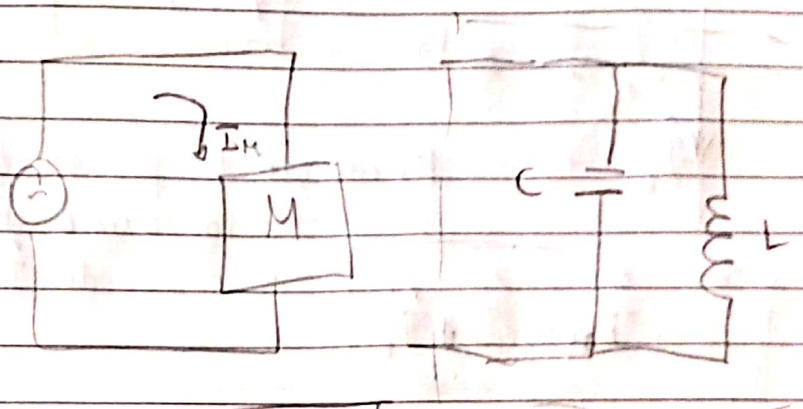
Ej 2



$V_{rms} = 170\ V \rightarrow \boxed{V_0 = 169,7\ V}$

$f = 50\ Hz \rightarrow \boxed{\omega = 314,16\ rad/s}$

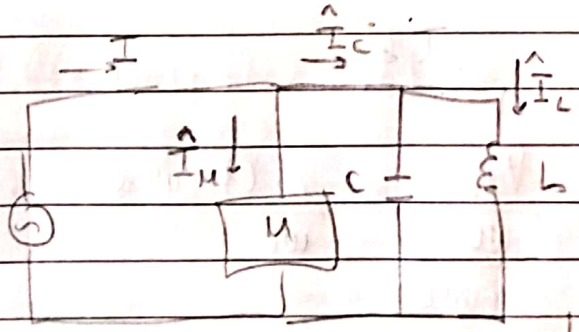
$P_M = 0,5\ kW$

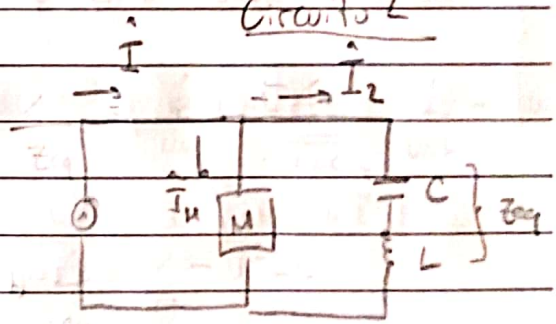
fac pot $= 0,6 \rightarrow \boxed{\phi = 53,13°}$

Corriente adelanta el voltaje fuente

a) $P = V_{rms} I_{rms} \cos\phi \rightarrow \boxed{I_{rms} = 4,91\ A}$

b)





fac pot $= 1 \rightarrow \boxed{\phi' = 0}$

$\frac{1}{Z_{eq}} = \frac{1}{Z_L} + \frac{1}{Z_C}$

$\frac{1}{Z_{eq}} = \frac{1}{i\omega L} + \frac{1}{\frac{1}{i\omega C}}$

$\frac{1}{Z_{eq}} = \frac{1}{i\omega L} + i\omega C = \frac{1 - \omega^2 LC}{i\omega L}$

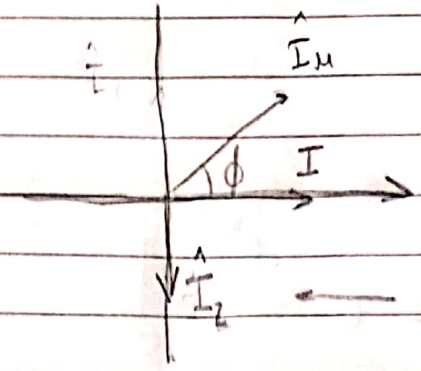
$\boxed{Z_{eq} = \frac{i\omega L}{1 - \omega^2 LC}}$

$\hat{I}_M$ es la corriente de la parte anterior

$\boxed{|\hat{I}_M| = \sqrt{2}\, I_{rms} = 6,94\ A}$

$\phi = 53,13°$

porque sabemos que adelanta respecto al voltaje (por letra)



$\phi = 53,13°$

En este sentido para que anule la componente imaginaria de $\hat{I}_M$

kirchoff $\hat{I} = \hat{I}_M + \hat{I}_2$

- Circuito 2: $V_0 - Z_{eq}\hat{I}_2 = 0$

$$\Rightarrow \hat{I}_2 = \frac{V_0}{Z_{eq}} = \frac{V_0}{\frac{i\omega L}{1-\omega^2 LC}} = \frac{V_0 \cdot (1-\omega^2 LC)}{i\omega L}$$

$$|\hat{I}| = |\hat{I}_M| \cos\phi$$

$$0 = |\hat{I}_M| \sin\phi - |\hat{I}_2|$$

$$\Rightarrow |\hat{I}_M| \sin\phi = \frac{V_0}{|Z_{eq}|} = \frac{V_0}{\frac{\omega L}{1-\omega^2 LC}} = \frac{V_0 (1-\omega^2 LC)}{\omega L}$$

$$\Rightarrow 5,55 = \frac{V_0 (1-\omega^2 LC)}{\omega L} \Rightarrow 0,308 = 1-\omega^2 LC$$

$$\Rightarrow \omega^2 LC = 0,692 \quad \boxed{C = 2,33 \times 10^{-4}\ F}$$