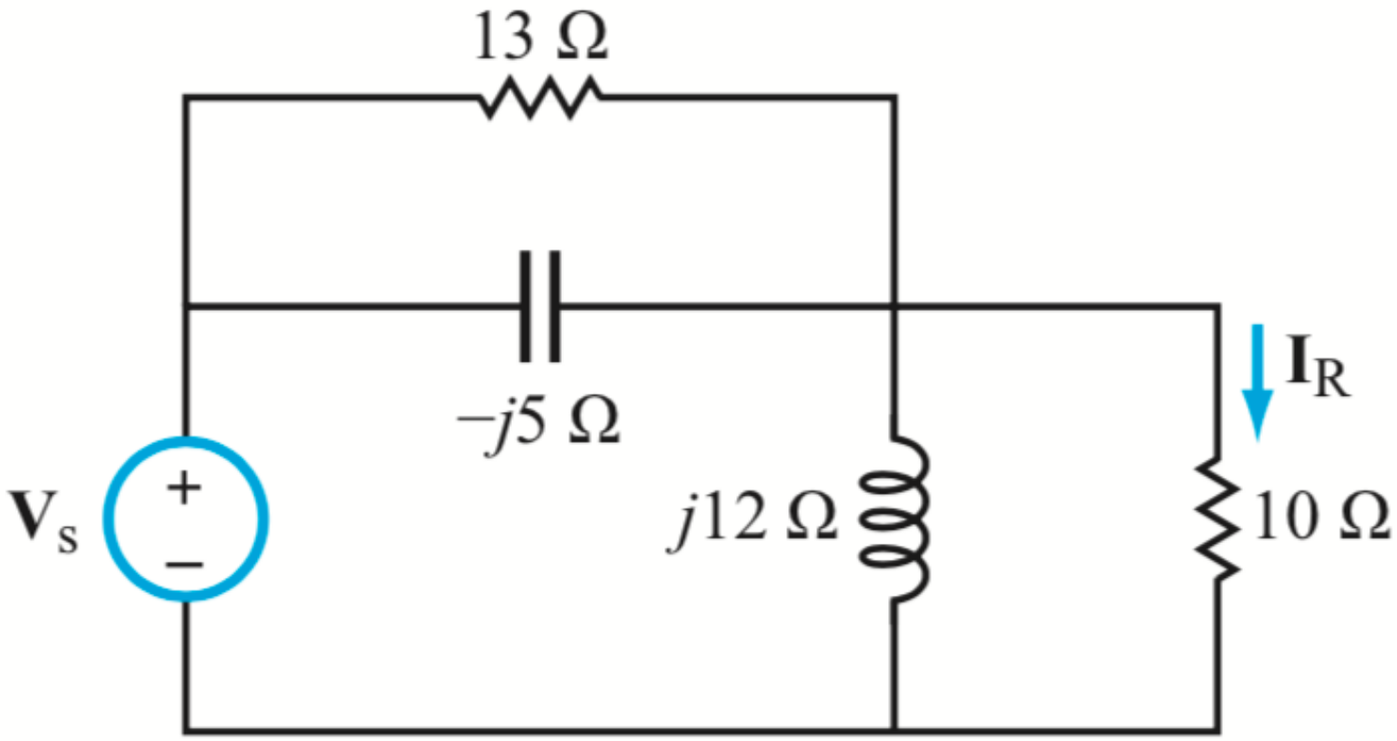
# Extra Problem 1

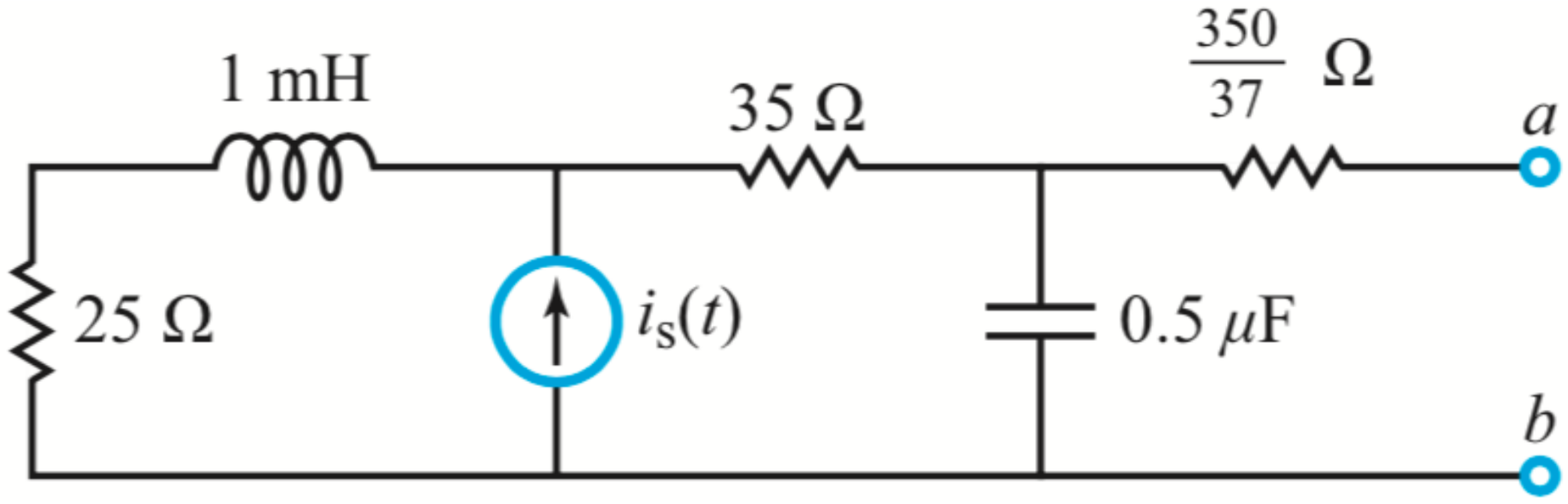
- Find $\boldsymbol{I_R}$, given that $\boldsymbol{V_S} = 25V$.



# Extra Problem 2

Your objective is to obtain a Thevenin, given that $i_S$(t)=3$\cos(4\times10^4 t)$, then:

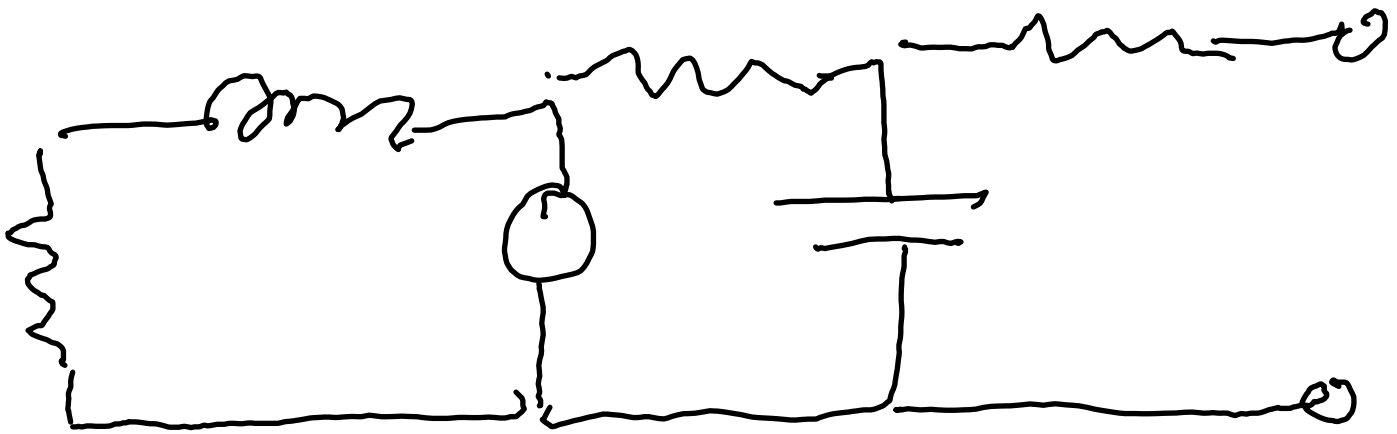
- Transform the circuit to the phasor domain.
- Apply the source-transformation technique to obtain the The venin equivalent circuit at terminals (a, b).
- Transform the phasor-domain Thevenin circuit back to the time domain.

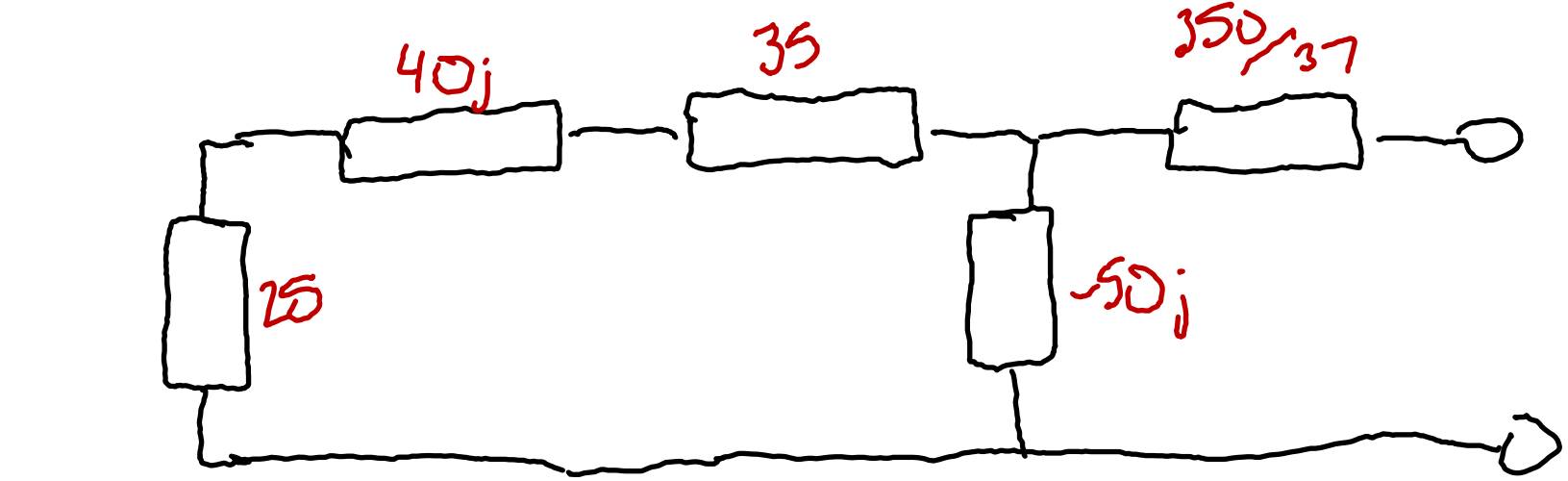


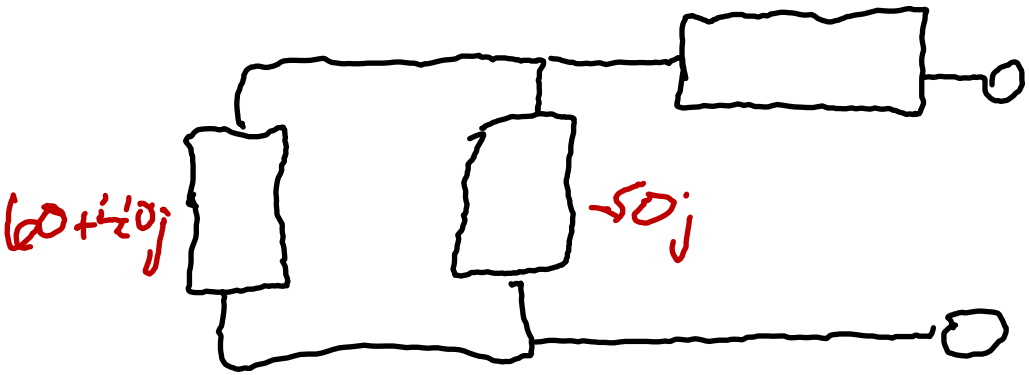
$\omega = 40k$

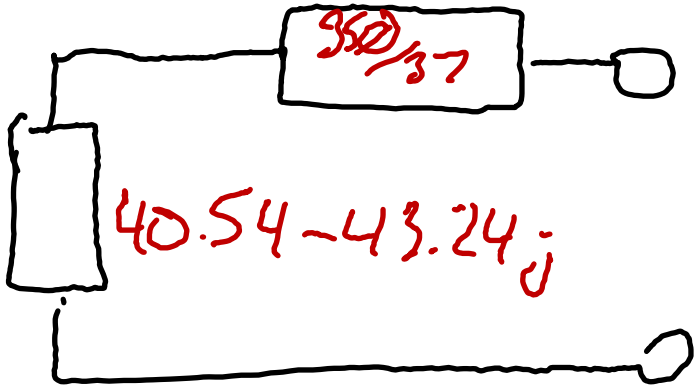
$j\omega C = 40k \cdot 1m \cdot j = 40j$

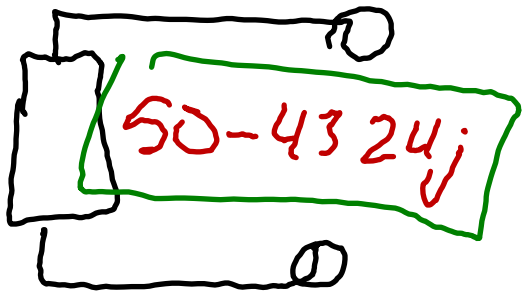
$\frac{-j}{\omega F} = \frac{-j}{40k \cdot .5\mu} = -50j$

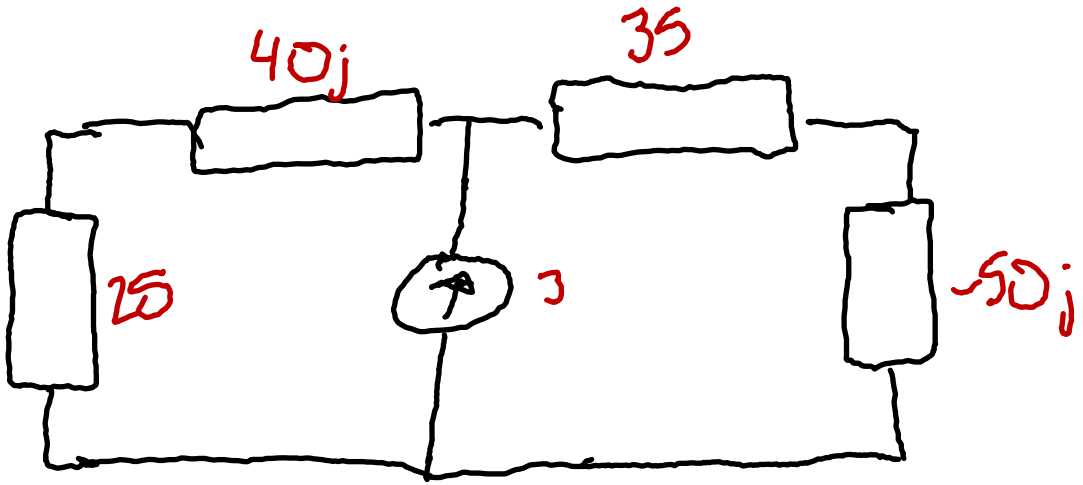


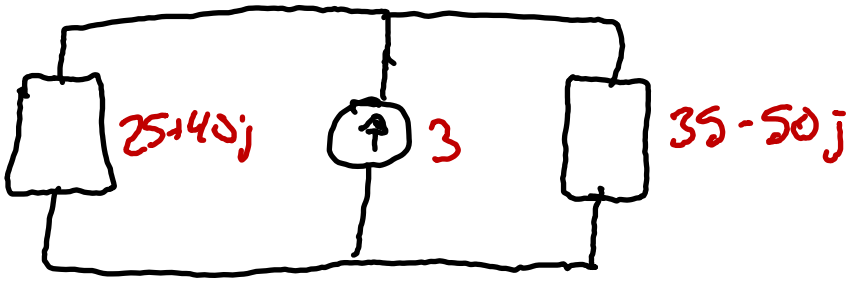

40j
35
350/37
25
-50j


60+120j
-50j


350/37
40.54-43.24j


50-43.24j




$$V_{TH} = -50j\, I_1$$

$$Z_{eq} = \frac{(25+40j)(35-50j)}{60-10j}$$

$$I_1 = \frac{Z_{eq}}{R_1} \cdot I_s$$

$$= \frac{25+40j}{60-10j} \cdot 3 = 2.326 \angle 67.45$$

$$V_{TH} = -50j($$

# Extra Problem 3

- Determine the complex power, apparent power, average power absorbed, reactive power, and power factor for a load circuit whose voltage and current at its input terminals are given by:
  - $v(t) = 100\cos(377t - 30°)\ V,\ i(t) = 2.5\cos(377t - 60°)\ A.$
  - $v(t) = 25\cos(2\pi\times10^3 t + 40°)\ V,$

    $i(t) = 0.2\cos(2\pi \times 10^3 t\ - 10°)A.$
  - $\boldsymbol{V} = 110\angle 60°\ V,\ \boldsymbol{I} = 3\angle 45°\ A.$
  - $\boldsymbol{V} = 440\angle 0°V, \boldsymbol{I} = 0.5\angle 75°A.$

# Extra Problem 4

- In the circuit below, $v(t) = 40\cos(105t)\,V$, $R_1 = 100\,\Omega$, $R_1 = 500\,\Omega$, $C = 0.1\,\mu F$, and $L = 0.5\,mH$. Determine the complex power for each passive element, and verify that conservation of energy is satisfied.