

[da : A. Oppenheim, A. Willsky "Signals and Systems"
Prentice-Hall, (1983) -]

→ Eseguire i seguenti esercizi nell'online indicato:
a, f, g, h, m, -c, j, p.

2.22. In this chapter we introduced a number of general properties of systems. In particular, a system may or may not be

- (1) Memoryless
- (2) Time-invariant
- (3) Linear
- (4) Causal
- (5) Stable

Determine which of these properties hold and which do not hold for each of the following systems. Justify your answers. In each example $y(t)$ or $y[n]$ denotes the system output, and $x(t)$ or $x[n]$ is the system input.

- (a) $y(t) = e^{x(t)}$
- (b) $y[n] = x[n]x[n-1]$
- (c) $y(t) = \frac{dx(t)}{dt}$
- (d) $y[n] = x[-n]$
- (e) $y[n] = x[n-2] - 2x[n-17]$
- (f) $y(t) = x(t-1) - x(1-t)$
- (g) $y(t) = [\sin(6t)]x(t)$
- (h) $y[n] = \sum_{k=n-2}^{n+4} x[k]$
- (i) $y[n] = nx[n]$
- (j) $y(t) = \int_{-\infty}^{3t} x(\tau) d\tau$
- (k) $y[n] = \mathcal{E}\mathcal{V}\{x[n]\}$
- (l) $y(t) = \begin{cases} 0, & t < 0 \\ x(t) + x(t-100), & t \geq 0 \end{cases}$
- (m) $y(t) = \begin{cases} 0, & x(t) < 0 \\ x(t) + x(t-100), & x(t) \geq 0 \end{cases}$
- (n) $y[n] = \begin{cases} x[n], & n \geq 1 \\ 0, & n = 0 \\ x[n+1], & n \leq -1 \end{cases}$
- (o) $y[n] = \begin{cases} x[n], & n \geq 1 \\ 0, & n = 0 \\ x[n], & n \leq -1 \end{cases}$
- (p) $y(t) = x(t/2)$
- (q) $y[n] = x[2n]$