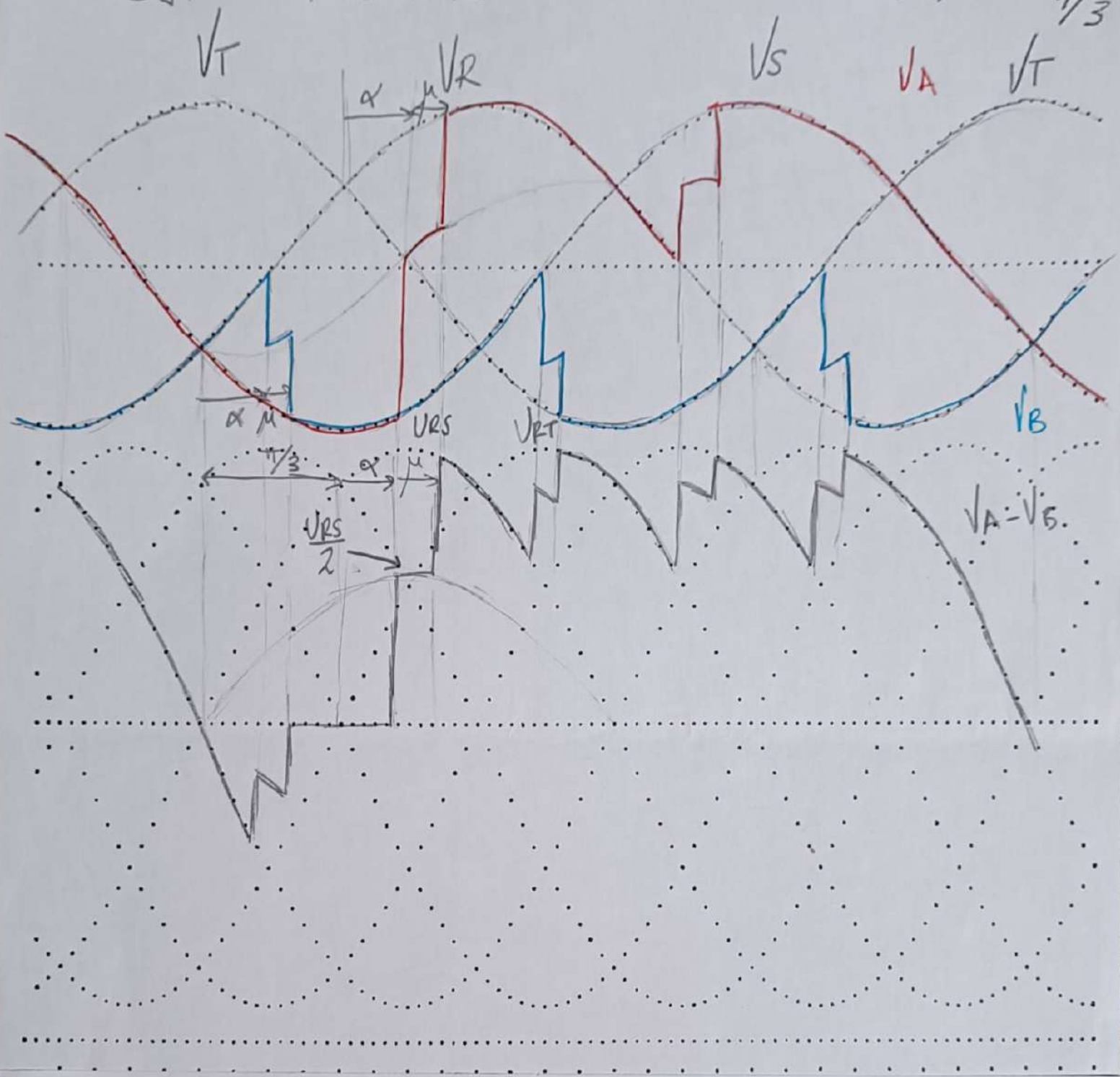
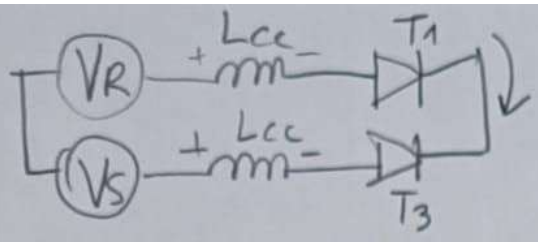


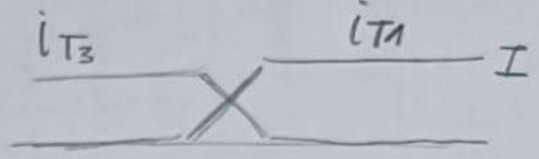
2)

$$\mu = \text{Arcos}\left(\cos(\alpha) - \frac{2 I X_{cc}}{U\sqrt{2}}\right) - \alpha$$

$$\mu = 9{,}85°$$

4)





$i_{T1} + i_{T3} = I$ (cte)

$\cdot U_{RS} = 2L_{cc} \frac{\partial i_{T1}}{\partial t}$

$\cdot U_{RS} = U\sqrt{2}\,\text{sen}\,\theta$

$$i_1(\theta) = \frac{1}{2L_{cc}\omega} \int_{\alpha+\pi/3}^{\theta} U\sqrt{2}\,\text{sen}\,\theta\, d\theta$$

$$i_1(\theta) = \frac{U\sqrt{2}}{2L_{cc}\omega} \left(\cos(\alpha+\pi/3) - \cos(\theta)\right)$$

en $\theta = \alpha + \mu + \pi/3 \rightarrow i_1(\alpha+\pi/3+\mu) = I$

$$I = \frac{U\sqrt{2}}{2L_{cc}\omega} \left(\cos(\alpha+\pi/3) - \cos(\alpha+\pi/3+\mu)\right)$$

$$\mu = \text{Arcos}\left(\cos(\alpha+\pi/3) - \frac{2I L_{cc}\omega}{\sqrt{2}\,U}\right) - \alpha - \pi/3$$

$$\begin{cases} \alpha = 30° \\ X_{cc} = 0{,}16\,\Omega \\ I = 100\,A \\ U = 230\,V \end{cases} \qquad \mu = 5{,}64°$$

5)

$$\Delta U_{AB} = \frac{1}{2\pi} \int_{\pi/3+\alpha}^{\pi/3+\alpha+\mu} \left(U_{RS} - \frac{U_{RS}}{2} \right) d\theta = \frac{1}{2\pi} \int_{\pi/3+\alpha}^{\pi/3+\alpha+\mu} \frac{U_{RS}}{2} d\theta =$$

$$U_{RS} = \sqrt{2} U \operatorname{sen}\theta d\theta$$

$$= \frac{1}{2\pi} \int_{\pi/3+\alpha}^{\pi/3+\alpha+\mu} \frac{\sqrt{2} U \operatorname{sen}\theta d\theta}{2} = \frac{\sqrt{2} U}{4\pi} \int_{\pi/3+\alpha}^{\pi/3+\alpha+\mu} \operatorname{sen}\theta d\theta =$$

$$\begin{cases} \Delta U_{AB} = \dfrac{\sqrt{2} U}{4\pi} \left(\cos(\pi/3+\alpha) - \cos(\pi/3+\alpha+\mu) \right) \\ I = \dfrac{U\sqrt{2}}{2 L_{cc} \omega} \left(\cos(\pi/3+\alpha) - \cos(\pi/3+\alpha+\mu) \right) \end{cases}$$

$$\Delta U_{AB} = \frac{\sqrt{2} U}{4\pi} \cdot \frac{2 L_{cc} \omega I}{U\sqrt{2}} = \frac{L_{cc} \omega I}{2\pi}$$

$$\Delta U_{AB} = \frac{X_{cc} I}{2\pi}$$

$$\begin{cases} U_A = U_R - L_{cc} \dfrac{\partial i_{T1}}{\partial t} = U_R - \dfrac{U_{RS}}{2} = \dfrac{U_{RS}}{2} \\ U_{RS} = 2 L_{cc} \dfrac{\partial i_{T1}}{\partial t} \\ V_0 = U_A - U_B = \dfrac{U_{RS}}{2} - U_S = \dfrac{U_R - U_S}{2} = \dfrac{U_{RS}}{2} \end{cases}$$