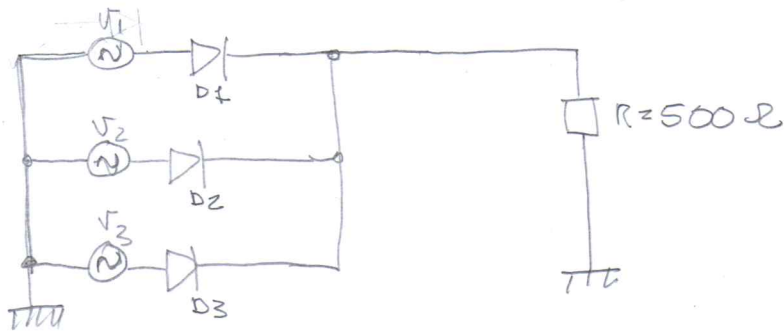


$V_{rms} = 120 \text{ V}$  trifásico

1)



$Z = 500 \angle 0^\circ$

2)

$$I_{orms} = \sqrt{\frac{1}{T} \int_0^T (i(\theta))^2 d\theta}$$

puramente resistivo

$$\frac{V_{rms} \sqrt{2}}{500} = I_{max} \angle 0$$

$$i(\theta) = \begin{cases} \frac{V_3}{R} & 0 < \theta < \frac{\pi}{6} \\ \frac{V_1}{R} & \frac{\pi}{2} - \frac{\pi}{3} < \theta < \frac{\pi}{2} + \frac{\pi}{3} \\ \frac{V_2}{R} & \frac{\pi}{2} + \frac{\pi}{3} < \theta < \pi + \frac{\pi}{2} \\ \frac{V_3}{R} & \pi + \frac{\pi}{2} < \theta < 2\pi \end{cases}$$

$$I_{orms} = \sqrt{\frac{1}{2\pi} \times \left[ \int_0^{\frac{\pi}{6}} \left(\frac{V_3}{R}\right)^2 + \int_{\frac{\pi}{2}-\frac{\pi}{3}}^{\frac{\pi}{2}+\frac{\pi}{3}} \left(\frac{V_1}{R}\right)^2 + \int_{\frac{\pi}{2}+\frac{\pi}{3}}^{\pi+\frac{\pi}{2}} \left(\frac{V_2}{R}\right)^2 + \int_{\pi+\frac{\pi}{2}}^{2\pi} \left(\frac{V_3}{R}\right)^2 \right]}$$

como as fases são simétricas = iguais

$$I_{orms} = 3 \times \sqrt{\frac{1}{2\pi} \int_{\frac{\pi}{2}-\frac{\pi}{3}}^{\frac{\pi}{2}+\frac{\pi}{3}} \left(\frac{V_1}{R}\right)^2 \times 3}$$

$$= 0,285338 \text{ A}$$

$$I_{oav} = 3 \times \frac{1}{2\pi} \int_{\frac{\pi}{2}-\frac{\pi}{3}}^{\frac{\pi}{2}+\frac{\pi}{3}} \frac{V_1}{R}$$

$$= 0,28069 \text{ A}$$

$$V_1 = \sqrt{2} V_{rms} \sin(\theta)$$

$$\theta = \omega t$$

$$V_2 = \sqrt{2} V_{rms} \sin\left(\theta - \frac{2\pi}{3}\right)$$

$$V_3 = \sqrt{2} V_{rms} \sin\left(\theta - \frac{4\pi}{3}\right)$$

3)

$$V_{D1\text{ méd}} = \frac{1}{\pi} \int_0^{\pi} V_{D1}(\theta) d\theta$$

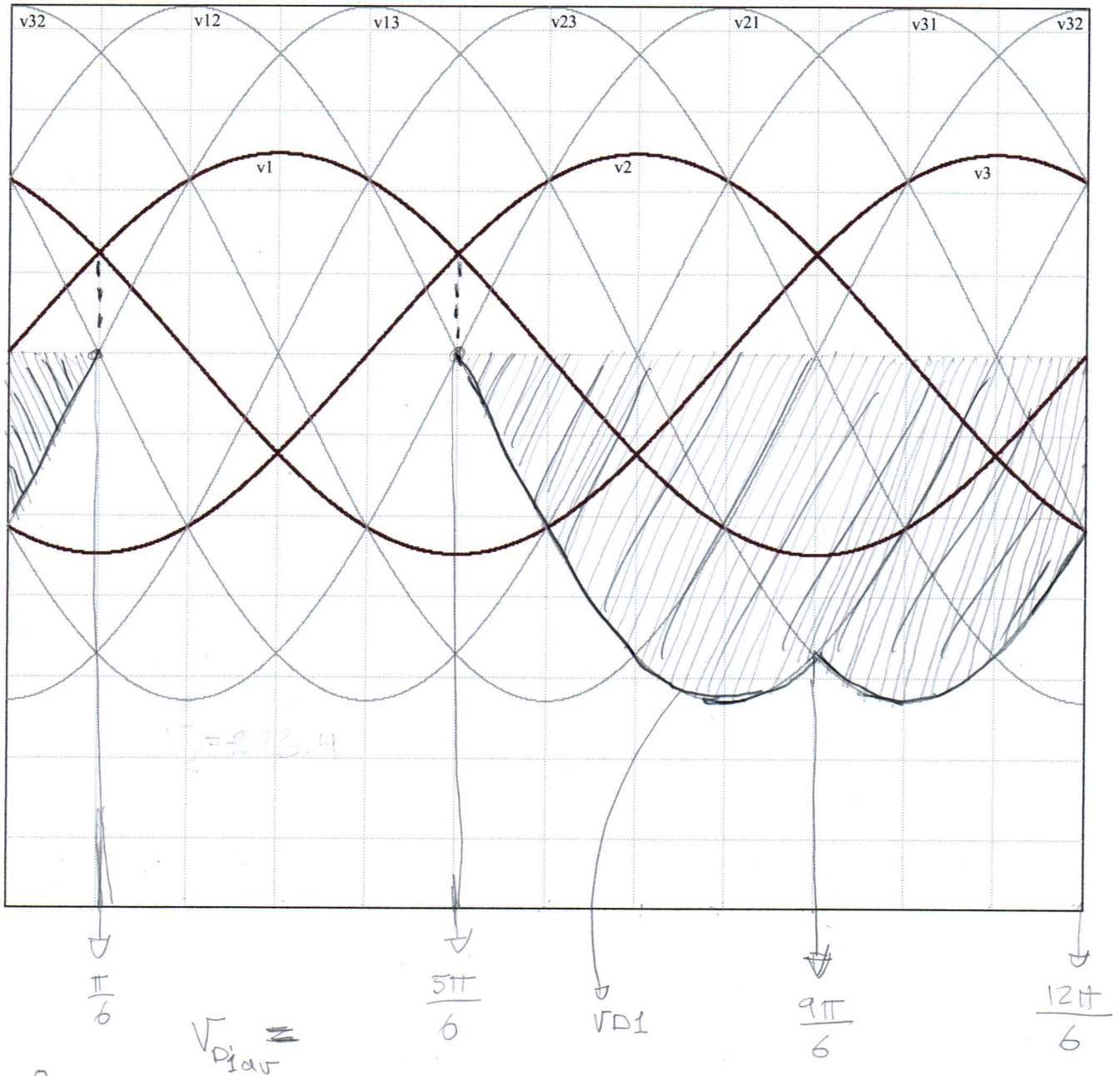
$$V_{D1} = V_A - V_K = V_1 - V_0$$

$$V_{D1}(\theta) = \begin{cases} V_1 - V_3, & 0 < \theta < \frac{\pi}{2} - \frac{\pi}{3} \\ 0, & \frac{\pi}{2} - \frac{\pi}{3} < \theta < \frac{\pi}{2} + \frac{\pi}{3} \\ V_1 - V_2, & \frac{\pi}{2} + \frac{\pi}{3} < \theta < \pi + \frac{\pi}{2} \\ V_1 - V_3, & \pi + \frac{\pi}{2} < \theta < 2\pi \end{cases}$$

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3)



$$\frac{1}{\pi} \left( + \int_{-\frac{\pi}{6}}^0 \sqrt{2}\sqrt{3} V_{ef} \sin(\theta) d\theta - \int_0^{\frac{4\pi}{6}} \sqrt{2}\sqrt{3} V_{ef} \sin(\theta) d\theta - \int_{\frac{2\pi}{6}}^{\frac{5\pi}{6}} \sqrt{2}\sqrt{3} V_{ef} \sin(\theta) d\theta \right)$$

$$= -140,81 \text{ Volt}$$

$$V_{\text{composto med}} = \sqrt{2}\sqrt{3} 120$$

$$= 293,93 \text{ V}$$