

# Lecture-3

Examples on Symmetrical component transformation

## Numerical Example

1. *The line currents in a 3-ph 4 -wire system are  $I_a = 100\angle 30^\circ$  ;  $I_b = 50\angle 300^\circ$  ;  $I_c = 30\angle 180^\circ$ . Find the symmetrical components and the neutral current.*

*Solution :*

$$I_{a0} = 1/3(I_a + I_b + I_c) = 27.29 \angle 4.7^\circ A$$

$$I_{a1} = 1/3(I_a + a I_b + a^2 I_c) = 57.98 \angle 43.3^\circ A$$

$$I_{a2} = 1/3(I_a + a^2 I_b + a I_c) = 18.96 \angle 24.9^\circ A$$

$$I_n = I_a + I_b + I_c = 3 I_{a0} = 81.87 \angle 4.7^\circ A$$

## Numerical Example

2. The sequence component voltages of phase voltages of a 3-ph system are:  $V_{a0} = 100 \angle 0^\circ \text{ V}$ ;  
 $V_{a1} = 223.6 \angle -26.6^\circ \text{ V}$  ;  $V_{a2} = 100 \angle 180^\circ \text{ V}$ .  
Determine the phase voltages.

**Solution:**

$$V_a = V_{a0} + V_{a1} + V_{a2} = 223.6 \angle -26.6^\circ \text{ V}$$

$$V_b = V_{a0} + a^2 V_{a1} + a V_{a2} = 213 \angle -99.9^\circ \text{ V}$$

$$V_c = V_{a0} + a V_{a1} + a^2 V_{a2} = 338.6 \angle 66.2^\circ \text{ V}$$