ECE2150J Homework 4

Deadline: 7th December 2024

Problem 1

(a) (10%) Obtain the equivalent admittance Y_{in} of the circuit at $\omega = 100\,\text{rad/s}$.

(b) (10%) Obtain the equivalent impedance Z_{in} of the circuit.

(c) (10%) Obtain the equivalent impedance Z_{ab} of the circuit.

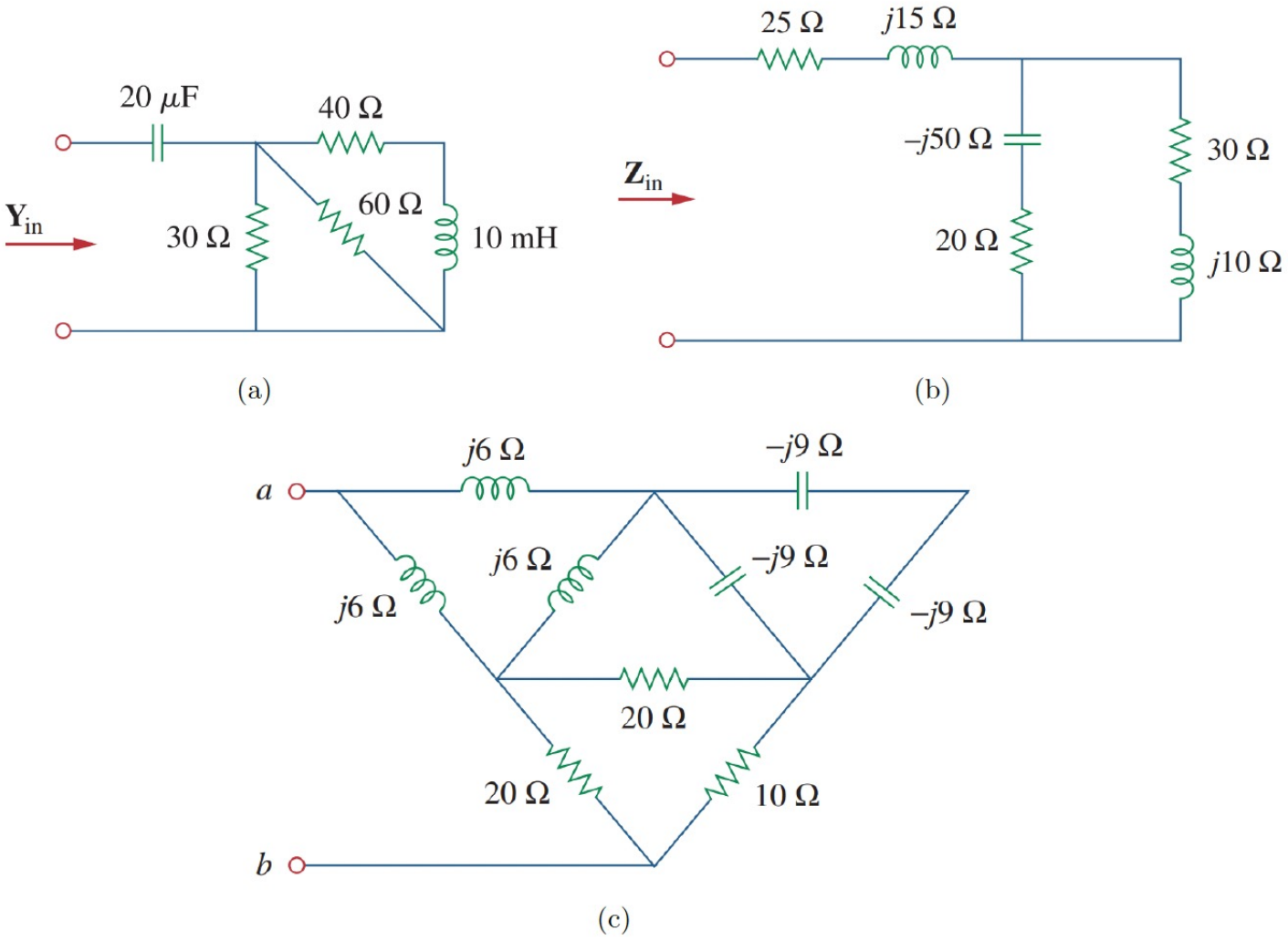

Figure 1: Circuit for Problem 1

Problem 2

(a) (30%) Please find the Thevenin equivalent circuits between terminal a and b under $\omega = 2000\,\text{rad/s}$ and $\omega = 4000\,\text{rad/s}$.

- **Hint:** Consider whether to turn on or turn off the voltage source and current source based on the frequency you choose.

(b) (10%) Please draw two phasor diagrams of the two Thevenin equivalent impedances under the two frequencies ($\omega = 2000\,\text{rad/s}$ and $\omega = 4000\,\text{rad/s}$).

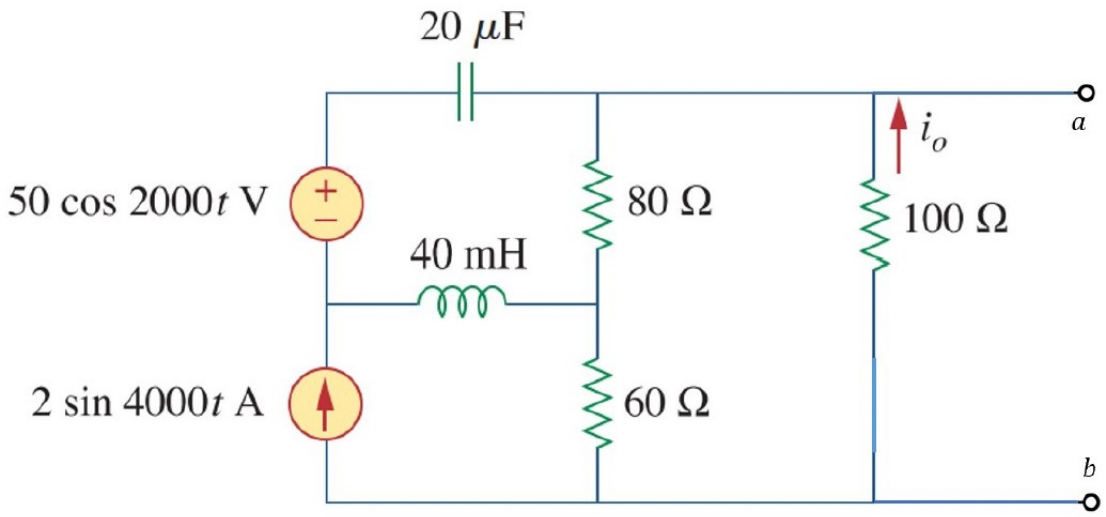

Figure 2: Circuit for Problem 2

Problem 3

Given the circuit below, calculate the equivalent impedance in each of the blocks. Also find I_o and the overall complex power supplied.

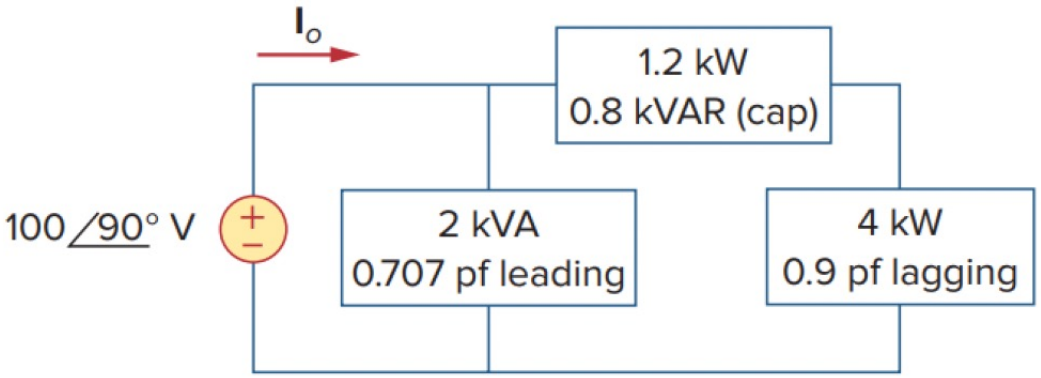

Figure 3: Circuit for Problem 3