$\omega = 600 \ \frac{rad}{s}$

$V = 1e^{j\omega t}$

$R = 400 \ \Omega$

V_{in} — W — $\circ V_{out}$

I_0

$L = 500 \ mH$

$Z_L = j\omega L$

$\hookrightarrow j \, 300$

$X = 400 + j\,300$
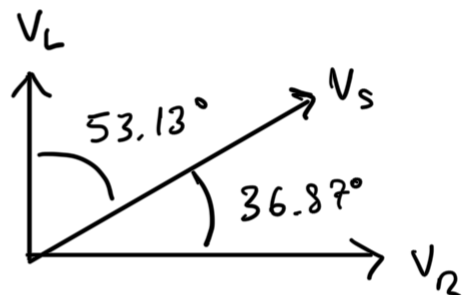
$I_0 = \dfrac{1}{500 \angle 36.87^\circ} e^{j\omega t}$

$I_0 = \dfrac{1e^{j\omega t}}{R + j\omega L}$

1.) $\hookrightarrow I = (2mA) \, e^{j(\omega t - \tan^{-1} 3/4)}$

$V_L = j\omega L \left[\dfrac{1e^{j\omega t}}{R + j\omega L} \right]$

$V_L = I \cdot Z_L$

2.) $V_L = .6 \, e^{j(\omega t + \frac{\pi}{2} - \tan^{-1} 3/4)}$

V_L — 53.13° — V_s — 36.87° — V_R

3.) $\boxed{\dfrac{V_{out}}{V_{in}} = H(j\omega)} = j\omega L \left[\dfrac{1e^{j\omega t}}{R + j\omega L} \right]$

sinusodal Response

$$H(j\omega) = \frac{j\omega L}{R + j\omega L}$$
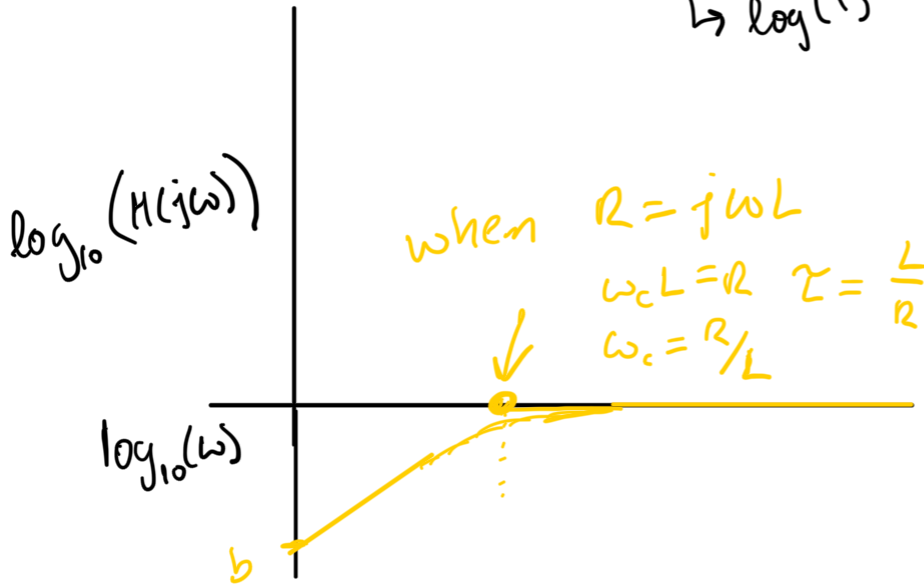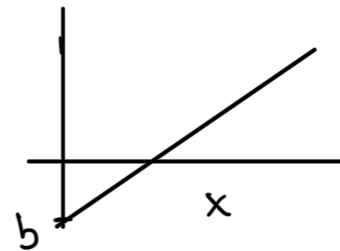
large ω

$\rightarrow \log(1) = 0$ small ω

$\log\left(\frac{j\omega L}{R}\right)$ vs $\log(\omega)$

$\rightarrow \log(\omega) + \log(\frac{L}{R})$

$y = x \quad + b$

$\log_{10}(H(j\omega))$

when $R = j\omega L$

$\omega_c L = R \quad \tau = \frac{L}{R}$

$\omega_c = R/L$

$\log_{10}(\omega)$

b

High pass filter:

lets through high f
filiters out low f

x

b

when λ_1, λ_2 are

- distinct & Real $\Rightarrow$ overdamped

- $=$ & Real $\Rightarrow$ critically damped

- complex $\Rightarrow$ underdamped