EC 1010: Electrical and Magnetic circuits.

Problem set # 7 (Due on 15 Apr. 2013)

**HKD:** Hayt, Kemmerly, and Durbin

Engineering circuit analysis, 7th Edition

Tata McGraw Hill 2010, 2006

MK: Murthy and Kamath

Basic circuit analysis,

Jaico Books 1998

Problem 1:
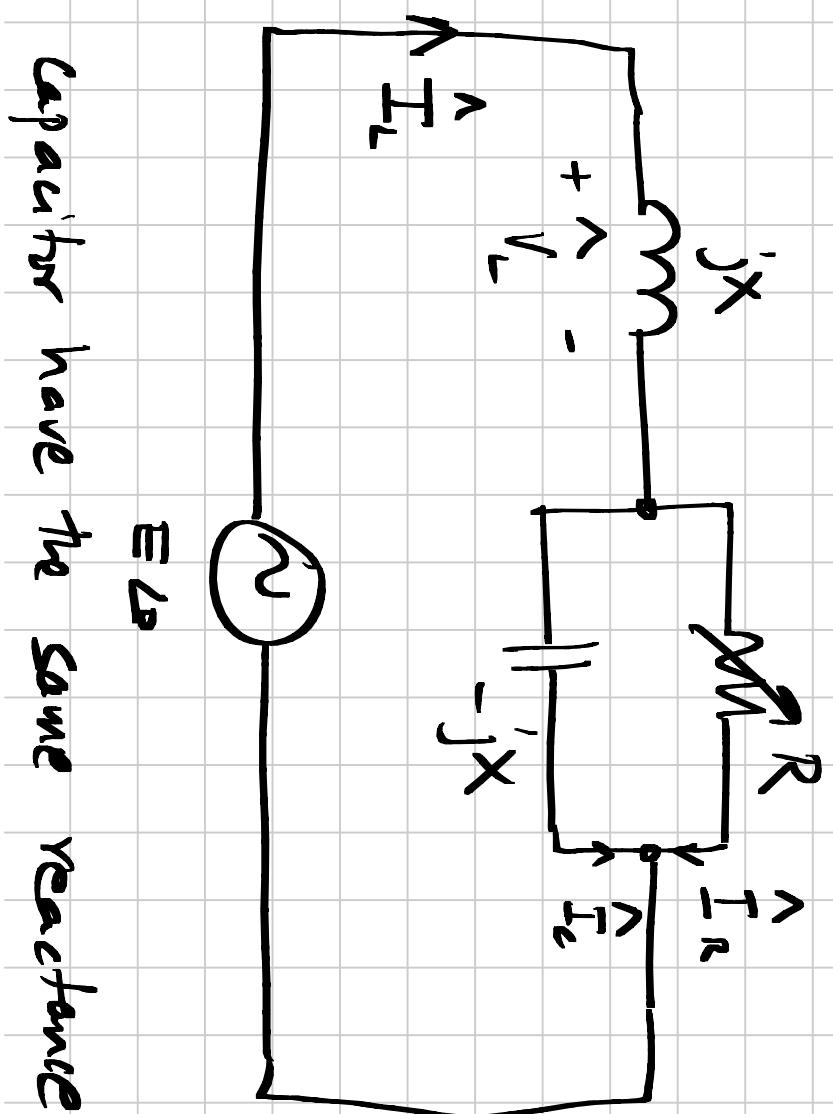
The inductor and capacitor have the same reactance at the

frequency of excitation.

(a) Calculate I_R, the current through the resistor, in terms of E, X & R.

(b) Draw a phasor diagram indicating the current through and voltage across R, L, C and the source.

(c) Draw the loci of (i) V_c (ii) I_c (iii) I_L and V_L as R is varied from 0 to ∞.

Problem 2

$Y(j\omega) \rightarrow$
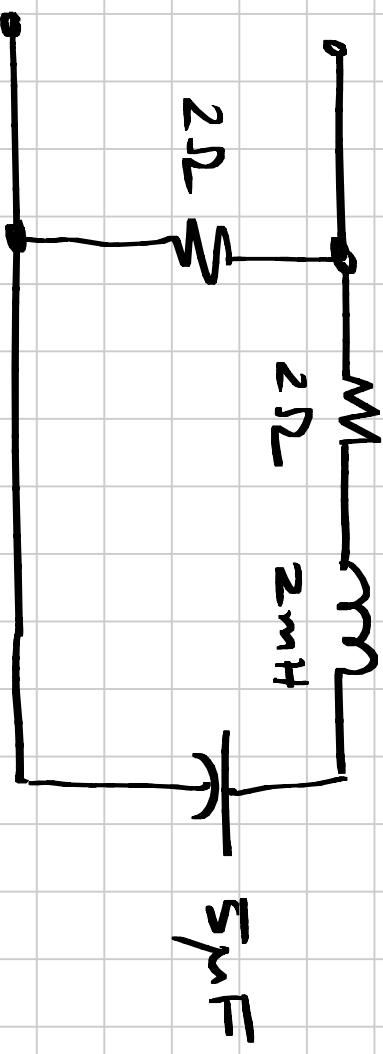
Compute $Y(j\omega)$ and draw its locus as ω varies from 0 to ∞.

Problem 3

$Y(j\omega) \rightarrow$
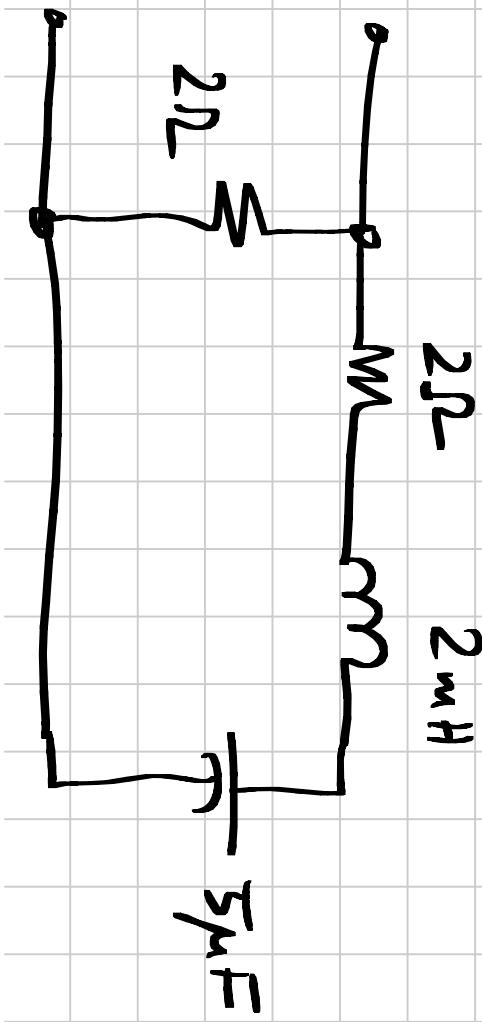
Draw the locus of $Y(j\omega)$ as ω varies from 0 to ∞.

Problem 4

$2\angle 0$
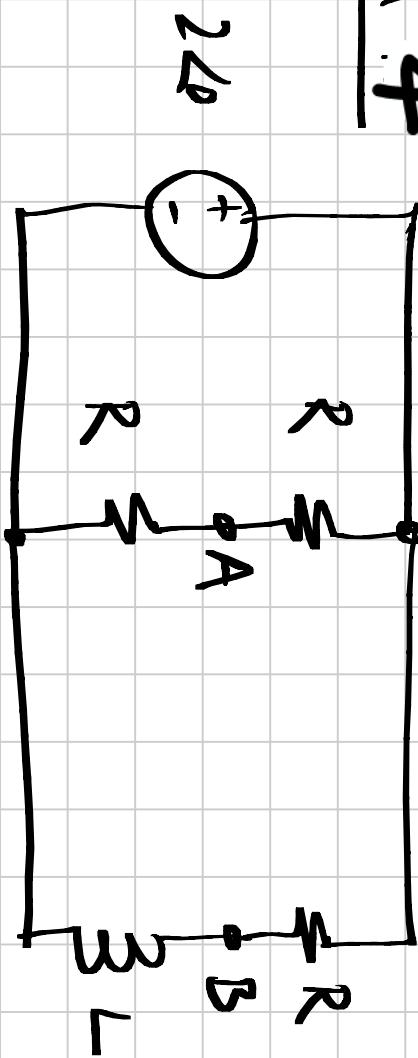
Use a locus diagram to show that the magnitude of V_{AB} does not change with frequency.

Problem 5

$Y(j\omega)$

Plot the admittance locus of Y as C is varied, for some fixed ω.
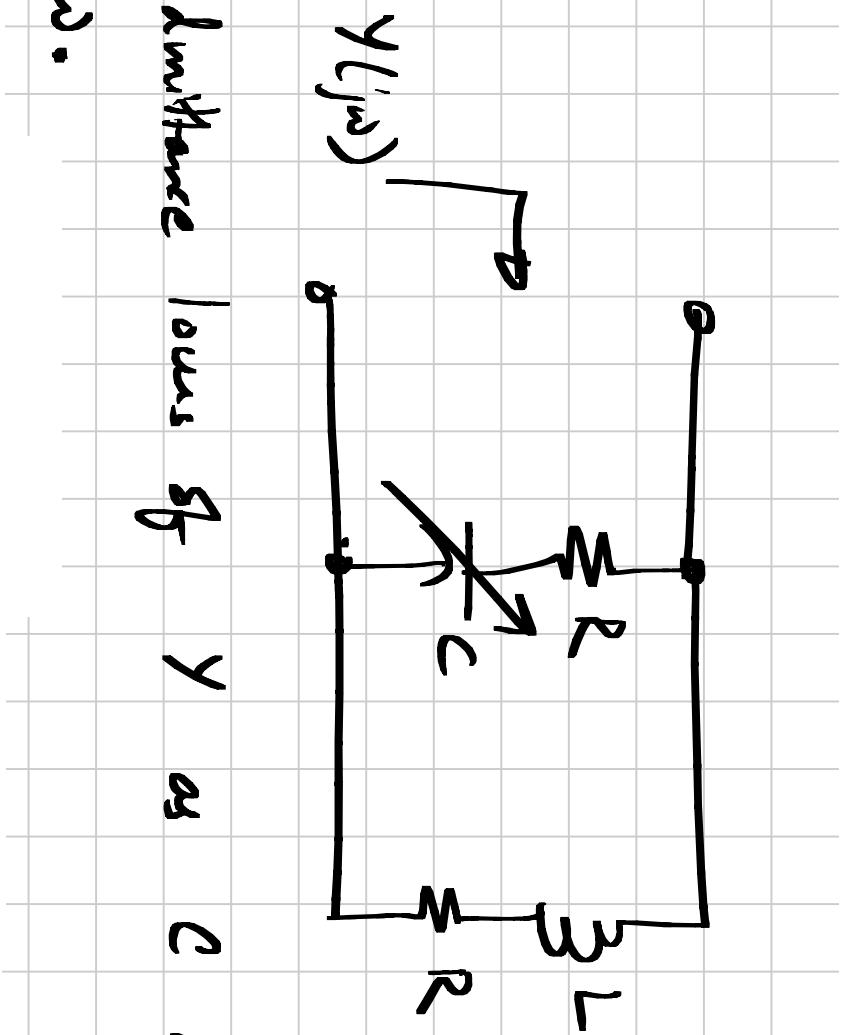
Part 2: 3 phase systems & power measurement

6.

R · ————→ Current coil ———— · R

Balanced
source

Y · ——————[Am]—————— · Y

+ − Voltage coil: Balanced load

B · ——————————————— · B
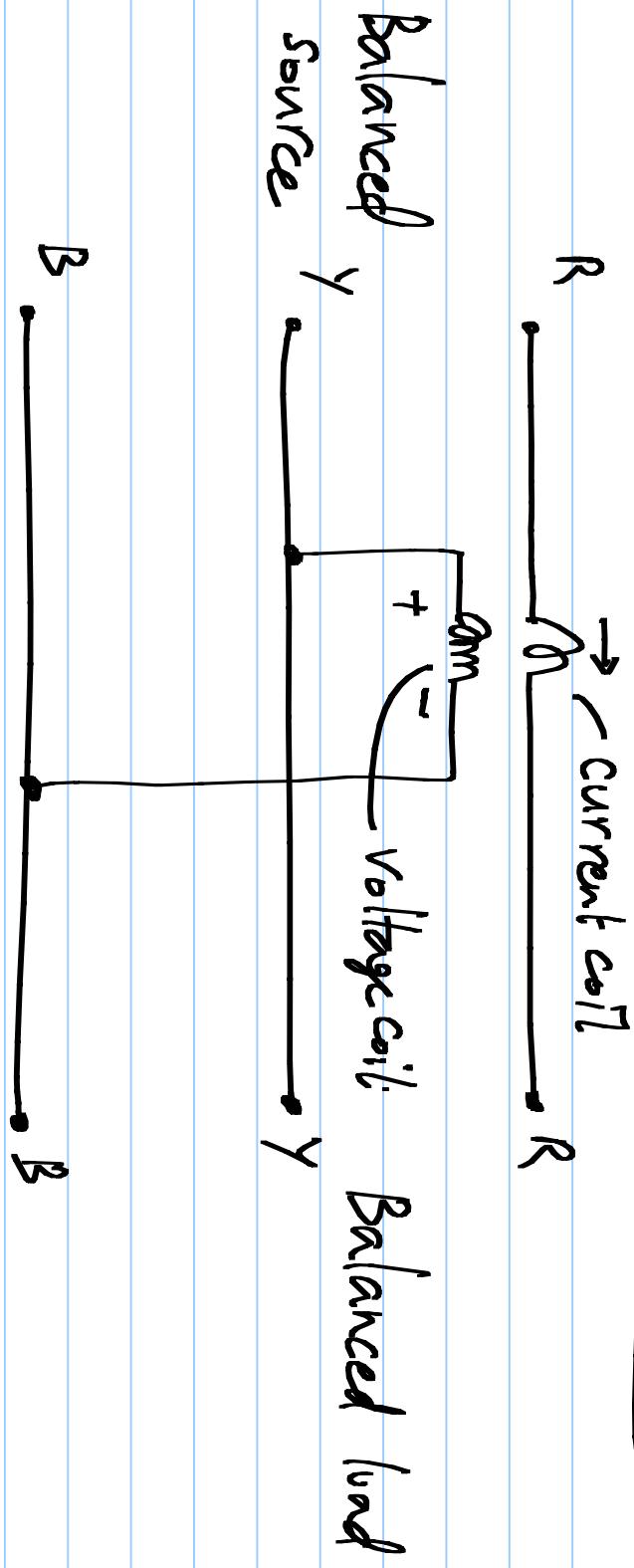
A wattmeter is connected as above between a balanced source & a balanced load. What does it's reading represent.

7. MS, P 10.4

8. MS, P 10.15

9. MS, P 10.16

10. MS, P 10.17