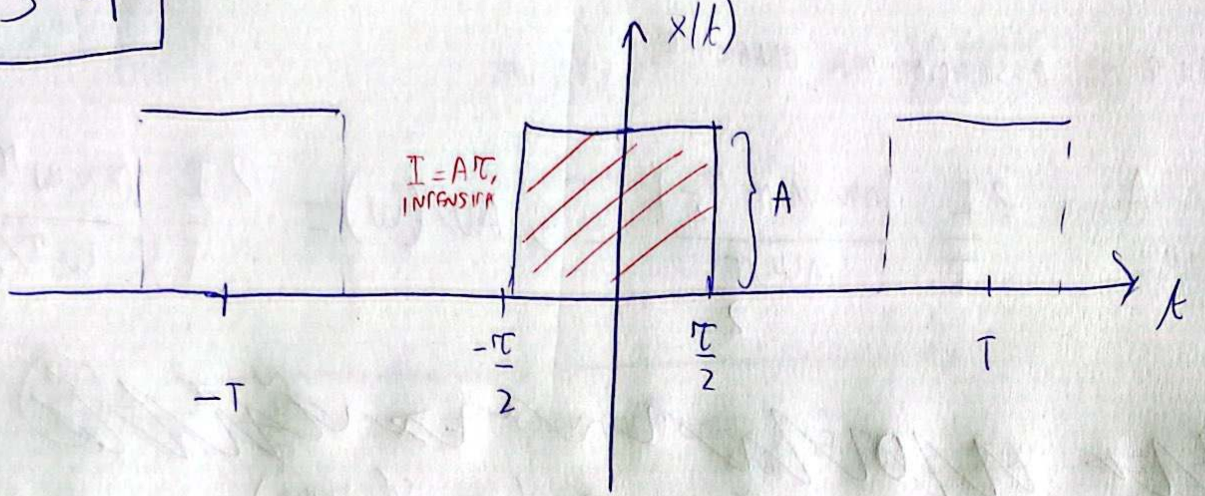
ES 1



- $x(t) = A$

- $\{C_n\}; \{A_n\}, \{\varphi_n\}$

$$C_n = \frac{1}{T}\int_{-\tau/2}^{\tau/2} x(t)\, e^{-jw_0 n t}\, dt = \frac{A}{T}\int_{-\frac{\tau}{2}}^{+\frac{\tau}{2}} e^{-jw_0 n t}\, dt$$

$$= \frac{A}{T}\left[\frac{e^{-jw_0 n t}}{\cancel{e}^{-jw_0 n t}}\right]_{-\tau/2}^{\tau/2} = \frac{A}{T}\,\frac{e^{-jw_0 n\tau/2} - e^{jnw_0\tau/2}}{-jnw_0} =$$

$$= \frac{A}{T}\,\frac{\operatorname{sen}\left(nw_0\frac{\tau}{2}\right)\cdot 2\cancel{j}}{\cancel{j}nw_0} = \frac{\overset{I}{A\tau}}{T}\,\frac{\operatorname{sen}(nw_0\tau/2)}{\frac{nw_0\tau}{2}}$$

• MOLTIPLICO $\frac{\tau}{\tau}$ PER AVERE COME $\frac{\operatorname{sen} x}{x}$

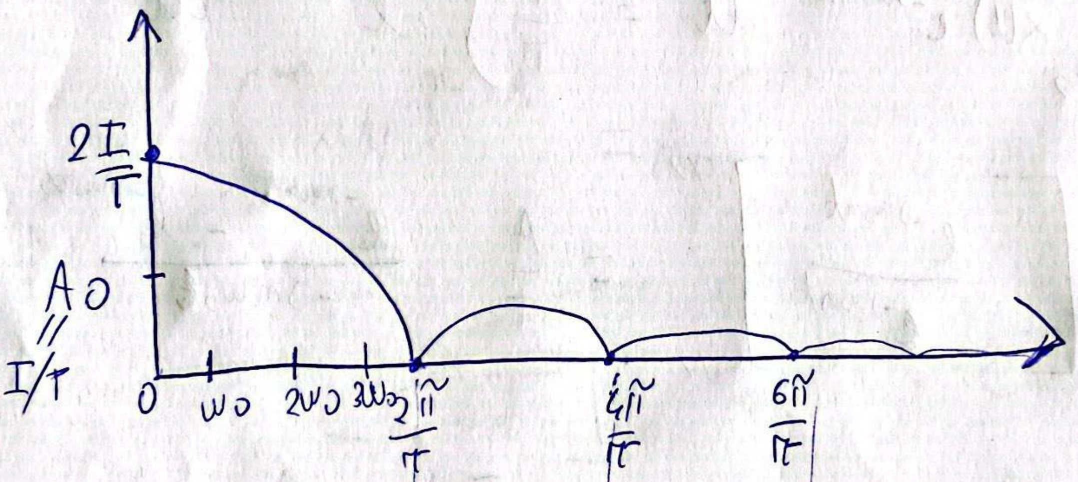
$$A_n = 2|C_n| = \frac{2I}{T}\,\frac{|\operatorname{sen}(nw_0\tau/2)|}{\frac{nw_0\tau}{2}} \qquad \varphi_n = -\arg\{C_n\} = \begin{cases} 0, & C_n > 0 \\ \pi, & C_n < 0 \end{cases}$$

$$A_0 = C_0 = \frac{I}{T} \quad \text{(VALOR MEDIO)}$$

Utilizza funzione ausiliaria per graficare

Avevamo $A_m = \frac{2I}{T}\,\frac{|\sin \omega_0 m \frac{\tau}{2}|}{m\omega_0 \frac{\tau}{2}} \Rightarrow AUX(\omega) = \frac{2I}{T}\,\frac{\sin \omega \frac{\tau}{2}}{\omega \tau/2}$

- $\frac{\sin x}{x}$ in π è $\frac{\sin \pi}{\pi} = \frac{0}{\pi}$ (non c'è limite notevole) $\Rightarrow \frac{\omega\tau}{2} = \pi \Rightarrow \boxed{\omega = \frac{2\pi}{\tau}}$ 1° punto nullo
- Nell'origine $\frac{\sin x}{x} = 1 \Rightarrow AUX(0) = \frac{2I}{T}$



In base a come viene scelto ω_0 e τ le $m\omega_0$ saranno più o meno vicine

Nota: $\varphi_m = \pi$ quando C_m negativa, non A_m