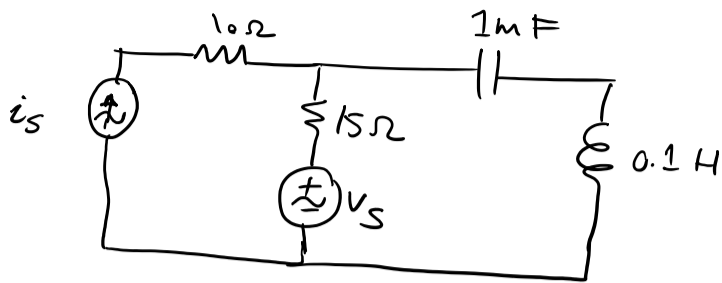


Exercise 9, Q1

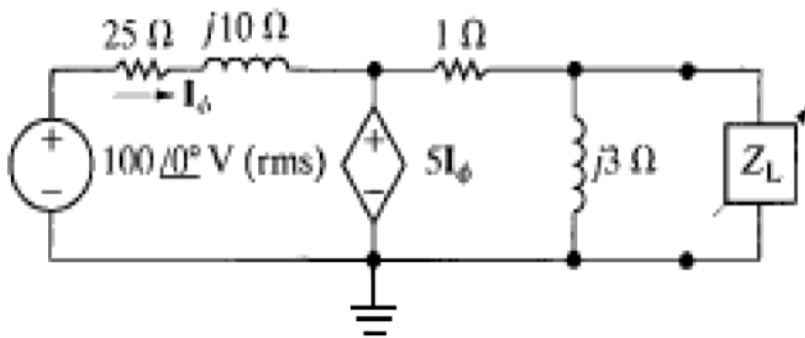
For the circuit below, use the phasor concept to find the voltage $v_o(t)$.



$$V_s(t) = 6\ \text{cos}(50t - 60^\circ)$$
$$i_s(t) = 15\ \text{cos}(200t + 45^\circ)$$

Exercise 9, Question 2 (discussion 11, P3)

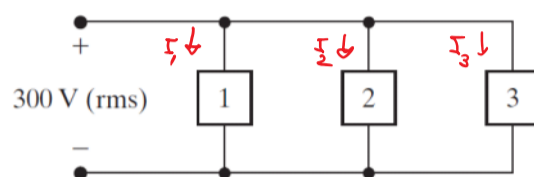
- A. the load impedance value, Z_L , so that maximum average power is delivered to the load;
- B. the maximum average power that can be delivered to the load, $P_{ave,max} = \frac{|V_{Th}|^2}{4R_{Th}}$, where V_{Th} is the Thevenin phasor voltage in rms and R_{Th} is the resistive component of the Thevenin impedance.



Exercise 9, Question 3

10.28 Three loads are connected in parallel across a 300 V(rms) line, as shown in Fig. P10.28. Load 1 absorbs 3 kW at unity power factor; Load 2 absorbs 5 kVA at 0.8 leading; Load 3 absorbs 5 kW and delivers 6 kvars.

- Find $I_{1,rms}$, the rms of current I_1
- Find $I_{2,rms}$, the rms of current I_2
- Find S_1 , the complex power of Load 1
- Find S_2 , the complex power of Load 2
- Find Z_1 , the impedance of Load 1 and draw it in terms of circuit elements
- Find Z_2 , the impedance of Load 2 and draw it in terms of circuit elements



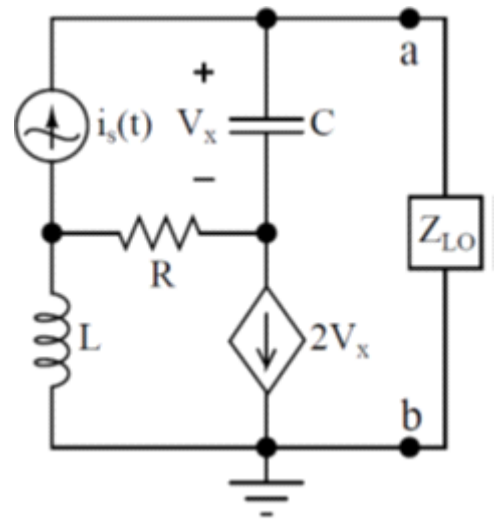
Exercise 9, Q4

4. Given that $i_s(t) = 4\cos(10t)$ A, $R = 3\Omega$,

$L = 0.1$ H, and $C = 0.2$ F,

A. Determine the load impedance value, Z_{LO} , so that maximum average power is delivered to the load;

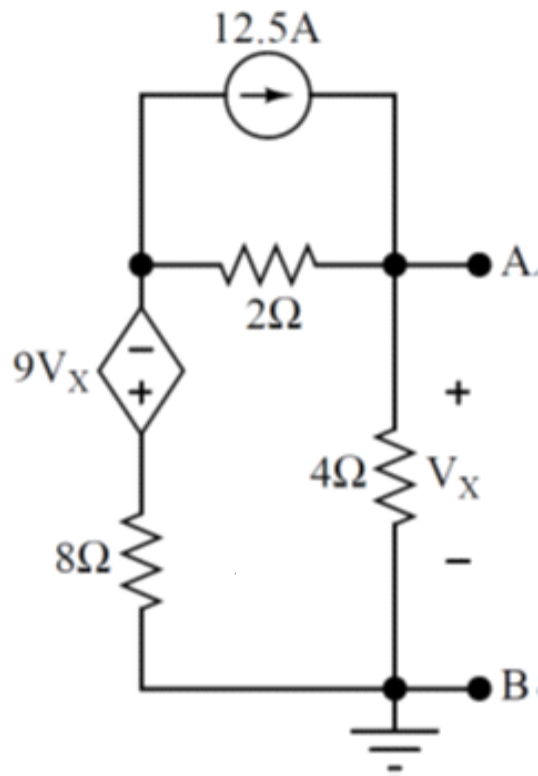
B. the maximum average power that can be delivered to the load, $P_{ave,max} = \frac{|V_{Th}|^2}{4R_{Th}}$, where V_{Th} is the Thevenin phasor voltage in rms and R_{Th} is the resistive component of the Thevenin impedance.



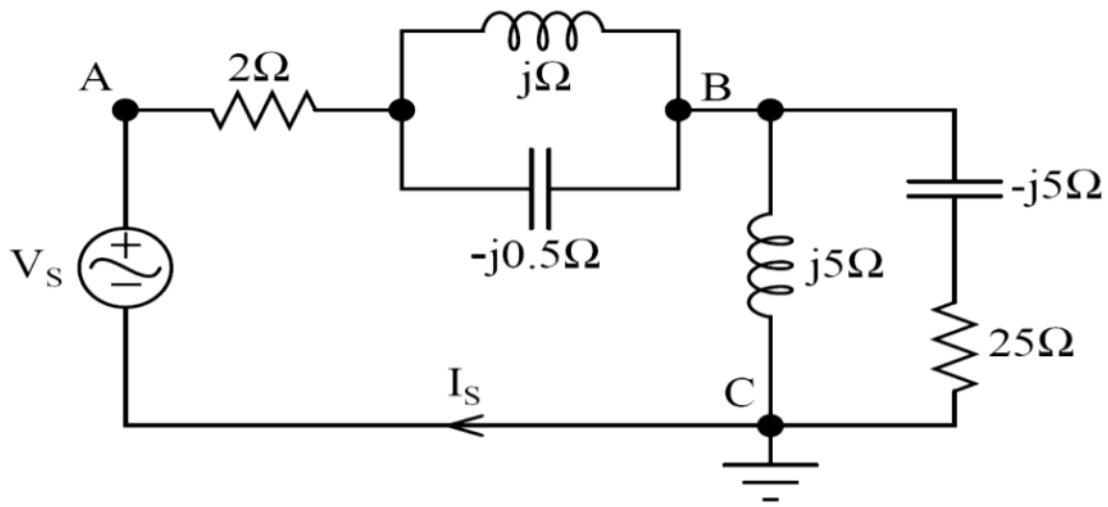
Exercise 9, Q5

1. Determine the Thevenin equivalent circuit of the network by finding

- A. the Thevenin equivalent resistance, R .
- B. the Thevenin equivalent voltage, V ;



Exercise 9, Q6



Given that $V_s = 60\angle 0^\circ V_{rms}$, determine

- the equivalent load impedance between terminals A and B, Z_{AB} ;
- the equivalent load impedance between terminals B and C, Z_{BC} ;
- the total load impedance seen by the voltage source, Z_L ;
- the rms value of the phasor current, I_s ;
- the average powers associated with Z_{AB} , Z_{BC} , and Z_L ;
- the reactive powers associated with Z_{AB} , Z_{BC} , and Z_L .