EC204: Networks & Systems
Problem Set 2

1. $u(t)$ is the *step function*. Find $u(t) * u(t)$.
2. Find $y(t) = x(t) * h(t)$.

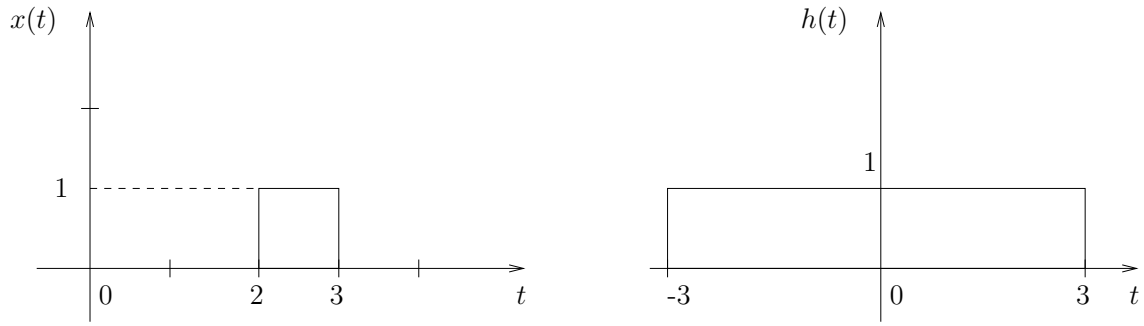

Figure 1:

3. Find $x(t) * h(t)$, where $h(t) = (-e^{-t} + 2e^{-2t})u(t)$ and $x(t) = 10e^{-3t}u(t)$.
4. Express $f_1(t)$ and $f_2(t)$ in terms of $u(t)$ and $r(t)$, where $r(t) = u(t) * u(t)$ and $f_1(t)$ and $f_2(t)$ are as in Figure 2.
5. An LTI system is specified as $(D^2 + 5D + 6)y(t) = (D + 1)x(t)$. Find the zero-input response $y(t)$ for $t \geq 0$ if $y_0(0^-) = 2$ and $\dot{y}_0(0^-) = -1$.
6. Consider the system shown in Figure 3, where $i_L(0^-) = 0$ and $v_C(0^-) = 0$. Write down the differential equation for the system given in Figure 4.

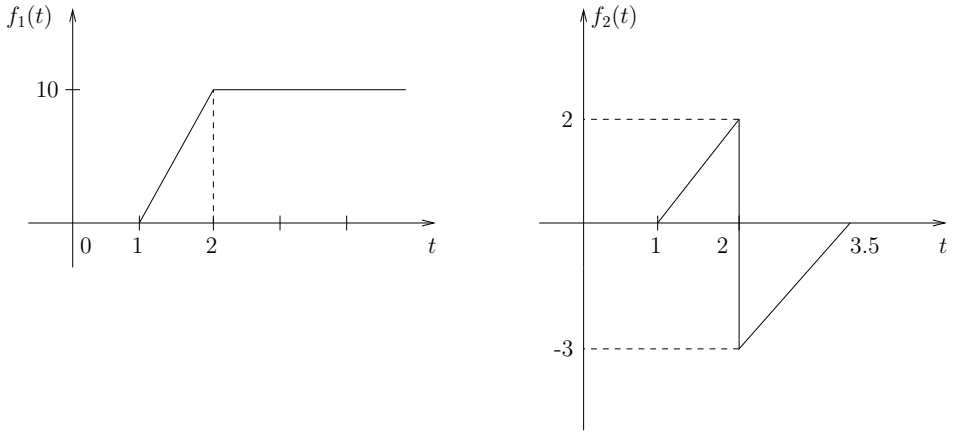

Figure 2:

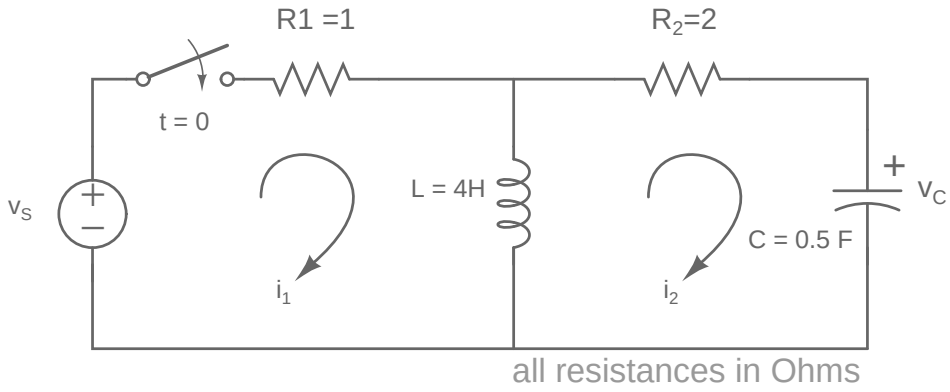

Figure 3:

Figure 4: