

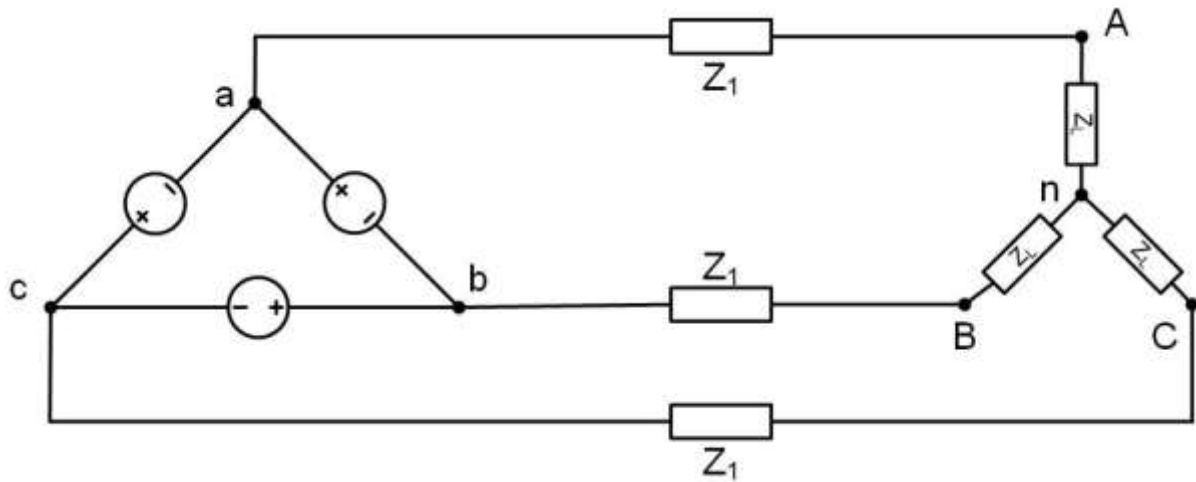
2023-2024 Spring semester, CSA, CRN:22167, Exercise 3

1-a) Find the line currents  $I_{aA}$ ,  $I_{bB}$ ,  $I_{cC}$ .

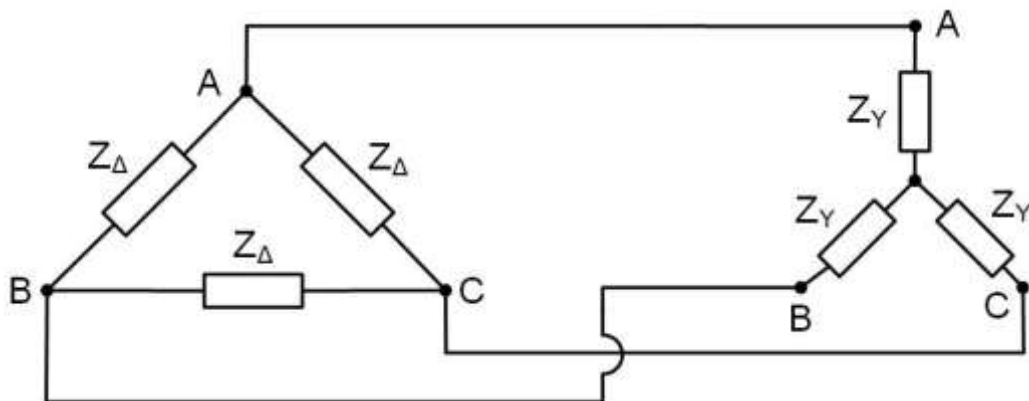
1-b) What is the magnitude of the phase voltage of the load?

1-c) Find the total complex power absorbed by the load.

$$Z_1 = 0,4 + j0,8 \, \Omega, Z_L = 8 + j6, V_{ab} = 208e^{j20^\circ}, V_{bc} = 208e^{-j100^\circ}, V_{ca} = 208e^{-j220^\circ}$$



2) Figure shows a composite load made up of a  $\Delta$ -connected load and Y-connected load in parallel with each other. Assuming  $Z_\Delta = 20 + j25 \, \Omega$  and  $Z_Y = 5 + j10 \, \Omega$  find a  $\Delta$ -equivalent and Y-equivalent for the composite load.



3) A source  $v_s(t) = 120\sqrt{2} \cos(2\pi 50t)$  V drives a series RLC circuit having  $R = 8 \, \Omega$ ,  $L = 50$  mH and  $C = 500 \, \mu\text{F}$ . What reactive element must be connected directly across the source to achieve power factor  $\text{pf} = 0,95$ , lagging?  $\text{Pf} = 0,95$ , leading?