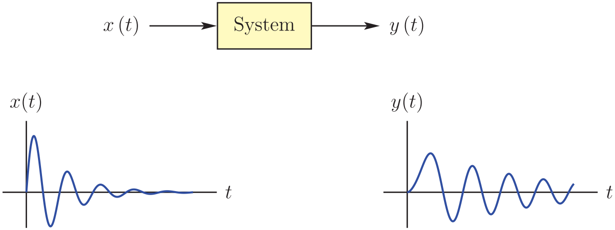


Figure 2.1 Continuous-time signal-system interaction.

002x001.eps

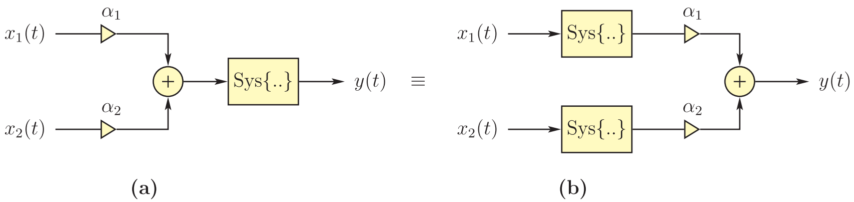


Figure 2.2 Illustration of Eqn. (2.7). The two configurations shown are equivalent if the system under consideration is linear.

002x002.eps

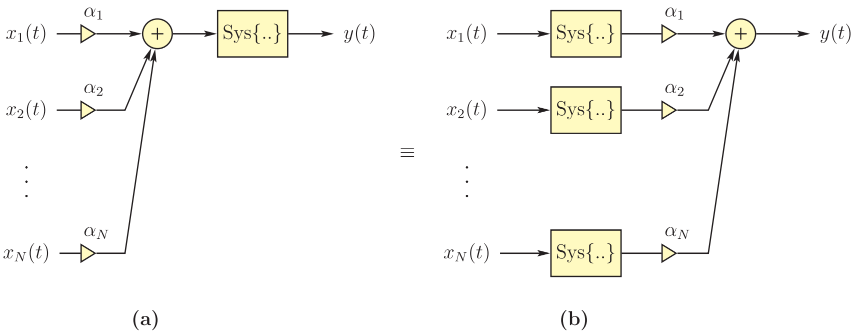


Figure 2.3 Illustration of Eqn. (2.7). The two configurations shown are equivalent if the system under consideration is linear.

002x003.eps

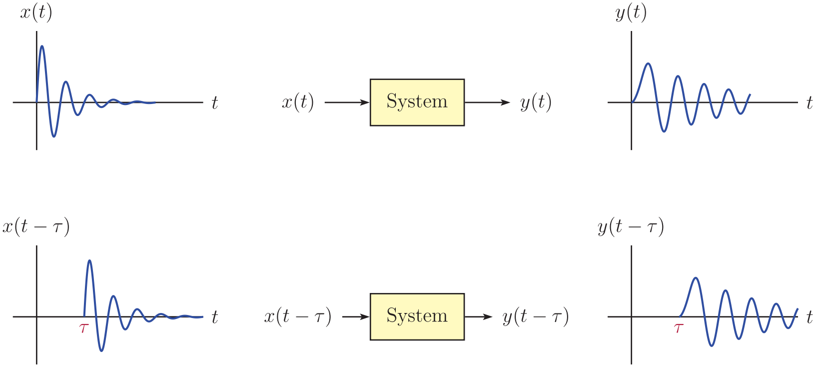


Figure 2.4 Illustration of time invariance.

002x004.eps

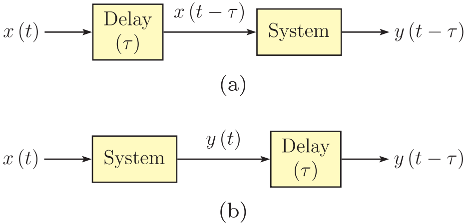


Figure 2.5 Another interpretation of time-invariance. The two configurations shown are equivalent for a time-invariant system.

002x005.eps

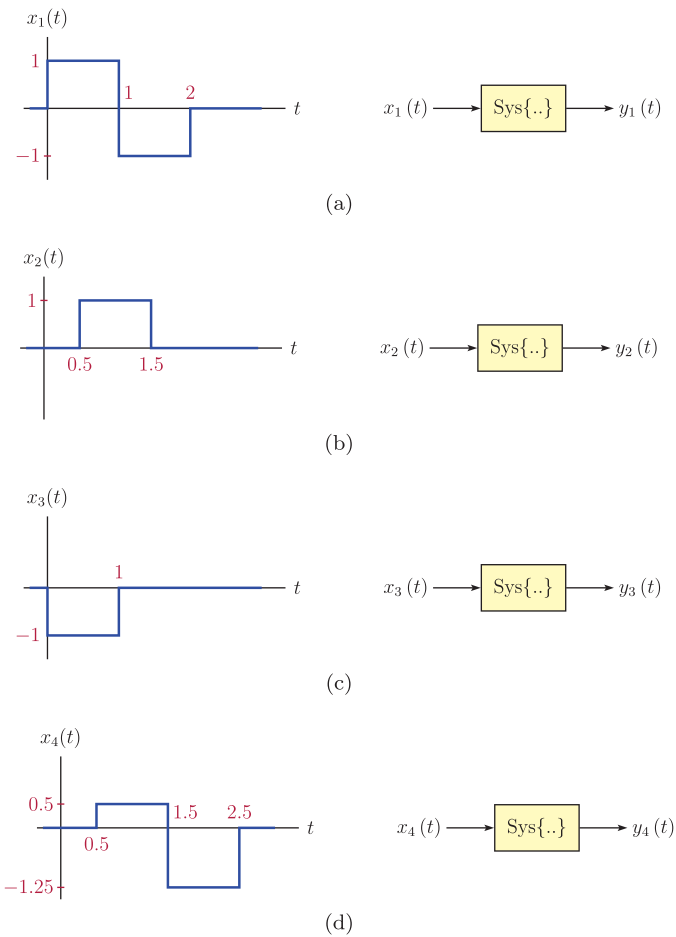
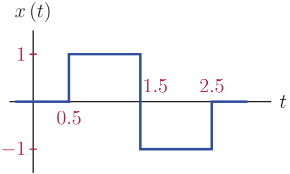


Figure 2.6 Input-output pairs for Example 2.3.



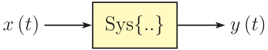


Figure 2.7 Input signal for Example 2.3.

Figure 2.8 Mathematical models for (a) ideal inductor, (b) ideal capacitor.

002x008.eps

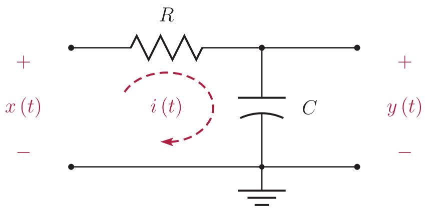


Figure 2.9 RC circuit for Example 2.4

002x009.eps

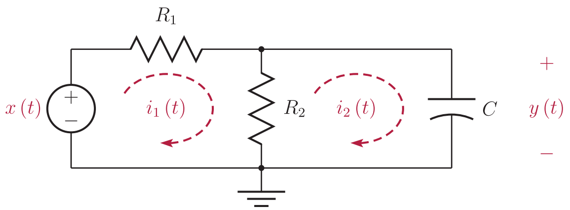


Figure 2.10 Circuit for Example 2.5.

002x010.eps

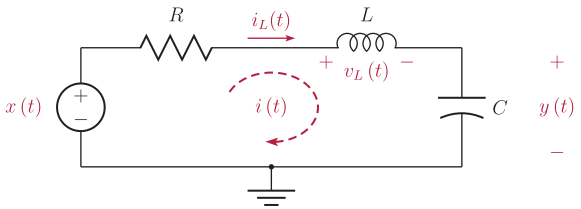


Figure 2.11 Circuit for Example 2.6.

002x011.eps

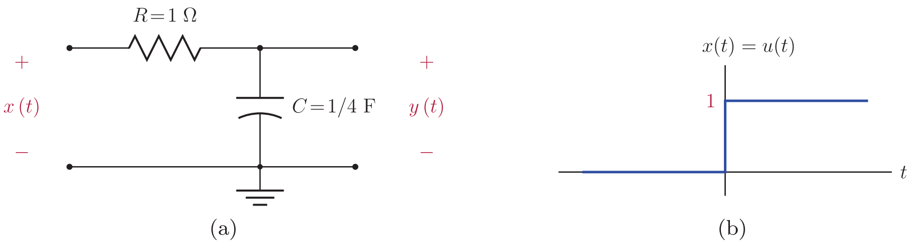


Figure 2.12 (a) The circuit for Example 2.8, (b) the input signal $x(t)$.

002x012.eps

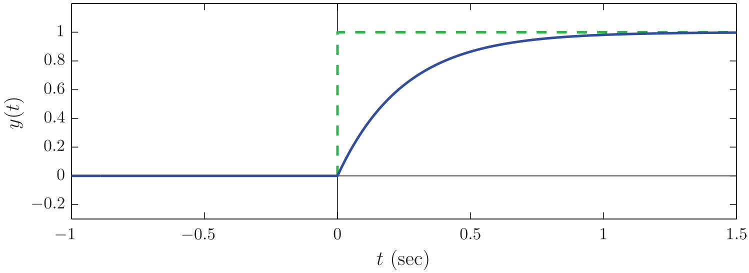


Figure 2.13 The output signal $y\ (t)$ for Example 2.8.

002x013.eps

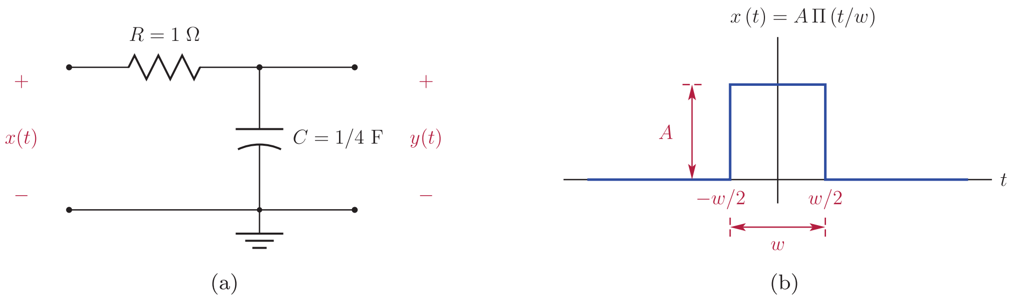


Figure 2.14 (a) The circuit for Example 2.9, (b) the input signal $x(t)$.

002x014.eps

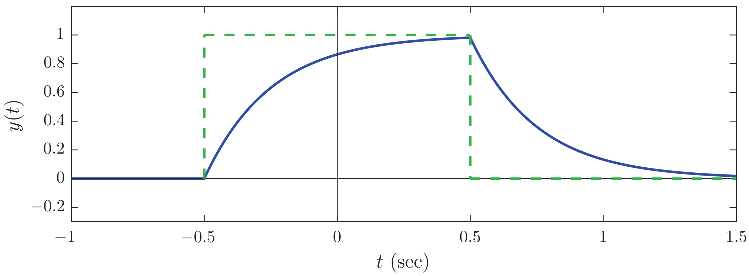


Figure 2.15 The output signal $y(t)$ for Example 2.9.

002x015.eps

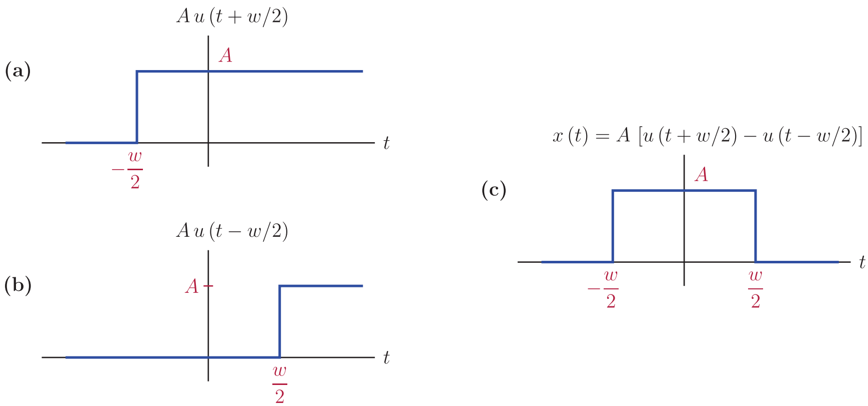


Figure 2.16 Constructing a pulse from time-shifted step functions.

002x016.eps

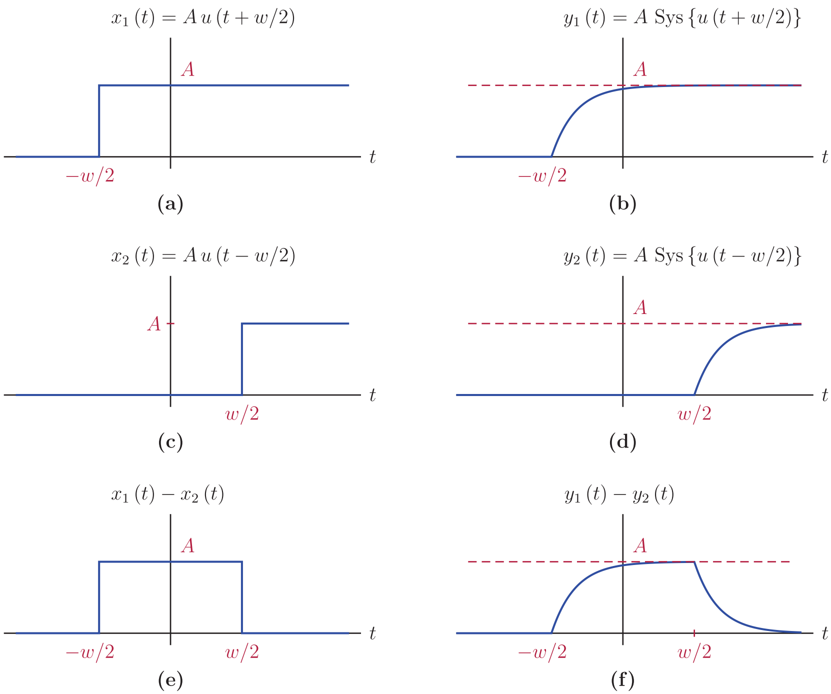


Figure 2.17 The steps employed in the solution of Example 2.10.

002x017.eps

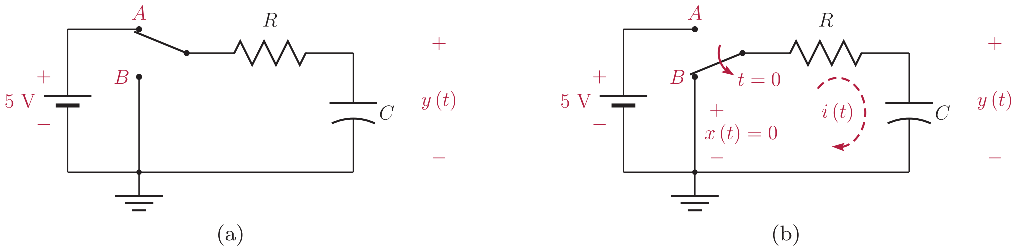


Figure 2.18 The RC circuit for Example 2.11: (a) for $t < 0$, (b) for $t \geq 0$.

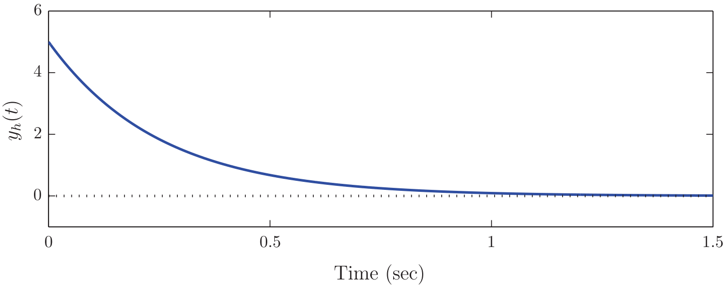


Figure 2.19 The natural response of the circuit in Example 2.11.

002x019.eps

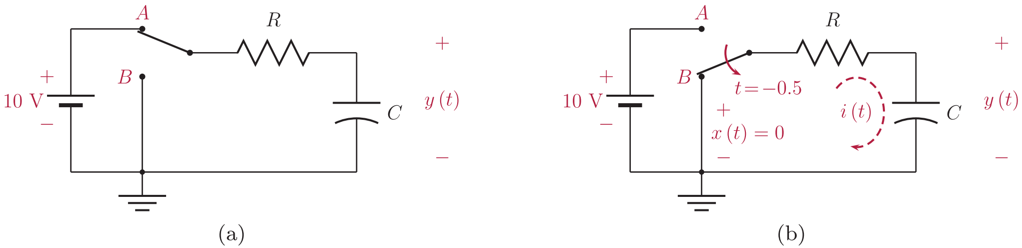


Figure 2.20 The RC circuit for Example 2.12: (a) for t < −0.5, (b) for $t \geq -0.5$.

002x020.eps

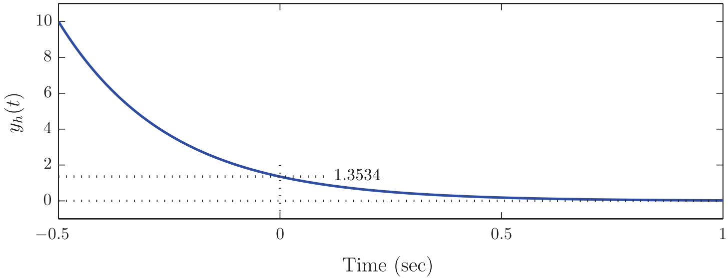


Figure 2.21 The natural response of the circuit in Example 2.12.

002x021.eps

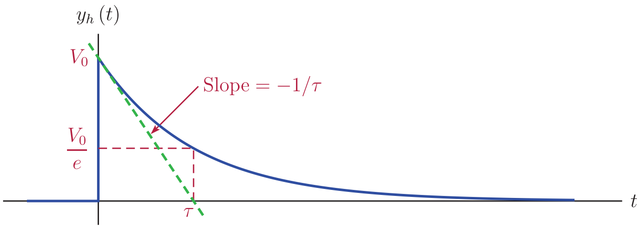


Figure 2.22 Illustration of the time constant for a first-order system.

002x022.eps

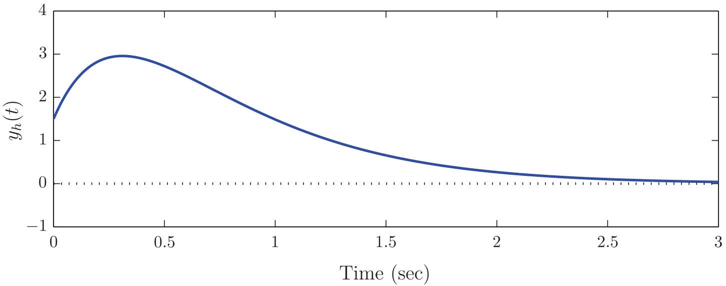


Figure 2.23 The natural response of the second-order system in Example 2.14.

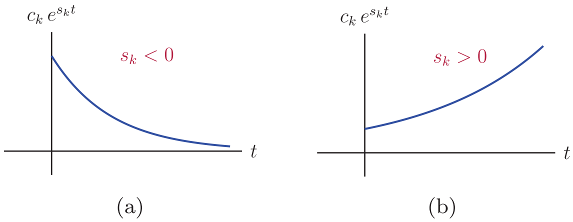


Figure 2.24 Terms corresponding to real roots of the characteristic equation: (a) $s_k < 0$, (b) $s_k > 0$.

002x024.eps

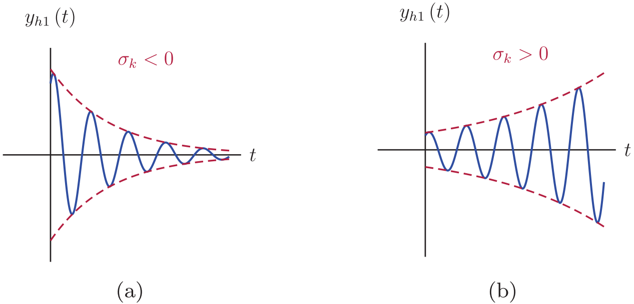


Figure 2.25 Terms corresponding to pair of complex conjugate roots of the characteristic equation: (a) $\sigma_1 < 0$, (b) $\sigma_1 > 0$.

002x025.eps

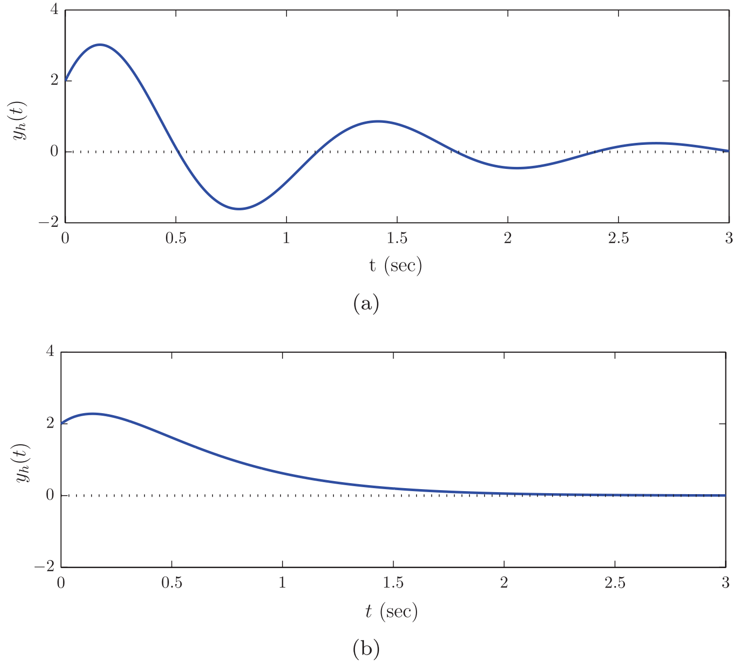


Figure 2.26 Natural responses on the RC circuit in Example 2.15 for (a) characteristic equation roots $s_{1,2} = -1 \pm j2$, and (b) characteristic equation roots $s_1 = s_2 = -3$.

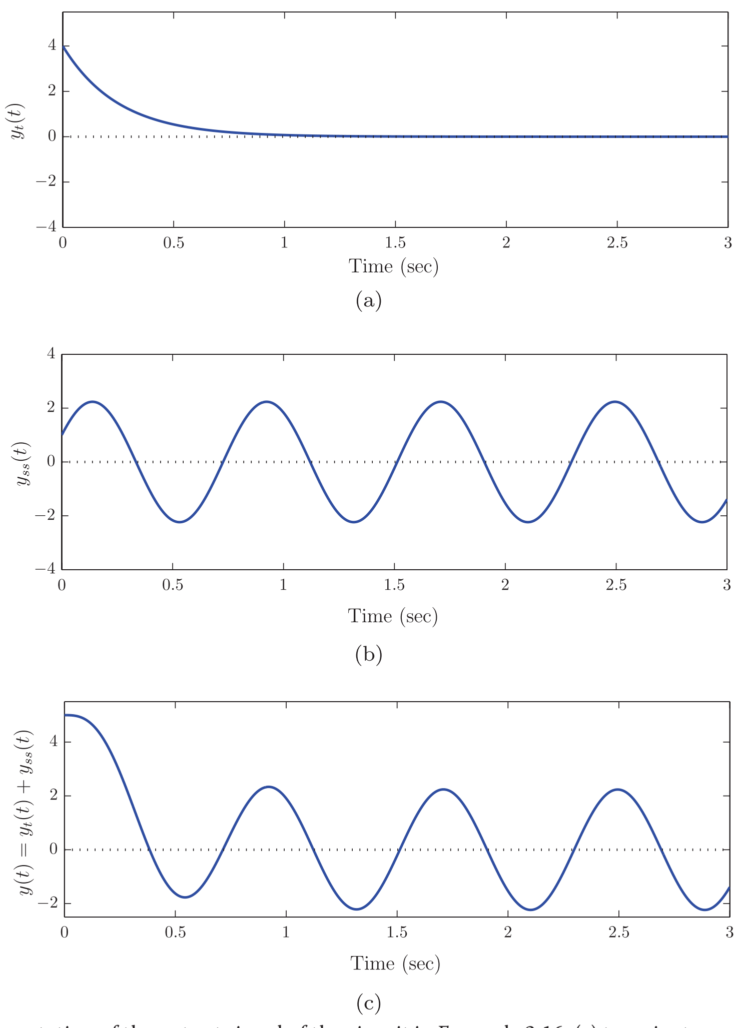


Figure 2.27 Computation of the output signal of the circuit in Example 2.16: (a) transient component, (b) steady-state component, (c) the complete output signal.

002x027.eps

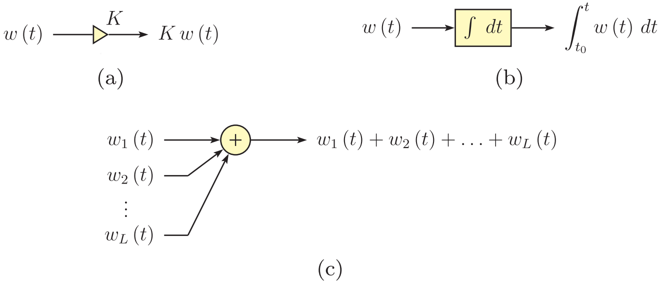


Figure 2.28 Block diagram components for continuous-time systems: (a) constant-gain amplifier, (b) integrator, (c) signal adder.

002x028.eps

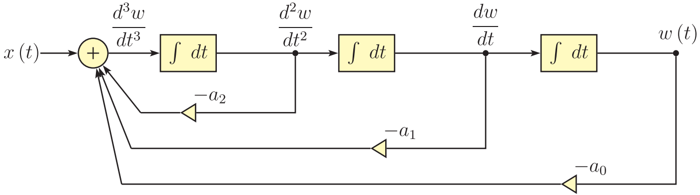


Figure 2.29 The block diagram for Eqn. (2.121).

002x029.eps

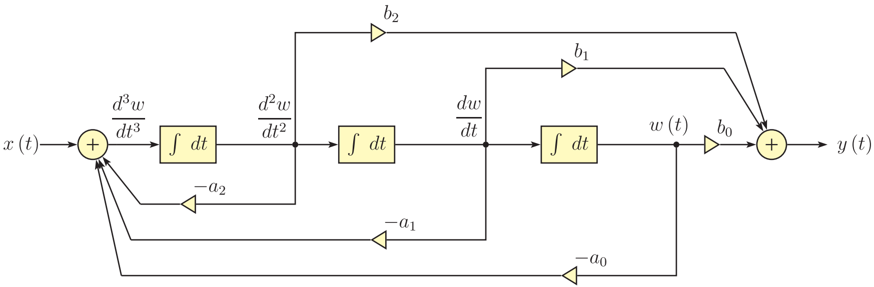


Figure 2.30 The completed block diagram for Eqn. (2.119).

002x030.eps

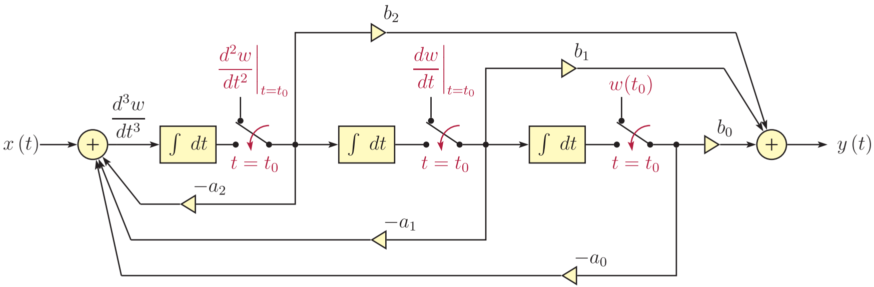


Figure 2.31 Incorporating initial conditions into a block diagram.

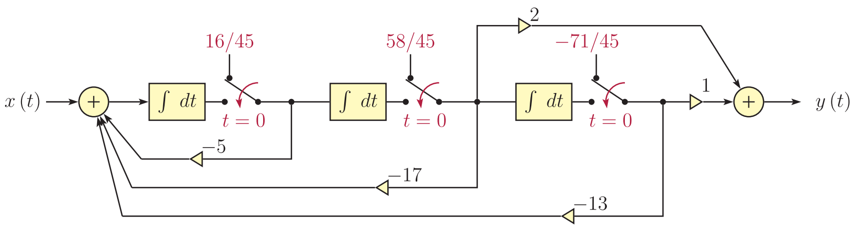


Figure 2.32 Block diagram for Example 2.17.

002x032.eps

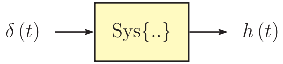


Figure 2.33 Computation of the impulse response for a CTLTI system.

002x033.eps

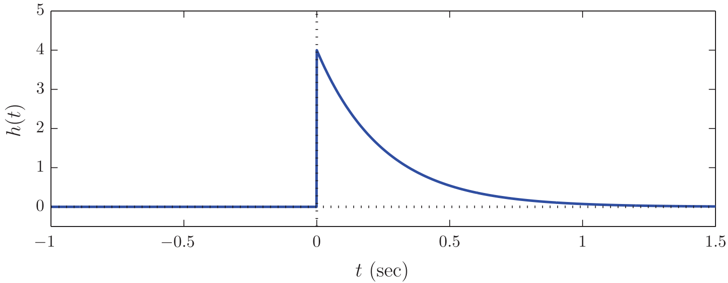


Figure 2.34 Impulse response of the system in Example 2.18.

002x034.eps

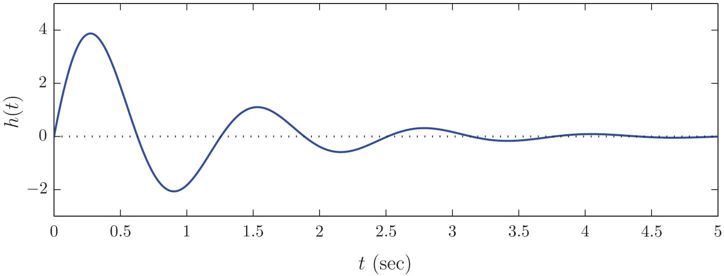


Figure 2.35 Impulse response of the system in Example 2.19.

002x035.eps

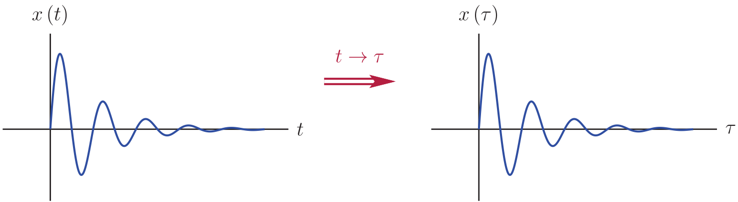


Figure 2.36 Obtaining $x\,(\lambda)$ for the convolution integral.

002x036.eps

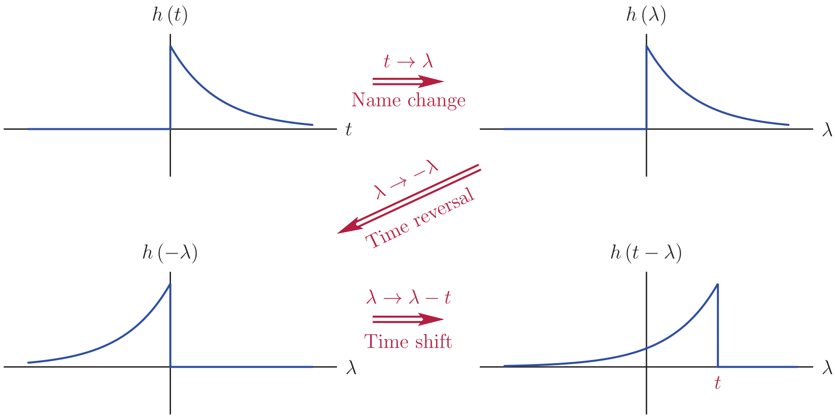


Figure 2.37 Obtaining $h(t - \lambda)$ for the convolution integral.

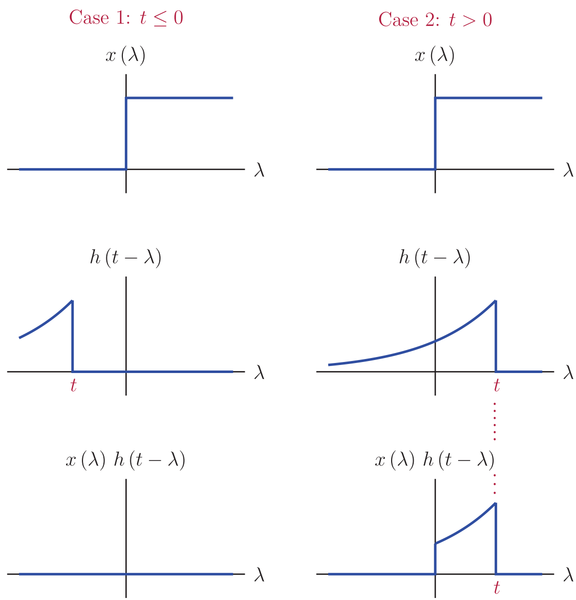


Figure 2.38 Signals involved in the convolution integral of Example 2.20.

002x038.eps

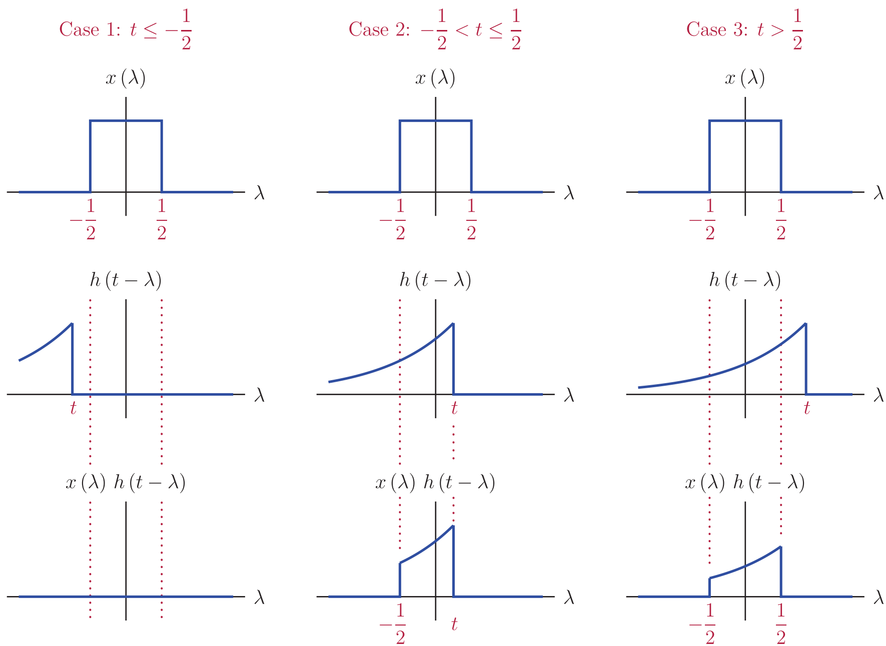


Figure 2.39 Signals involved in the convolution integral of Example 2.21.

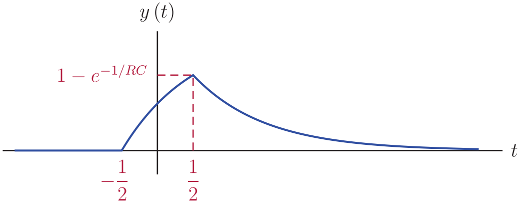


Figure 2.40 Convolution result for Example 2.21.

002x040.eps

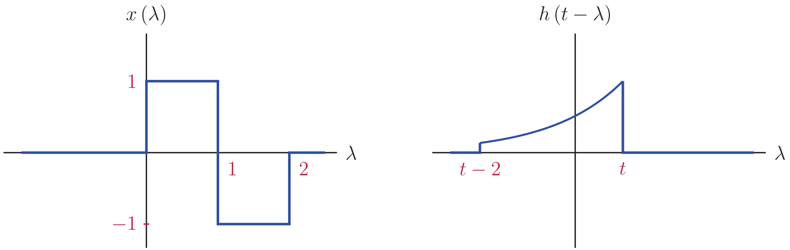


Figure 2.41 The functions $x(\lambda)$ and $h(t-\lambda)$ for the convolution problem of Example 2.22.

002x041.eps

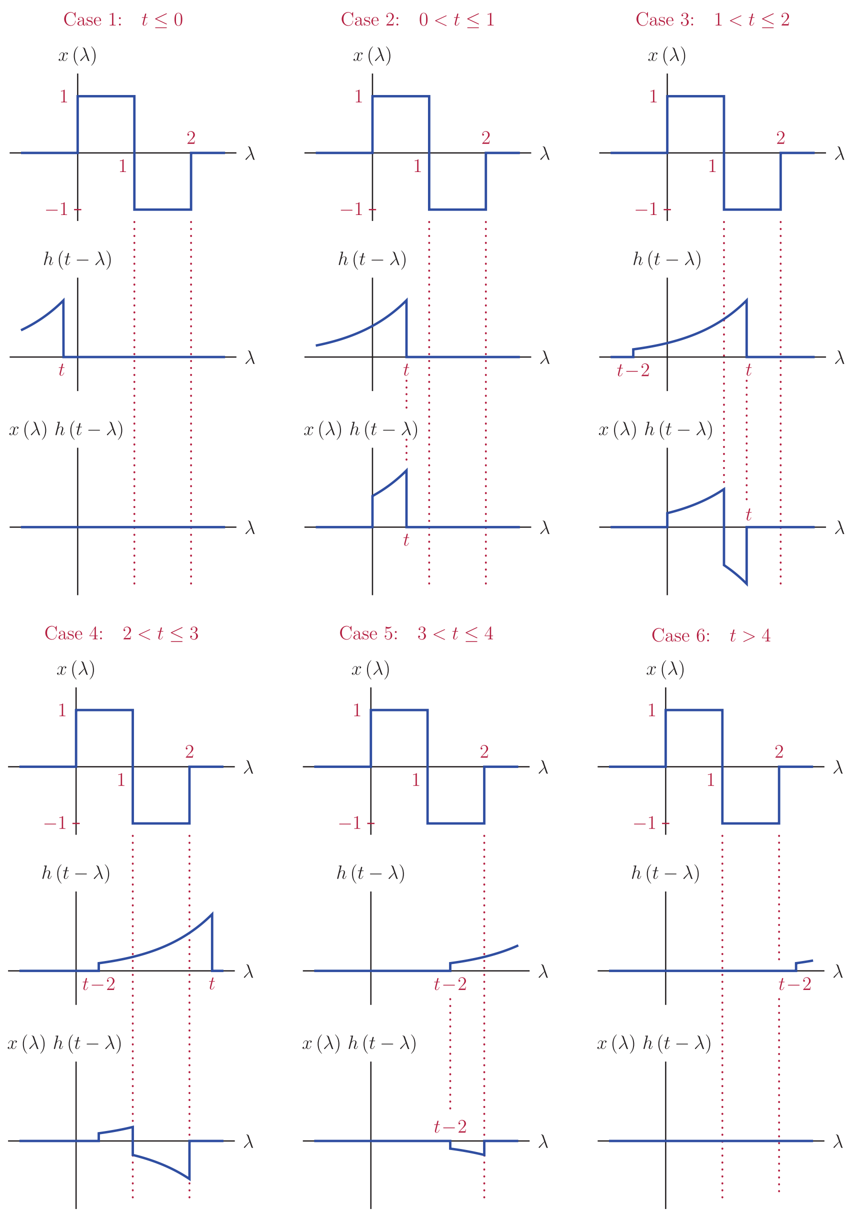


Figure 2.42 Signals involved in the convolution integral of Example 2.22.

002x042.eps

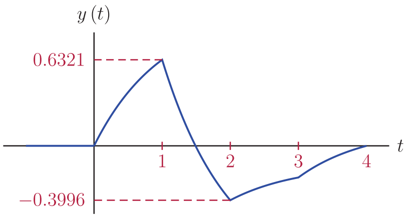


Figure 2.43 Convolution result for Example 2.22.

002x043.eps

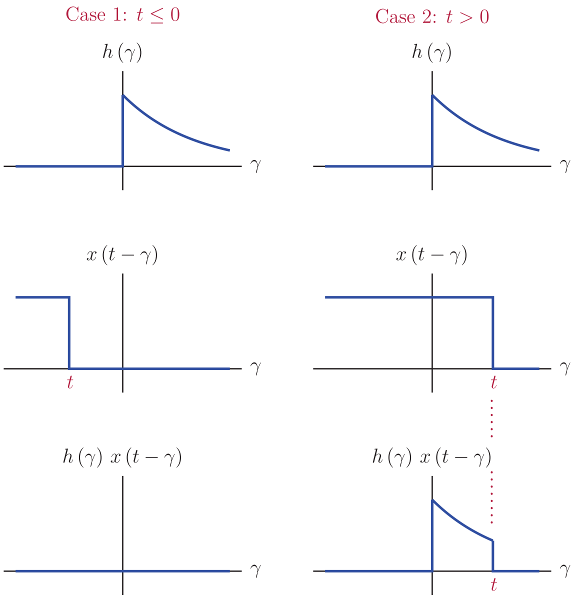


Figure 2.44 Signals involved in the convolution integral of Example 2.23.

002x044.eps

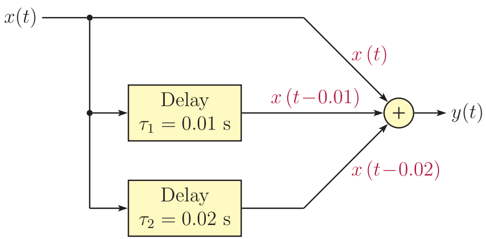


Figure 2.45 Causal system given by Eqn. (2.161).

002x045.eps

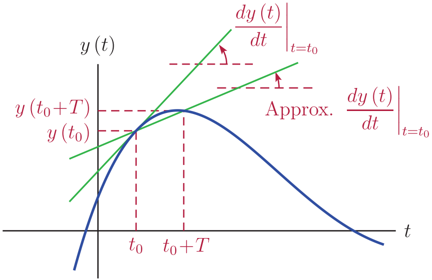


Figure 2.46 Approximating the first derivative using a finite difference.

002x046.eps

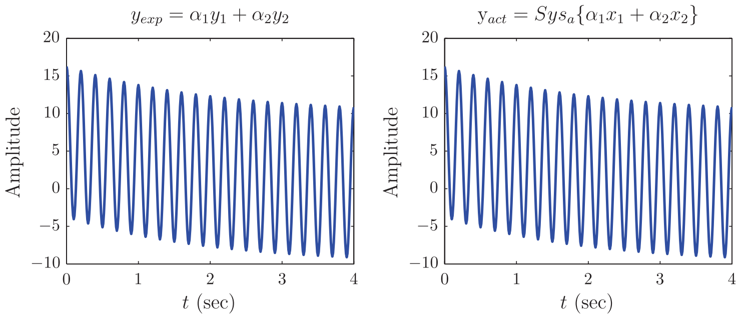


Figure 2.47 Signals $y_{exp}(t)$ and $y_{act}(t)$ for MATLAB Exercise 2.1.

002x047.eps

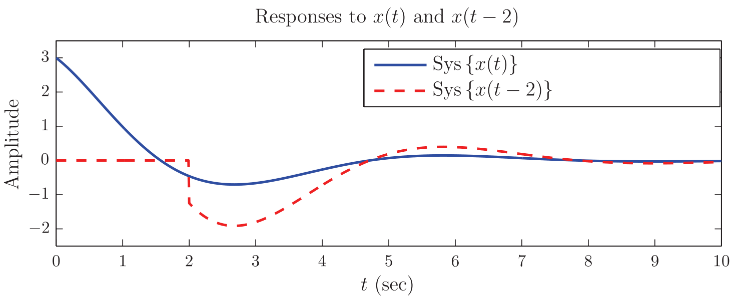


Figure 2.48 Signals Sys $\{x(t)\}$ and Sys$\{x(t-2)\}$for MATLAB Exercise 2.2.

002x048.eps

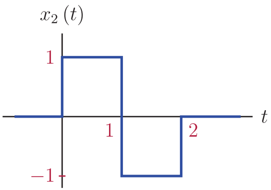
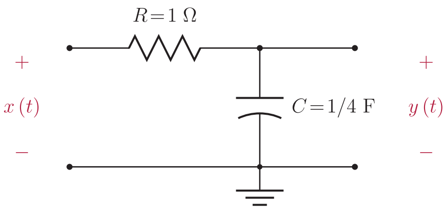


Figure 2.49 Signal $x_2(t)$ for MATLAB Exercise 2.3.

002x049.eps



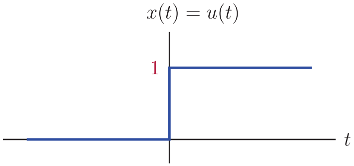


Figure 2.50 The circuit for MATLAB Exercise 2.4, (b) the input signal $x(t)$.

002x050.eps

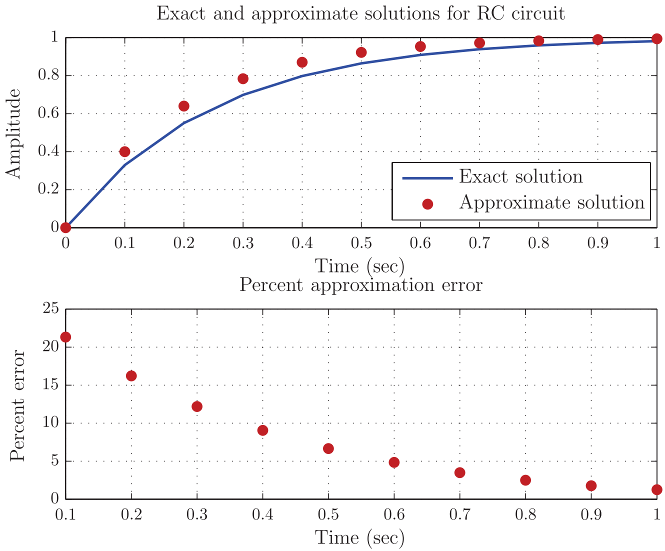


Figure 2.51 Actual and approximate solutions for the RC circuit and the percent error for $\Delta t = 0.1$ s.

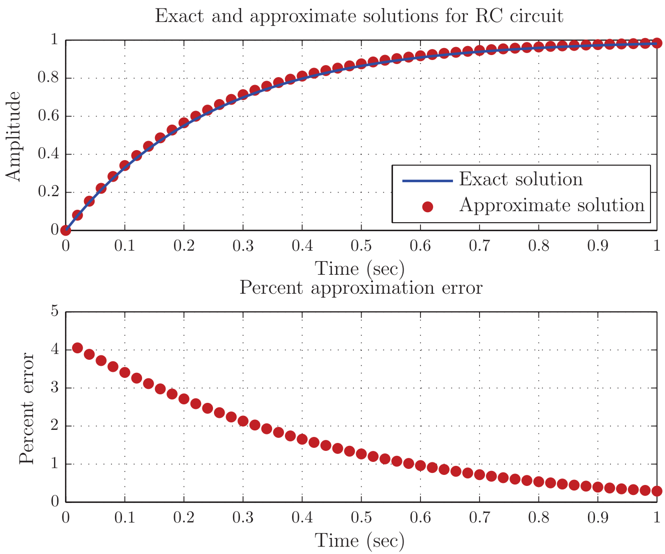


Figure 2.52 Actual and approximate solutions for the RC circuit and the percent error for $\Delta t = 0.02$s.

002x052.eps

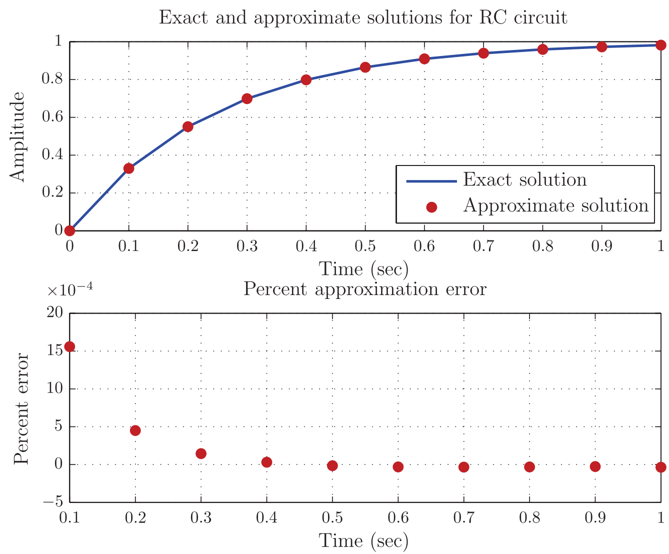


Figure 2.53 Actual and approximate solutions for the RC circuit and the percent error with the ode45(...)function.

Figure P. 2.2

P002x002.eps

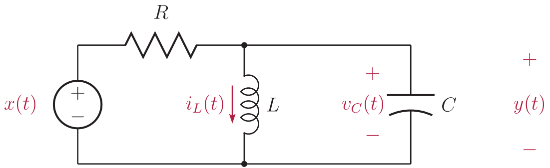


Figure P. 2.4

P002x004.eps

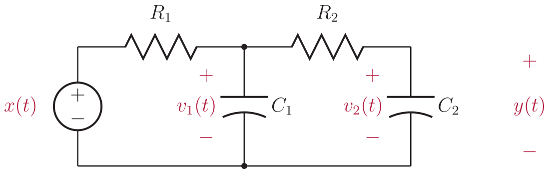
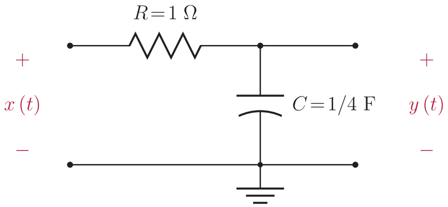
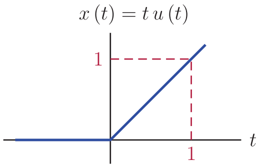


Figure P. 2.5

P002x005.eps



(a)



(b)

Figure P. 2.12

P002x012.eps

Courtesy of CRC Press/Taylor & Francis Group

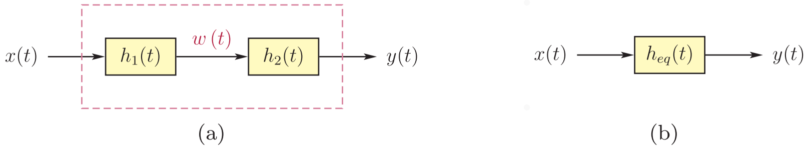


Figure P. 2.17

P002x017.eps

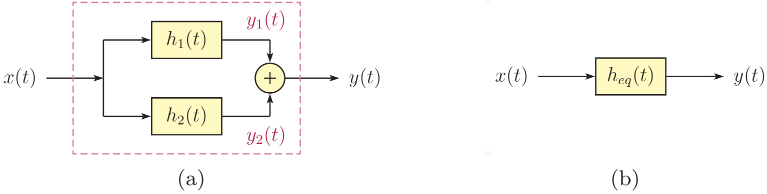
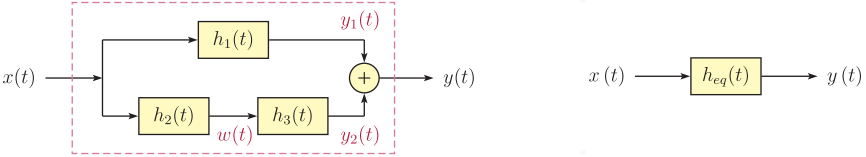


Figure P. 2.18

P002x018.eps

Courtesy of CRC Press/Taylor & Francis Group



(a) (b)

Figure P. 2.19

P002x019.eps

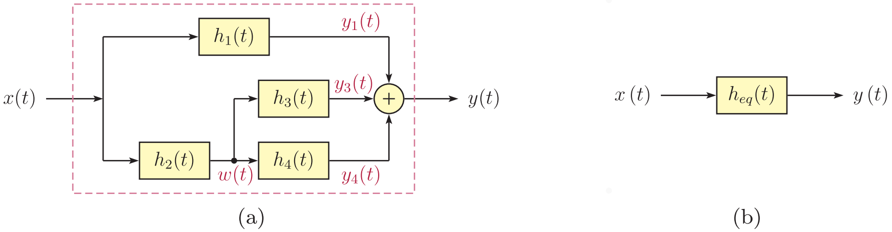


Figure P. 2.20

P002x020.eps

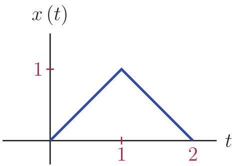


Figure P. 2.23

P002x023.eps

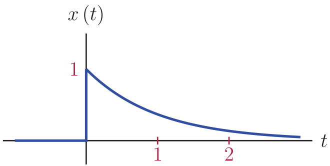


Figure P. 2.24

P002x024.eps

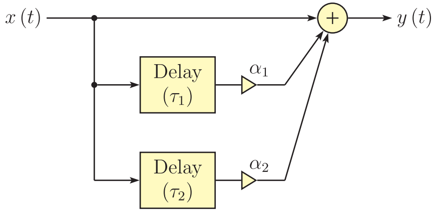


Figure P. 2.30

P002x030.eps

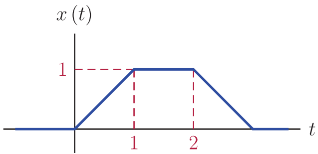


Figure P. 2.36

P002x036.eps

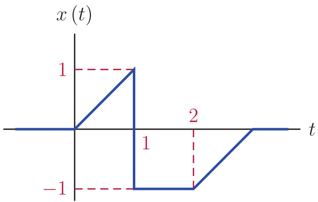


Figure P. 2.37

P002x037.eps