$$i_n(t) = \frac{\sqrt{2}\,V_0}{(R^2+X^2)^{1/2}} \sin(\omega t - \phi) \qquad (\alpha < \omega t < \beta)$$

$$\tau = RC$$

$$X = -\frac{1}{\omega C}$$

$$i_r(t) = -i_c(t) = i_r(\beta)\, e^{-t/\tau} \qquad (\beta < \omega t < \gamma)$$

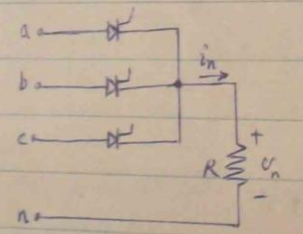
$$i_r(\beta) = \frac{\sqrt{2}\,V_0 \sin\beta}{R}$$

$$v_n = v_0 \qquad (\alpha < \omega t < \beta)$$

$$v_n = i_r(t)\, R \qquad (\beta < \omega t < \gamma)$$

$$v_n = 0 \qquad (\gamma < \omega t < 0)$$

3.3 Three phase rectifier resistance load



3ϕ half wave rectifier ckt

$$V_n = \frac{3}{2\pi} \int_{\alpha_1}^{\alpha_2} \sqrt{2}\, V_0 \sin\omega t \; d(\omega t)$$

$$= \frac{-3}{\sqrt{2}\,\pi} \left[V_0 \cos\omega t \right]_{\pi/6}^{5\pi/6} = 1.17\, V_0$$

$$V_n = \frac{3\sqrt{2}}{\pi} V_0\, 0.866 \cos\alpha \qquad (0 < \alpha < \tfrac{\pi}{6})$$

$$V_n = \frac{3\sqrt{2}}{\pi} V_0 \left[0.5 \cos(\alpha + \tfrac{\pi}{6}) + 0.5 \right] \qquad (\tfrac{\pi}{6} < \alpha < \pi)$$

for 3ϕ full wave rectifier ckt,

$$V_n = \frac{-6}{\sqrt{2}\,\pi} V_0 \cos\omega t \Big]_{\alpha_1}^{\alpha_2}$$

$$V_n = \frac{-6}{\sqrt{2}\,\pi} V_0 \cos\omega t \Big|_{\pi/3}^{2\pi/3} = 1.35\, V_0$$

$$V_n = \frac{6}{\sqrt{2}\,\pi} V_0 \cos\alpha \qquad (0 < \alpha < \tfrac{\pi}{3})$$