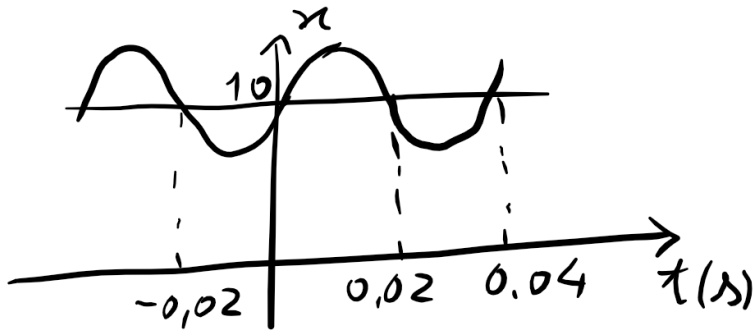
2-ª chamada 9/7/2012

1- $x(t) = 10 + \sin(2\pi 25 t)$ $\quad T_0 = \frac{1}{25}\,s = 0{,}04\,s$

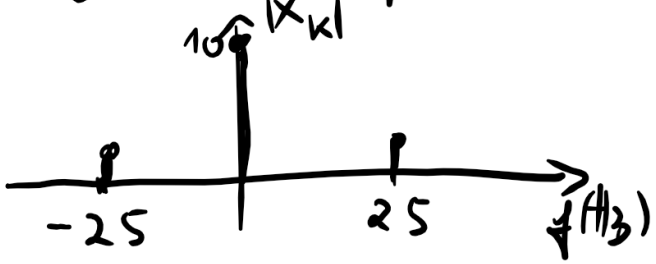
$y(t)$: $Y_k = \begin{cases} -2 & k = 0 \\ e^{-j\pi/4} & , k = 1 \\ e^{j\pi/4} & , k = -1 \\ 0{,}5 & , k = 3, k = -3 \end{cases}$

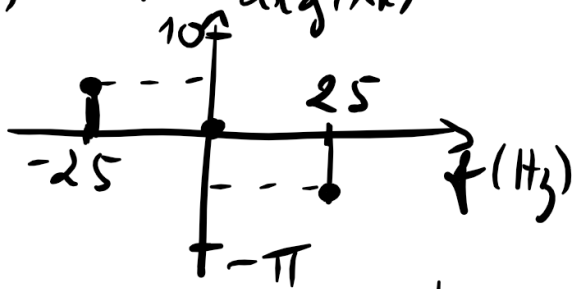
a)



b) $x(t) = 10 + \cos(2\pi 25 t - \pi/2)$

$X_0 = 10$, $X_1 = 0.5\, e^{-j\pi/2}$, $X_{-1} = 0.5\, e^{j\pi/2}$





c) $f_0 = 10\,Hz$

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

$+ 0{,}5\, e^{j2\pi(10)3t} + 0{,}5\, e^{-j2\pi(10)3t} =$

$= -2 + 2\cos(2\pi 10 t - \pi/4) + \cos(2\pi 30 t)$

d) $P_y = 4 + 1 + 1 + 0{,}25 + 0.25 = 6.5\,W$

09/07/2012

2 - A fig. representa uma onda par com

a) $T_1 = 0.05\,s$ $\quad T_0 = 0,2\,s$ $\quad f_0 = 5\,Hz$

$$A_k = 2\frac{2T_1}{T_0}\,\mathrm{sinc}\left(k\frac{2T_1}{T_0}\right) =$$

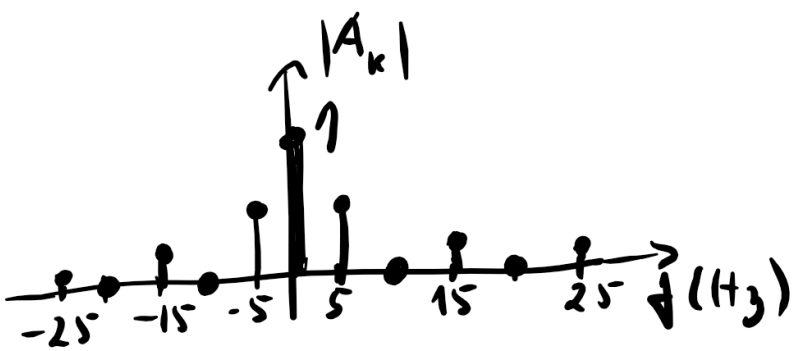
$$= 2\frac{0,1}{0,2}\,\mathrm{sinc}\left(k\frac{0,1}{0,2}\right) = \mathrm{sinc}\left(\frac{k}{2}\right)$$

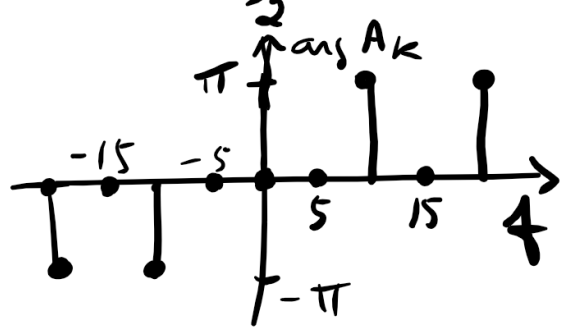
$$x(t) = \sum_{k=-\infty}^{+\infty} \mathrm{sinc}\left(\frac{k}{2}\right) e^{j\frac{2\pi}{0,2}kt}$$

b) $A_0 = 1$, $A_1 = 1\,\mathrm{sinc}(1/2) = 1\,\frac{\sin(\pi/2)}{\pi/2} = \frac{2}{\pi}$,

$$A_2 = 1\,\mathrm{sinc}\left(\frac{2}{2}\right) = 0 \,,\quad A_3 = 1\,\frac{\sin(3\pi/2)}{3\pi/2} = \frac{-2}{3\pi} = \frac{2}{3\pi}e^{j\pi}$$

$$A_4 = 1\,\frac{\sin(2\pi)}{2\pi} = 0,\quad A_5 = 1\,\frac{\sin(5\pi/2)}{5\pi/2} = \frac{2}{5\pi}$$





c) $b(t) = 3a(t-0,05) - 1$

$B_0 = 6 - 1 = 5 \qquad B_k = 3A_k e^{-j\frac{2\pi}{0,2}k\,0,05}$

9/7/2012

2 e) $B_0 = 3A_0 - 1$ $\quad B_k = 3A_k e^{-j\frac{2\pi}{0,2} k\, 0,05}$

$= 3A_k e^{-j\frac{\pi k}{2}}$

$B_0 = 3 - 1 = 2$

$B_1 = \frac{6}{\pi} e^{-j\pi/2}$, $B_2 = 0$, $B_3 = -\frac{6}{3\pi} e^{-j\frac{\pi 3}{2}}$

$B_4 = 0$, $B_5 = \frac{6}{5\pi} e^{-j\frac{\pi 5}{2}}$