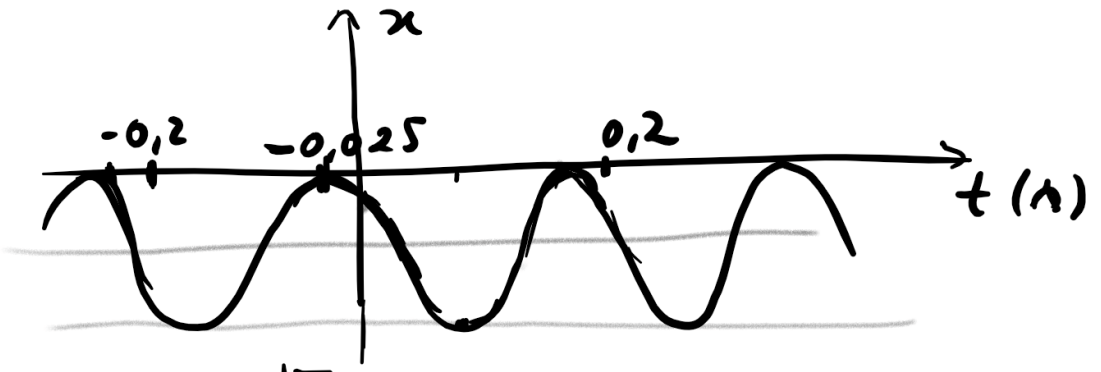
17/7/2012

1- $x(t) = -1 + \cos(2\pi 5t + \pi/4)$

$y(t)$:

$$Y_k = \begin{cases} 10 & , \ k = 0 \\ 4/j & , \ k = 1 \\ -4/j & , \ k = -1 \\ 1 & , \ k = 4, -4 \end{cases}$$

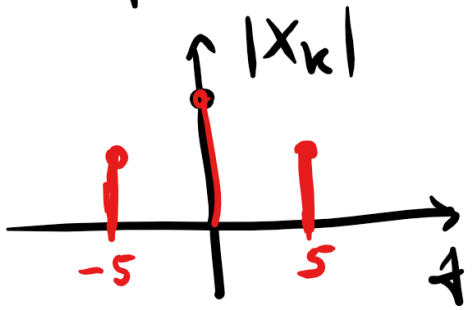
a) $T_x = \frac{1}{5} = 0{,}2\,s$



b) $X_0 = 1\,e^{j\pi}$

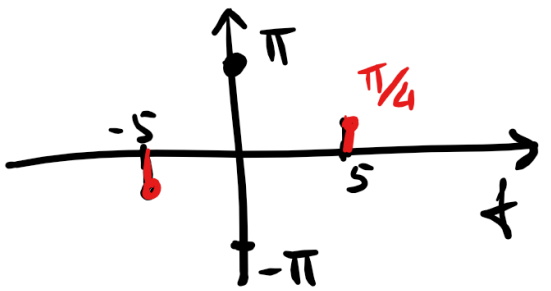
$X_1 = 0{,}5\,e^{j\pi/4}$

$X_{-1} = 0{,}5\,e^{-j\pi/4}$



$k = 1 \rightarrow 1 \times f_x = 5$

$k = -1 \rightarrow -1 \times f_x = -5$



17/7/2012

1- $x(t) = -1 + \cos(2\pi 5t + \pi/4)$

$y(t)$:

$$Y_k = \begin{cases} 10 & , k=0 \\ 4/j & , k=1 \\ -4/j & , k=-1 \\ 1 & , k=4,-4 \end{cases} = \begin{cases} 10 & , k=0 \\ 4e^{-j\pi/2} & , k=1 \\ 4e^{j\pi/2} & , k=-1 \\ 1 & , k=4,-4 \end{cases}$$

c) $f_y = 10\ Hz$

$$y(t) = 10 + 4e^{j(2\pi 10t - \pi/2)} + 4e^{-j(2\pi 10t - \pi/2)} + 1e^{j2\pi(10)4t} + 1e^{-j2\pi(10)(-4)t} =$$

$$= 10 + 8\cos(2\pi 10t - \pi/2) + 2\cos(2\pi 40t)$$

d) $v(t) = x(t) + y(t)$

$T_x = \frac{1}{5}$ $T_y = \frac{1}{10}$ $f_x = 5$ $f_y = 10$

$f_v = mdc\{5, 10\} = 5$

$v(t)$ é periódico com período $T_v = 1/5 = 0{,}2$ s

Espectro de $v(t)$

$V_0 = -1 + 10 = 9$

$V_1 = 0{,}5e^{j\pi/4}$, $V_2 = 4e^{-j\pi/2}$, $V_3 = V_4 = V_5 = V_6 =$

$= V_7 = 0$, $V_8 = 1$