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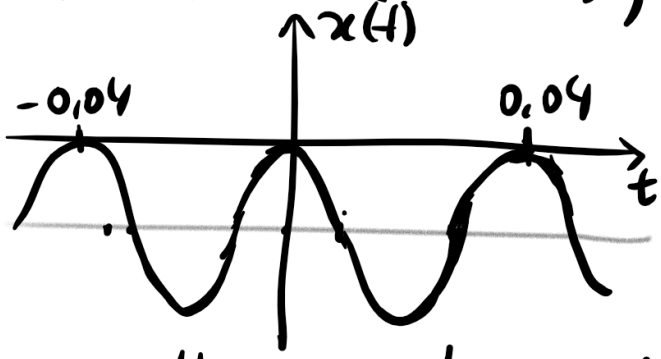
1- $x(t) = -1 + \cos(2\pi 25 t)$; $y(t) = 3x(t+2) + \cos(2\pi 80 t)$

a)



$T_0 = \frac{1}{25} = 0,04\,s$

b) $f_{0x} = 25\,Hz$ $\quad f_{0y} = mdc\{25, 80\} = 5\,Hz$

25	5	80	2
5	1	40	2
1		20	2
		10	2
		5	5
		1	

c) $X_0 = 1e^{j\pi}$ $\quad X_1 = 0.5$ $\quad X_{-1} = 0,5$

$Y_0 = -3 = 3e^{j\pi}$ $\quad Y_{\pm 1} = Y_{\pm 2} = Y_{\pm 3} = Y_{\pm 4} = 0$

$Y_5 = 1,5e^{j2\pi 50} = 1,5$, $Y_{-5} = 1,5$,

$Y_{\pm 5} = \cdots = Y_{\pm 15} = 0$, $Y_{16} = 0,5$, $Y_{-16} = 0,5$

d) $P_x = 1^2 + 0,5^2 + 0,5^2 = 1,5\,W$

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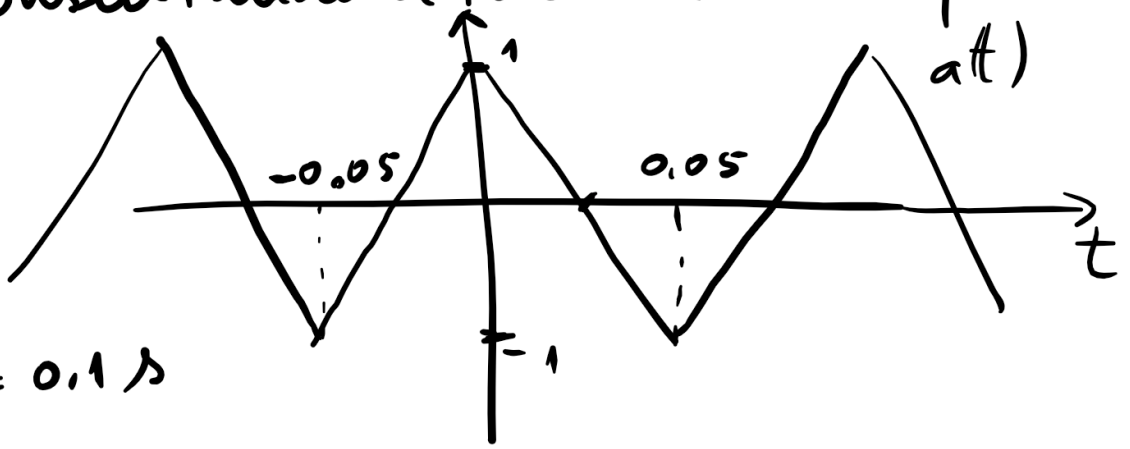
2- $f_0 = 10\,Hz$ $\quad A_k = \begin{cases} 0, & k \text{ par} \\ \left(\frac{2}{\pi k}\right)^2, & k \text{ ímpar} \end{cases}$

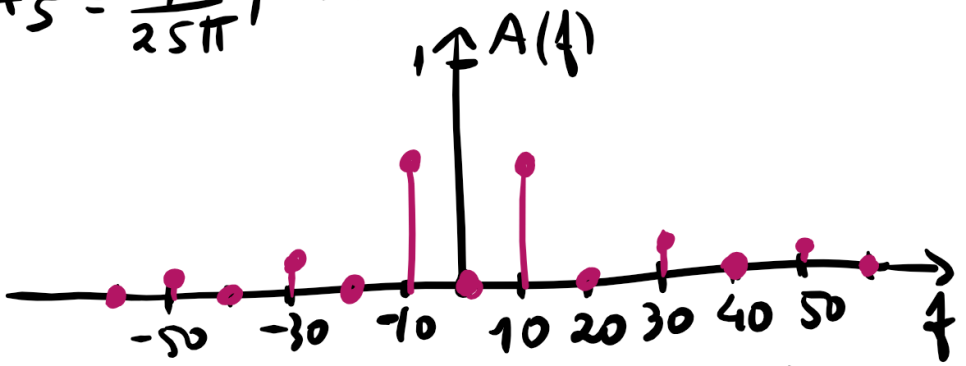
a) Consultando a tabela vemos que:



$T_0 = 0,1\,s$

b) $A_0 = 0,\ A_1 = \frac{4}{\pi^2},\ A_2 = 0,\ A_3 = \frac{4}{9\pi^2},\ A_4 = 0$

$A_5 = \frac{4}{25\pi}, \ldots$



c) $k < 4$

$$a(t) \simeq \frac{4}{\pi^2} e^{j2\pi 10 \times 1t} + \frac{4}{\pi^2} e^{-j2\pi 10 \times t} + \frac{4}{9\pi^2} e^{j2\pi 10 \times 3t} + \frac{4}{9\pi^2} e^{-j2\pi 10 \times 3t} =$$

$$= \frac{8}{\pi^2} \cos(2\pi 10t) + \frac{8}{9\pi^2} \cos(2\pi 30t)$$