1. For the signals $x(t)$ and $h(t)$ shown in Fig. 1, determine $h(t) * x(t)$.

2. For the signals $x(t)$ and $h(t)$ shown in Fig. 2, determine $h(t) * x(t)$.

3. For the signals $x(t)$ and $h(t)$ shown in Fig. 3, determine $h(t) * x(t)$. Hint: Note that

$$h(t) = 2e^{-2t}u(t) - 2e^{-2t}u(t-2)$$

$$= 2e^{-2t}u(t) - 2e^{-4}e^{-2(t-2)}u(t-2).$$

4. Compute $h(t) * x(t)$ for $-\infty < t < \infty$ where $h(t) = u(t) + u(t-1) - 2u(t-2)$ and $x(t) = 2u(t+1) - u(t) - u(t-1)$.

5. A linear time-invariant continuous-time system has impulse response

$$h(t) = \begin{cases} e^{-t} + \sin(t), & t \geq 0 \\ 0, & t < 0 \end{cases}$$

(a) Compute the step response (output $y(t)$ when input $x(t) = u(t)$) for all $t$.

(b) Compute the output $y(t)$ when the input is $x(t) = u(t) - u(t-2)$. 
Figure 1: Plots for problem 1.
Figure 2: Plots for problem 2.
Figure 3: Plots for problem 3.

The plots show the functions $x(t) = \exp(-t)$ and $h(t) = 2\exp(-2t)$ over the range of time $t$ from -2 to 6.