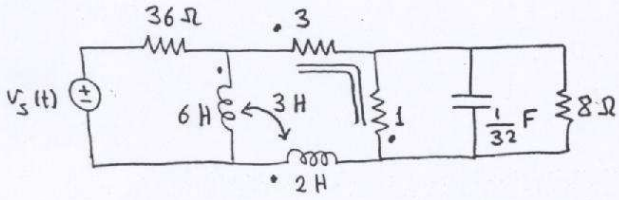
METU/EEED
EE 202/ZPS III

Spring 2009

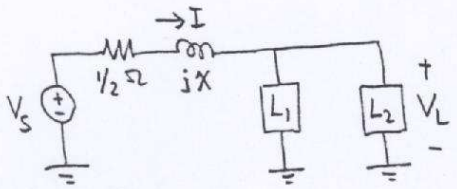
1)



$v_s(t) = 30\cos(4t+24^\circ)$ V
The circuit is in the SSS.

(a) Compute the complex power supplied by the source.
(b) Compute the real powers delivered to the resistive elements and the reactive powers delivered to the dynamic elements.
(c) Verify that the real and reactive powers are conserved.
(d) Compute the average stored energies in the dynamic elements.

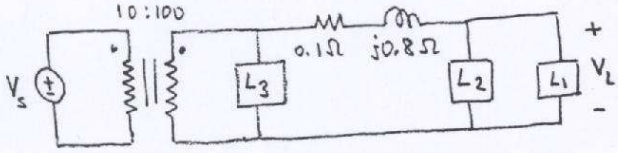
2)



L_1: 4 W, resistive
L_2: 5 VA, $pf_2 = 0.6$ leading
$S_s = 9 + j7$ VA

Find I_{eff}, X, V_{Leff}, V_{seff}.

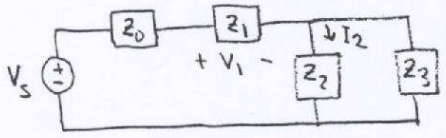
3)



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
$V_{Leff} = 140$ Vrms

Compute the complex power supplied by the source. Find V_{seff}.

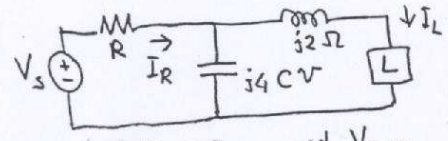
4)



$V_1 = 0.2 + j0.6$ Vrms, $I_2 = 0.6 + j0.8$ A rms
$|V_s| = 1.5$ V, $pf_{source} = 0.8$ leading
$S_1 = 0.8 + j0.4$ VA, $S_2 = -j$ VA

Find Z_0, Z_1, Z_2, Z_3, V_s.

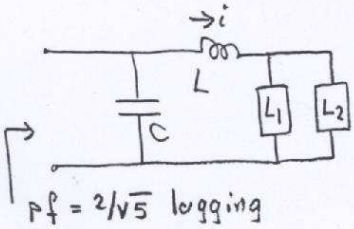
5)



$S_s = 6.6 + j1.5$ VA
L: −4 VAR, $pf = 0.6$
$I_{L\,eff} = 2$ A rms

Find R, C, I_{Reff} and V_{seff}.

6)



$pf = 2/\sqrt{5}$ lagging

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

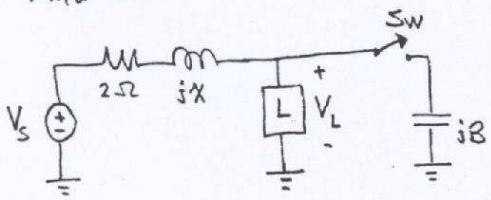
$i_{eff} = 10\sqrt{5}$ Arms, $L = \frac{2}{25\pi}$ H

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

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

Find C.

7)



$V_{L_{eff}} = 10$ Vrms

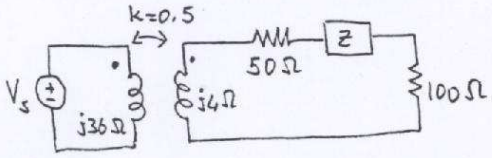
L: 5 VA, inductive

$P_s = 4.5$ W

(a) Sw is open: Find X, pf_{load} and S_s given $V_{s_{eff}} = 15$ Vrms.

(b) Sw is closed ($V_{L_{eff}} = 10$ Vrms): Determine B so that pf_{load} (including the capacitor) is 0.96 lagging. Also find S_s and $V_{s_{eff}}$.

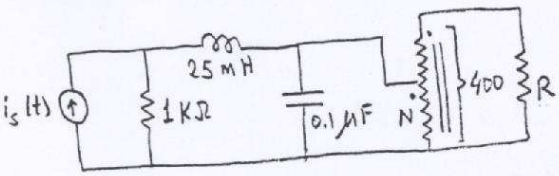
8)



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

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

9)



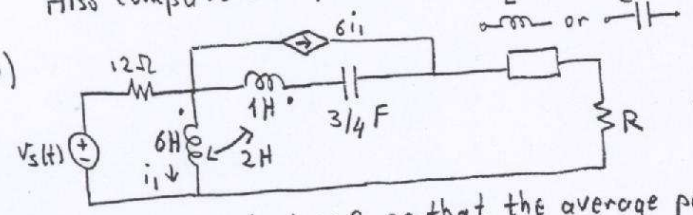
$i_s(t) = 10\cos(4\times10^4 t)$ mA

The circuit is in the SS

$R = 800\sqrt{2}$ Ω

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

10)



$v_s(t) = 20\cos(2t+30^\circ)$ V

The circuit is in the SSS.

Determine R and L or C so that the average power delivered to R is maximum. For these values of R and L or C compute the complex powers supplied by the sources and the average powers delivered to the resistors.