ECE 3364, Dr. Hebert, Fall 2016 HW 04 due 9/22

Problem 1.
Nilsson, 8th edition
Problem 11.37

Problem 2.
Nilsson, 8th edition
Problem 11.43

Problem 3.
Nilsson, 8th edition
Problem 11.46

Problem 4.
Nilsson, 8th edition
Problem 11.47

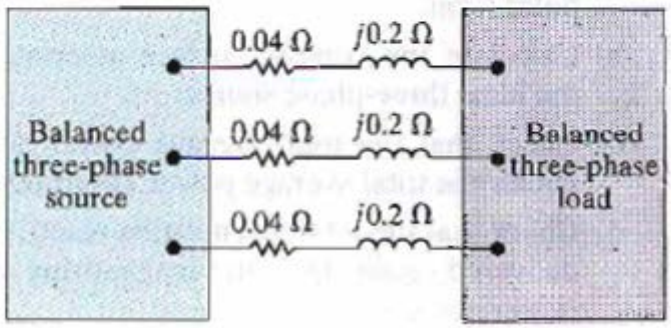
Problem 5.
Nilsson, 8th edition
Problem 11.50

11.37 The output of the balanced positive-sequence three-phase source in Fig. P11.37 is 78 kVA at a leading power factor of 0.8. The line voltage at the source is $208\sqrt{3}$ V.

a) Find the magnitude of the line voltage at the load.

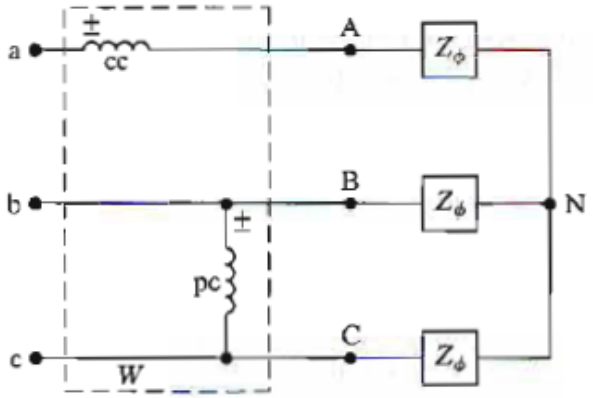
b) Find the total complex power at the terminals of the load.

Figure P11.37



11.43 In the balanced three-phase circuit shown in Fig. P11.43, the current coil of the wattmeter is connected in line aA, and the potential coil of the wattmeter is connected across lines b and c. Show that the wattmeter reading multiplied by $\sqrt{3}$ equals the total reactive power associated with the load. The phase sequence is positive.

Figure P11.43



11.46 The balanced three-phase load shown in Fig. P11.46 is fed from a balanced, positive-sequence, three-phase Y-connected source. The impedance of the line connecting the source to the load is negligible. The line-to-neutral voltage of the source is 4800 V.

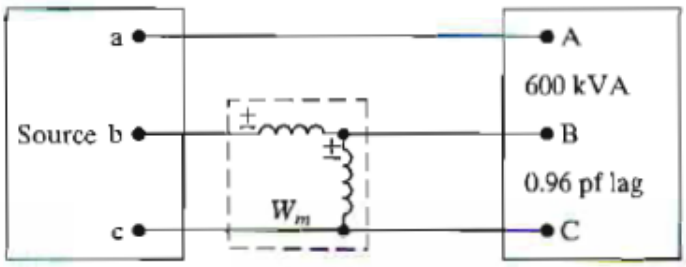
a) Find the reading of the wattmeter in watts.

b) Explain how you would connect a second wattmeter in the circuit so that the two wattmeters would measure the total power.

c) Calculate the reading of the second wattmeter.

d) Verify that the sum of the two wattmeter readings equals the total average power delivered to the load.

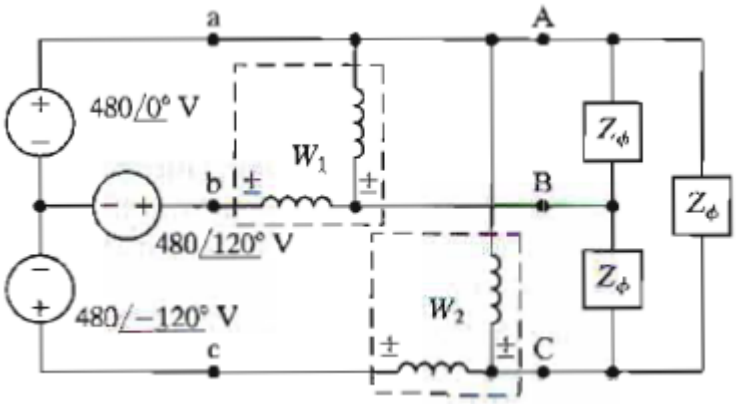
Figure P11.46



11.47 a) Calculate the reading of each wattmeter in the circuit shown in Fig. P11.47. The value of Z_ϕ is $60 \angle 30^\circ\ \Omega$.

b) Verify that the sum of the wattmeter readings equals the total average power delivered to the Δ-connected load.

Figure P11.47



11.50 a) Calculate the reading of each wattmeter in the circuit shown in Fig. P11.50 when $Z = 276 - j207\ \Omega$.

b) Check that the sum of the two wattmeter readings equals the total power delivered to the load.

c) Check that $\sqrt{3}(W_1 - W_2)$ equals the total magnetizing vars delivered to the load.

Figure P11.50