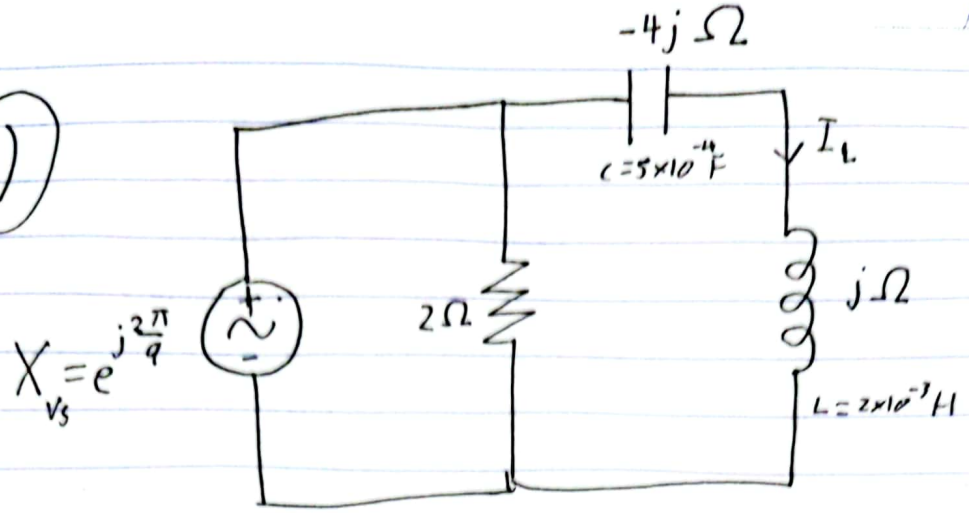
6)



ω=500

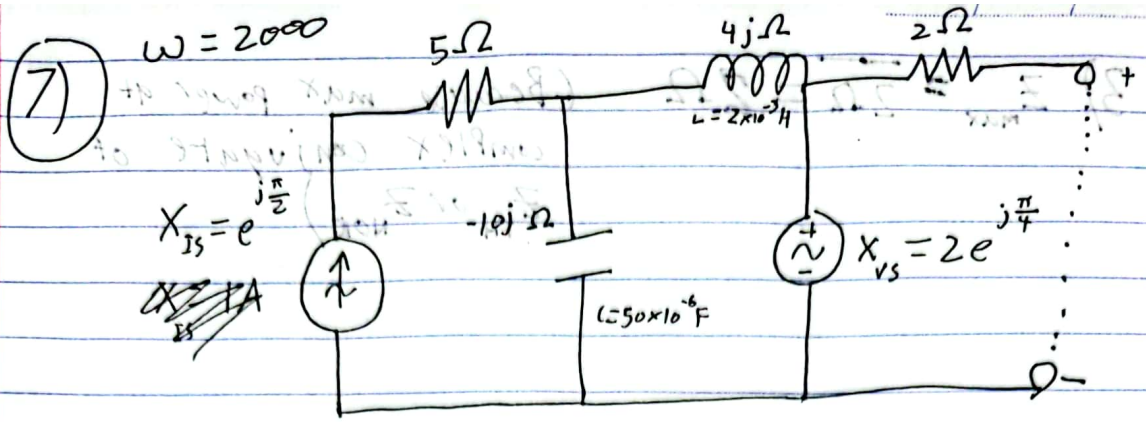
1) $V_1 = e^{j\frac{2\pi}{9}} \frac{j}{-3j} = -\frac{e^{j\frac{2\pi}{9}}}{3}$

$\therefore I_L = \frac{-\frac{e^{j\frac{2\pi}{9}}}{3}}{j} = \frac{-e^{j\frac{2\pi}{9}}}{3e^{j\frac{\pi}{2}}} = -\frac{e^{-j\frac{5\pi}{18}}}{3} = -\frac{e^{j\frac{31\pi}{18}}}{3}$ (current divider)

$\therefore I_L = \frac{1}{3}\cos(500t + 310^\circ)\,A$

2) $t=0 \Rightarrow I_L = \frac{-\cos(310^\circ)}{3} \approx -0.2142625$

7) $\omega = 2000$



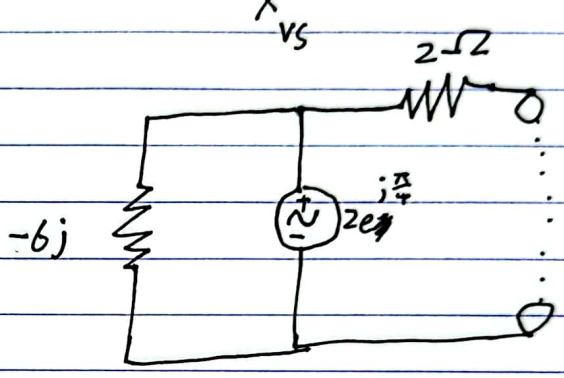
1) $Z_{TH} = Z_{NOR} =$ ~~$(5 \| -10j) + 4j$~~ $2\,\Omega$ (since all current flows through no-resistance zeroed wire)

Superposition

X_{Is}

With X_{Is}, no current reaches terminals.

X_{Vs}



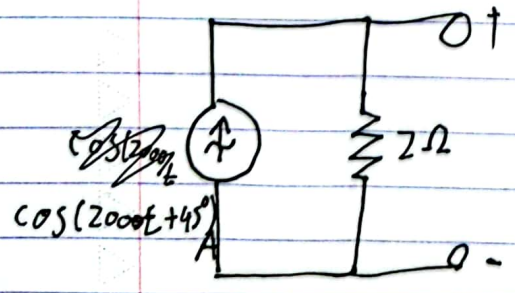
$\therefore I_{NOR} = e^{j\frac{\pi}{4}}$ (because $\frac{2e^{j\frac{\pi}{4}}}{2} = \frac{V}{Z} = e^{j\frac{\pi}{4}}$)

$I_{NOR} = \cos(2000t + 45°)\,A$

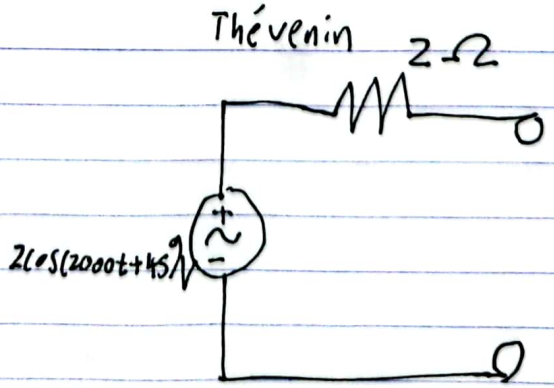
$\therefore V_{TH} = 2\cos(2000t + 45°)\,V$

2)

Norton



Thévenin



3) $Z_{max} = \overline{2\Omega} = 2\Omega$ (Because max power at complex conjugate of Z_{TH} or Z_{NOR})