

Y Connected Generator and Load

- Review/Clarification
 - Three phase voltages
 - The Y-connected generator
- Y- Connected Generator and Load ICP
 - Balanced load, ABC phase sequence

Recall: Three-Phase System Voltages (ABC phase sequence)

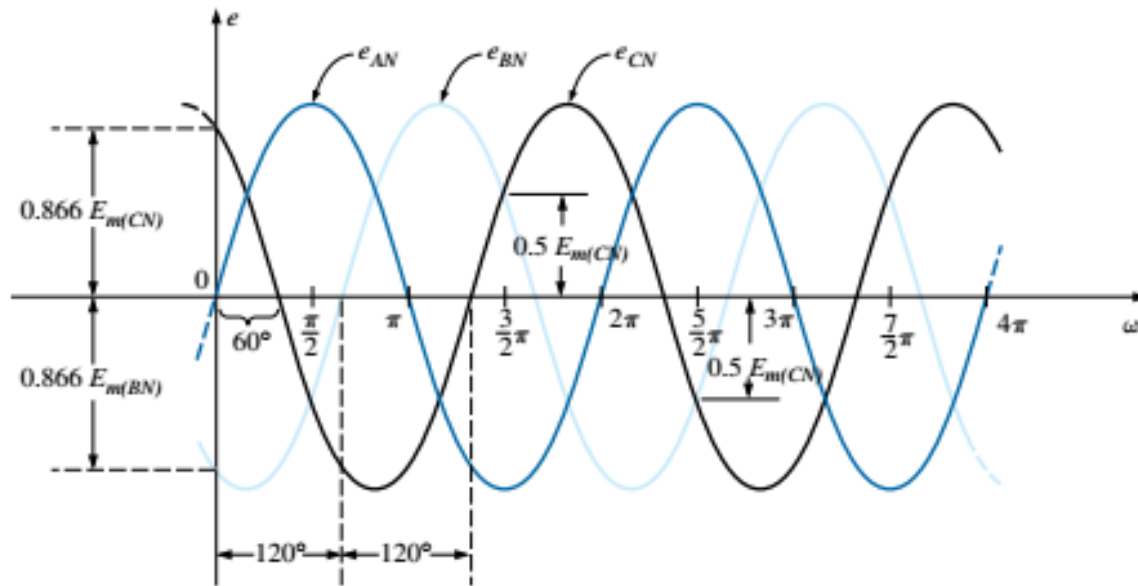


FIG. 24.2

Phase voltages of a three-phase generator.

Phase voltages as functions of time:

- At any "t," the algebraic sum of the three phase voltages = 0V
- When one phase voltage = 0V, the other two are at 86.6% of their positive or negative maximums
- When any two phase voltages are equal in magnitude and sign (at $0.5E_m$), the remaining phase voltage has the opposite polarity and is at its peak value

Phase voltages as vectors (phasor diagram):

- For an ABC phase sequence

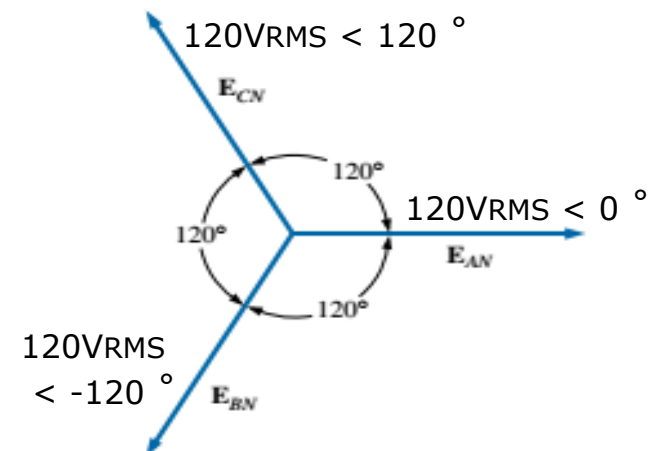


FIG. 24.3

Phasor diagram for the phase voltages of a three-phase generator.

Recall: The Y Connected Generator (topology/terminology)

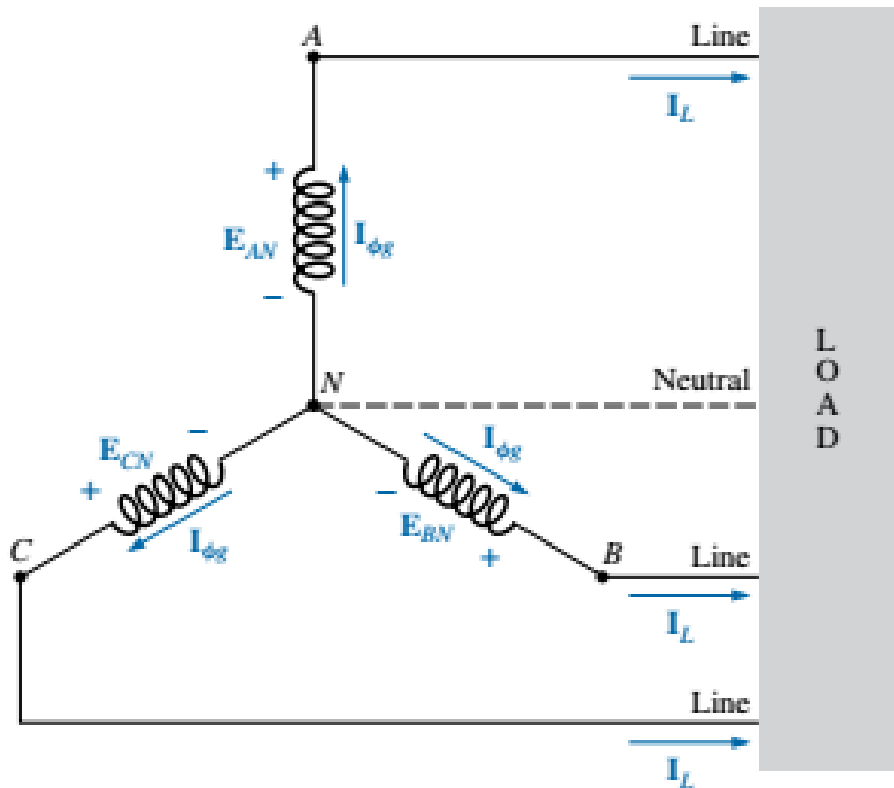


FIG. 24.5

Y-connected generator.

PHASE VOLTAGES

$$\vec{E}_{AN}, \vec{E}_{BN}, \vec{E}_{CN}$$

PHASE CURRENTS

I_{ϕ} : EQUAL FOR A BALANCED LOAD

LINE CURRENTS

$$I_L = I_{\phi}$$

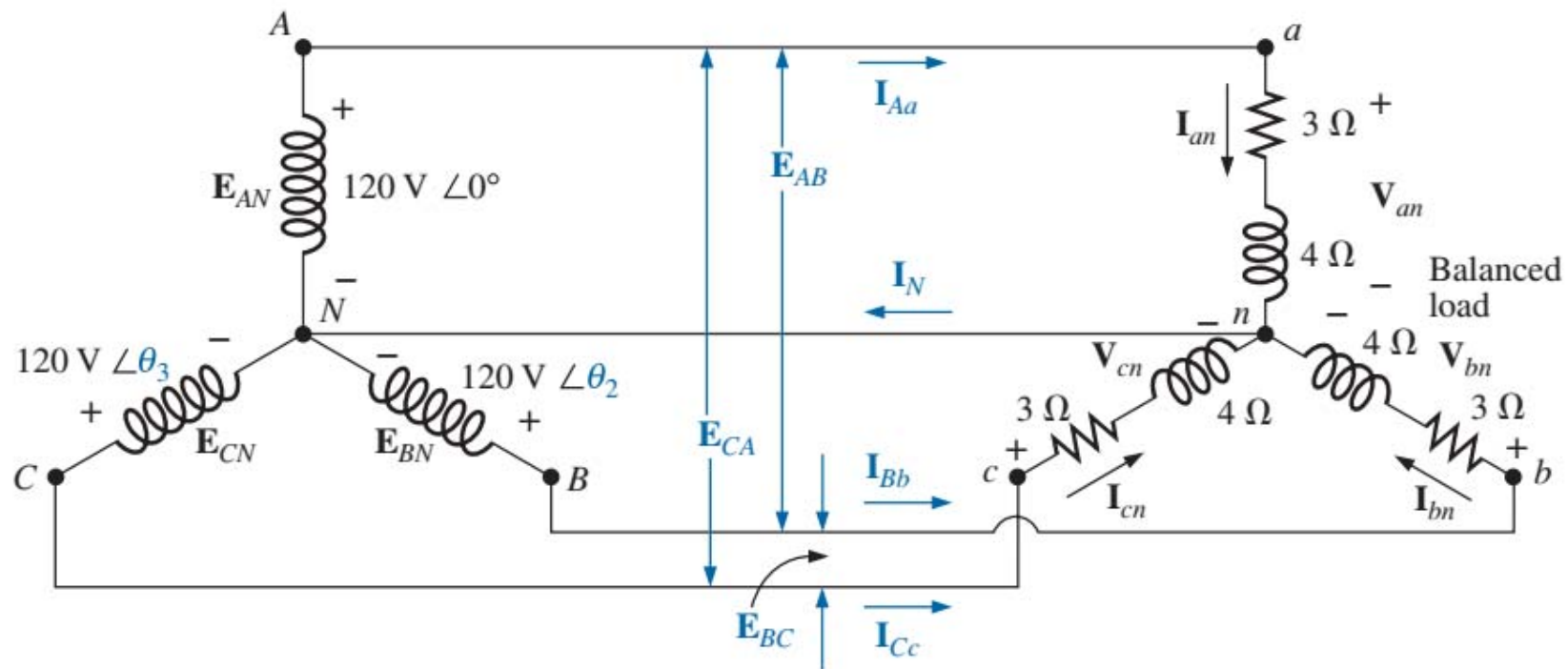
LINE VOLTAGES

$$\vec{E}_{AB} = \vec{E}_{AN} - \vec{E}_{BN}$$

$$\vec{E}_{BC} = \vec{E}_{BN} - \vec{E}_{CN}$$

$$\vec{E}_{CA} = \vec{E}_{CN} - \vec{E}_{AN}$$

Y Connected Generator and Load – In Class Problem



Find:

- θ_2 and θ_3
- E_{AB} , E_{BC} and E_{CA} , the line voltages
- The line currents
- I_N , the neutral current

- All voltages and currents in RMS
- ABC Phase Sequence