Problem # 1

What is the phase sequence of each of the following sets of voltages?

a) $v_a = 208\cos(\omega t + 27^\circ)$ V,

$v_b = 208\cos(\omega t + 147^\circ)$ V,

$v_c = 208\cos(\omega t - 93^\circ)$ V.

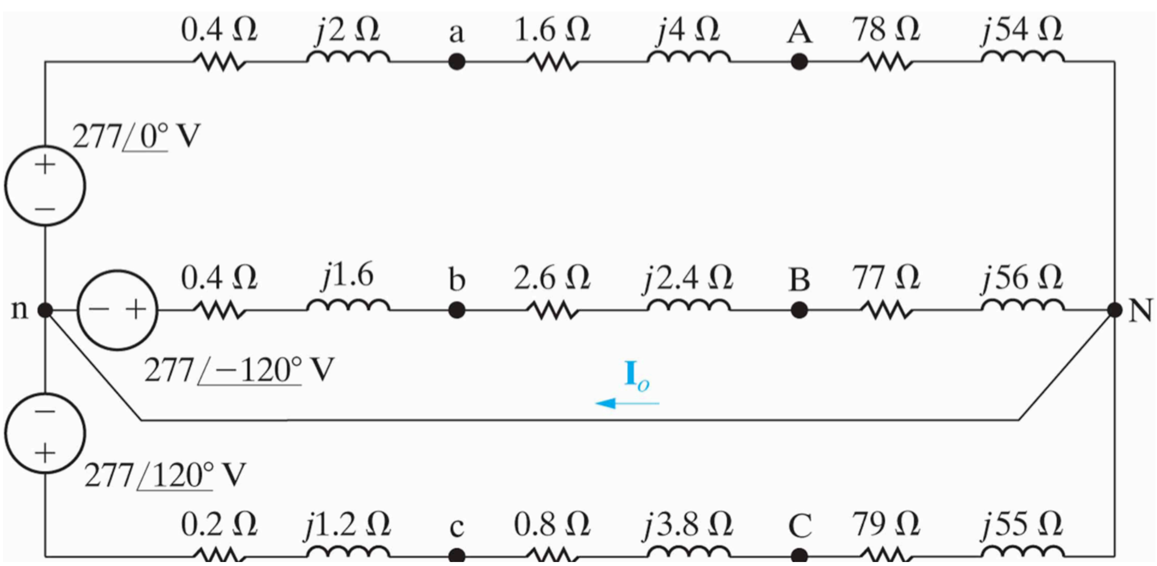
b) $v_a = 4160\cos(\omega t - 18^\circ)$ V,

$v_b = 4160\cos(\omega t - 138^\circ)$ V,

$v_c = 4160\cos(\omega t + 102^\circ)$ V.

Problem #2

Find the rms value of $\mathbf{I}_o$ in the unbalanced three-phase circuit.



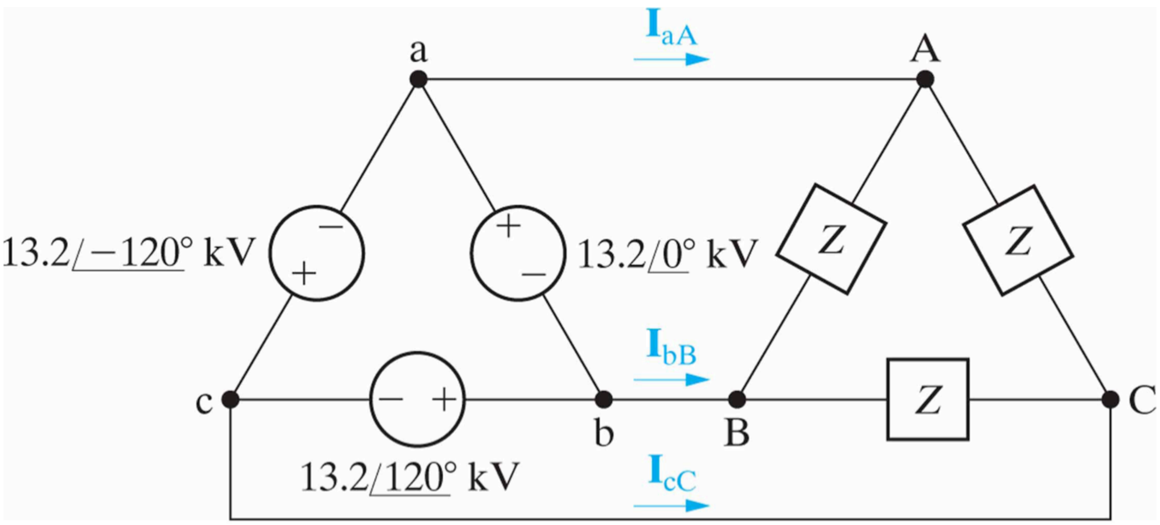
Problem #3

The impedance Z in the balanced three-phase circuit is 100 - j75 Ω. Find

a) I_{AB}, I_{BC}, and I_{CA},

b) I_{aA}, I_{bB}, and I_{cC},

c) I_{ba}, I_{cb}, and I_{ac}.



Problem #4

A three-phase line has an impedance of 0.1 + j0.8 Ω/ϕ. The line feeds two balanced three-phase loads connected in parallel. The first load is absorbing a total of 630 kW and absorbing 840 kVAR magnetizing vars. The second load is Y-connected and has an impedance of 15.36 - j4.48 Ω/ϕ. The line-to-neutral voltage at the load end of the line is 4000 V. What is the magnitude of the line voltage at the source end of the line?

Problem #5

a) Calculate the reading of each wattmeter in the circuit when Z = 13.44 + $j46.08\Omega$.

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.