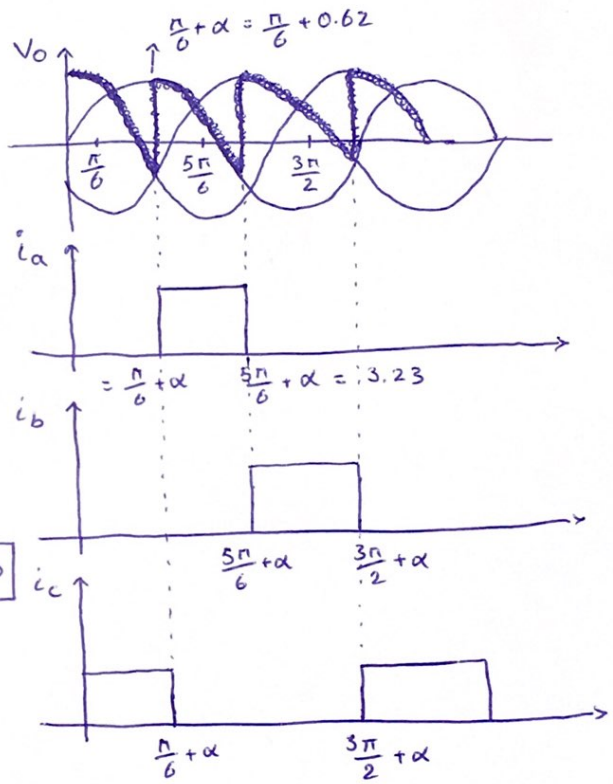
یا علی

رضا ادیب زاده
۹۸۱۴۳۰۳
کنترل دوم اک صنعتی

#1

- half wave
- 3φ
- Inductive load
- $V_s = 380^{V}$ (rms)
- f = 50 HZ
- $I_o = 10$ A

$\alpha = 3 \times 12 = 36^{\circ} = 0.62$ Rad



$$V_{odc} = \frac{1}{\frac{2\pi}{3}} \int_{\frac{\pi}{6}+\alpha}^{\frac{5\pi}{6}+\alpha} V_{max} \sin\theta \, d\theta$$

$$= \frac{3\sqrt{3}}{2\pi} V_{max} \cos\alpha$$

$$= \frac{3\sqrt{3}}{2\pi} \times \frac{380\sqrt{2}}{\sqrt{3}} \cdot \cos(0.62) = 208.83$$

$$\Rightarrow V_{odc} = R\, I_o \Rightarrow R = \frac{208.83}{10}$$

$$\Rightarrow R = 20.8\ \Omega$$

$$I_{rms} = 10^{A} = I_d \Rightarrow PF = \frac{V_{odc} \cdot I_d}{\sqrt{3} \cdot V_{L-L(rms)} I_d} = \frac{208.83}{\sqrt{3} \times 380} = 0.317$$

$$\Rightarrow \cos^{-1}(0.317) = 1.24^{Rad} = 71.5^{\circ}$$

$$P = V_{rms} I_{rms} \cos(\theta - \varphi) = 10 \times \frac{3\sqrt{3} \times 380\sqrt{2}}{2\pi\sqrt{3}} \times 0.317 = 813.4$$

$$Q = V_{rms} I_{rms} \cdot \sin(\theta - \varphi) = 10 \times \frac{3\sqrt{3} \times 380\sqrt{2}}{2\pi\sqrt{3}} \times \sin(1.24) = 2426.7$$

$$\cos u = 1 - \frac{\omega L_s I_d}{\frac{\sqrt{2}V_s}{\sqrt{3}}} = \frac{-X_s I_d}{\frac{\sqrt{2}V_s}{\sqrt{3}}} + 1 = \frac{-1 \times 10^{-3} \times 10^{A}}{\frac{\sqrt{2} \times 380}{\sqrt{3}}} + 1 = 0.999 \Rightarrow$$

$$\cos^{-1}(0.999) = 0.46^{\circ} = u$$