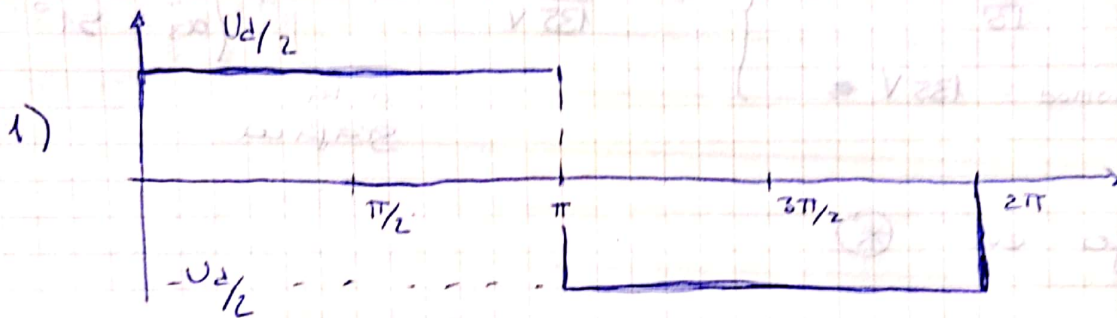
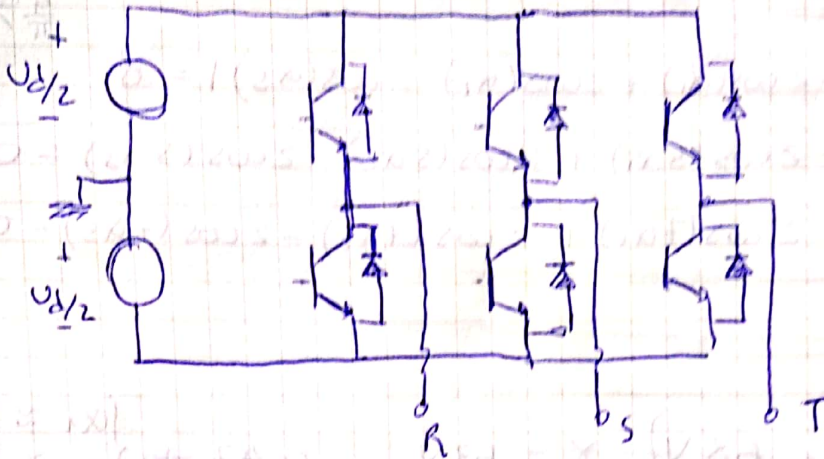


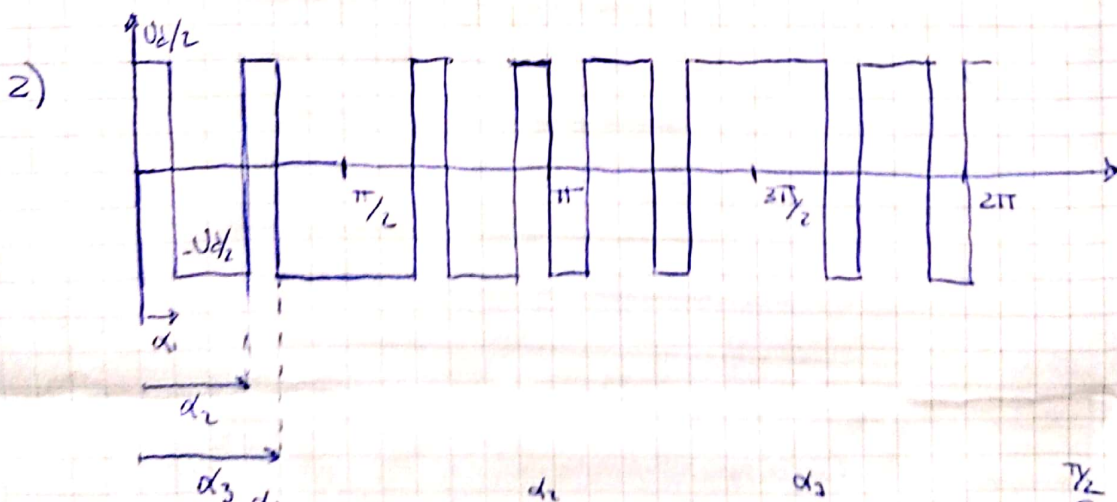
Examen de Electrónica de Potencia febrero 2021

Problema 1



$$\hat{U}(1) = \frac{4}{\pi} \int_0^{\pi/2} \frac{U_d}{2} \sin \theta d\theta = \frac{4}{\pi} \frac{U_d}{2} (-\cos \theta) \Big|_0^{\pi/2} = \frac{4}{\pi} \frac{U_d}{2}$$

$$\underline{U(1)} = \frac{\hat{U}(1)}{\sqrt{2}} = 0,45 U_d = \underline{135 \text{ V}}$$



$$\hat{U}(1) = \frac{4}{\pi} \left[\int_0^{\alpha_1} \frac{U_d}{2} \sin(n\theta) d\theta + \int_{\alpha_1}^{\alpha_2} -\frac{U_d}{2} \sin(n\theta) d\theta + \int_{\alpha_2}^{\alpha_3} \frac{U_d}{2} \sin(n\theta) d\theta + \int_{\alpha_3}^{\pi/2} -\frac{U_d}{2} \sin(n\theta) d\theta \right]$$

$$\hat{U}(1) = \frac{4}{\pi} \frac{U_d}{2} \frac{1}{n} \left[1 - 2\cos(n\alpha_1) + 2\cos(n\alpha_2) - 2\cos(n\alpha_3) \right]$$

$$n=1 \Rightarrow 1 - 2\cos(\alpha_1) + 2\cos(\alpha_2) - 2\cos(\alpha_3) = \frac{\hat{U}_n}{\frac{4U_1}{\pi} \cdot \frac{1}{2}}$$

$$n=5 \Rightarrow (*) \begin{cases} |1 - 2\cos(\alpha_1) + 2\cos(\alpha_2) - 2\cos(\alpha_3)| = \gamma \\ 1 - 2\cos(5\alpha_1) + 2\cos(5\alpha_2) - 2\cos(5\alpha_3) = 0 \end{cases}$$

$$n=7 \Rightarrow \begin{cases} 1 - 2\cos(7\alpha_1) + 2\cos(7\alpha_2) - 2\cos(7\alpha_3) = 0 \end{cases}$$

3)

$$U_n = \frac{110V}{\sqrt{3}} = 63V \quad \left. \begin{array}{l} \\ U_{n, \text{nomod}} = 135V \end{array} \right\} \gamma = \frac{63V}{135V} = 0,47 \Rightarrow \begin{cases} \alpha_1 \approx 22^\circ \\ \alpha_2 \approx 35^\circ \\ \alpha_3 \approx 51^\circ \end{cases}$$

de la gráfica.

Sustituyo en (*)

$$n=1 \Rightarrow \gamma = |1 - 0,47|$$

$$n=5 \Rightarrow \hat{U}_{(5)} = \frac{4}{\pi} \cdot \frac{U_1}{2} \cdot \frac{1}{5} \cdot 0,2$$

$$n=7 \Rightarrow \hat{U}_{(7)} = \frac{4}{\pi} \cdot \frac{U_1}{2} \cdot \frac{1}{7} \cdot (-0,04)$$

$$\hat{U}_{(1)} = -89,73V$$

$$\hat{U}_{(5)} = 7,64V$$

$$\hat{U}_{(7)} = -1,09V$$