

## Sheet (2)

- 1.34. Consider the system shown in Fig. 1-35. Determine whether it is (a) memoryless, (b) causal, (c) linear, (d) time-invariant, or (e) stable.

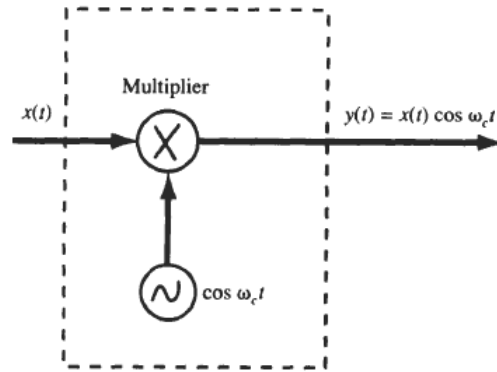


Fig. 1-35

- 1.35. A system has the input-output relation given by

$$y = T\{x\} = x^2$$

Show that this system is nonlinear.

- 1.36. The discrete-time system shown in Fig. 1-36 is known as the *unit delay* element. Determine whether the system is (a) memoryless, (b) causal, (c) linear, (d) time-invariant, or (e) stable.

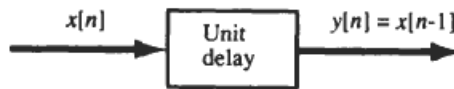


Fig. 1-36 Unit delay element

- 1.41. The system represented by  $T$  in Fig. 1-39 is known to be time-invariant. When the inputs to the system are  $x_1[n]$ ,  $x_2[n]$ , and  $x_3[n]$ , the outputs of the system are  $y_1[n]$ ,  $y_2[n]$ , and  $y_3[n]$  as shown. Determine whether the system is linear.

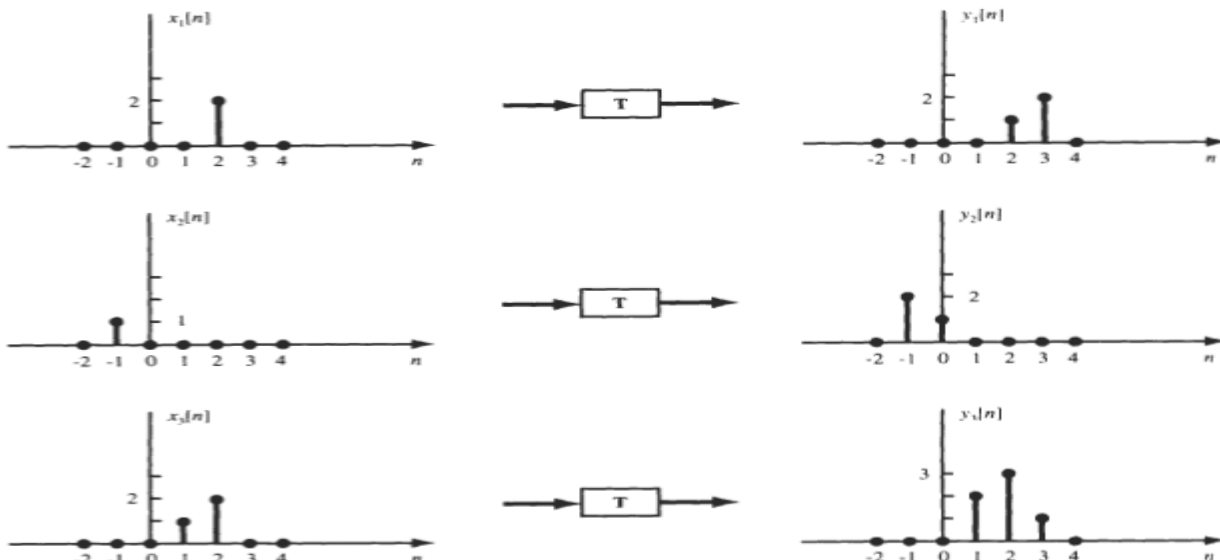


Fig. 1-39

## Sheet (2)

1.46. Express the signals shown in Fig. 1-41 in terms of unit step functions.

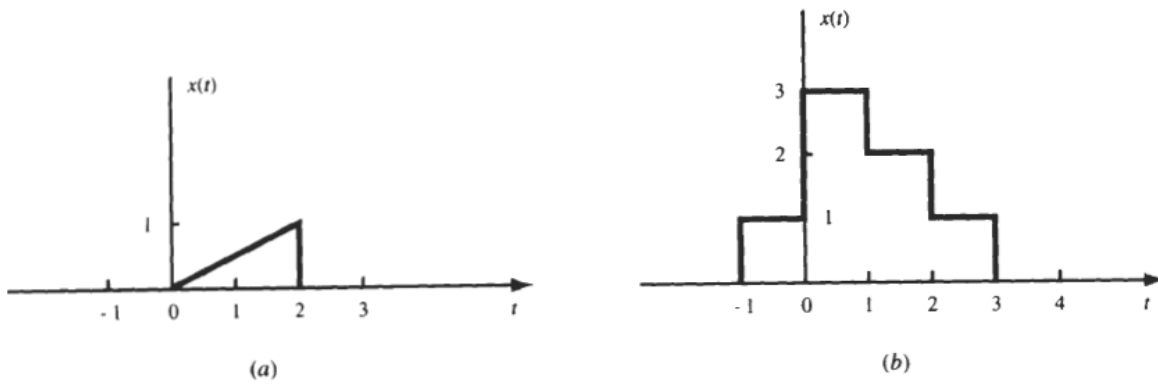


Fig. 1-41

1.58. Consider a discrete-time system with the input-output relation

$$y[n] = T\{x[n]\} = x^2[n]$$

Determine whether this system is (a) linear, (b) time-invariant.