

Sinais e Sistemas

2ª aula prática

P1.2 Considere o sinal contínuo $x(t)$ representado na Figura 1.32.

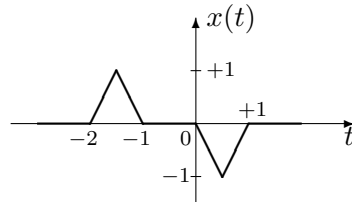


Figura 1.32:

Represente graficamente os seguintes sinais:

- a) $y(t) = x(t - 3)$;
- b) $y(t) = x(-t)$;
- c) $y(t) = x(3t)$;
- d) $y(t) = x(3t + 4)$;
- e) $y(t) = x\left(-\frac{1}{2}t\right)$.

P1.3 Considere os sinais contínuos $x(t)$ e $y(t)$ representados nas Figuras 1.33, 1.34, 1.35 e 1.36. Escreva a expressão que relaciona os dois sinais.

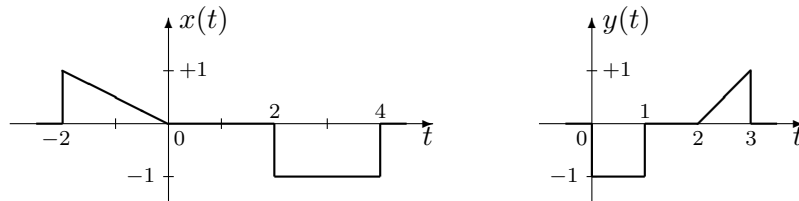


Figura 1.33:

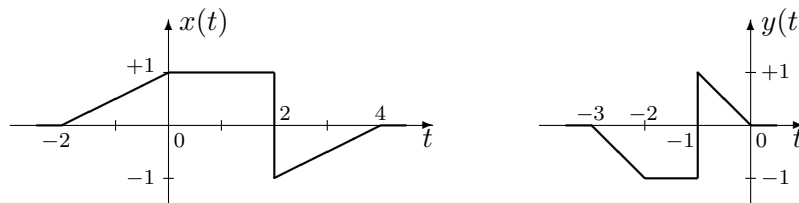


Figura 1.34:

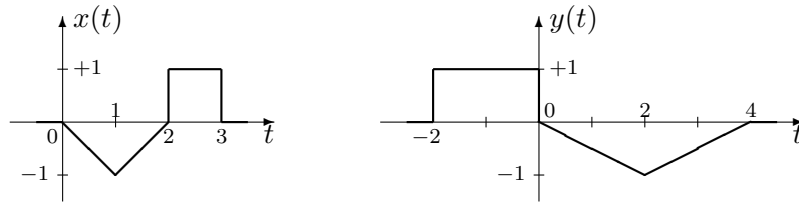


Figura 1.35:

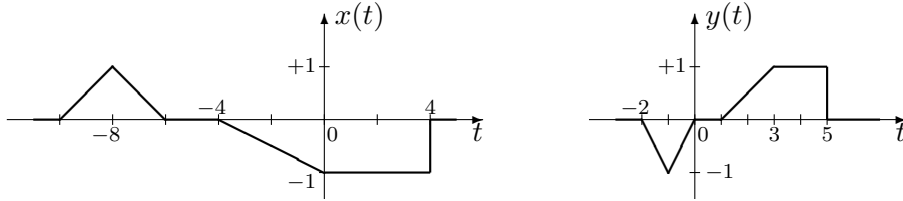


Figura 1.36:

P1.6 Esboce graficamente as componentes par e ímpar dos sinais representados nas Figuras 1.38, 1.39, 1.40 e 1.41.

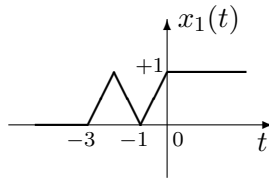


Figura 1.38:

P1.8 Classifique quanto à paridade os seguintes sinais discretos:

- a) $x(n) = \begin{cases} \frac{1}{n} & ; n \neq 0 \\ 0 & ; n = 0 \end{cases}$.
- b) $x(n) = \begin{cases} 2 \left(\frac{1}{3}\right)^{n^2} & ; n \neq 0 \\ 0 & ; n = 0 \end{cases}$.
- c) $x(n) = \begin{cases} 3(n+1) & ; n \neq 0 \\ 0 & ; n = 0 \end{cases}$.
- d) $x(n) = \begin{cases} 4(-1)^n & ; n \neq 0 \\ 0 & ; n = 0 \end{cases}$.

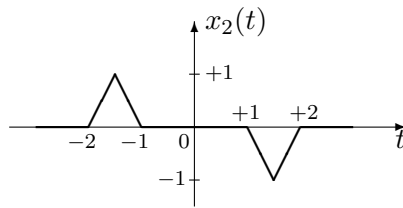


Figura 1.39:

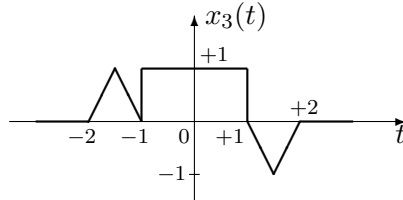


Figura 1.40:

P1.11 Determine quais dos sinais seguintes são periódicos. Para os sinais periódicos indique o período fundamental.

- a) $x(t) = 10 \sin(\pi(t + 1))$;
- b) $x(n) = \sin\left(\frac{5\pi}{4}n + 2\right)$;
- c) $x(n) = \cos\left(\frac{1}{2}n\right)$;
- d) $x(n) = \cos(5\pi n^2)$;
- e) $x(n) = \sum_{m=-\infty}^{+\infty} \left(\frac{1}{2}\right)^{(n-5m)} u_{-1}(n - 5m)$;
- f) $x(t) = \cos(3\pi t) u_{-1}(t)$;
- g) $x(n) = \cos((1 + \pi)n)$;
- h) $x(t) = \sum_{n=-\infty}^{+\infty} e^{-(t-3n)} u_{-1}(t - 3n)$;
- i) $x(n) = \sin\left(\frac{\pi}{2}n\right) + \cos(10n)$.

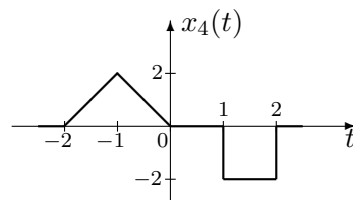


Figura 1.41: