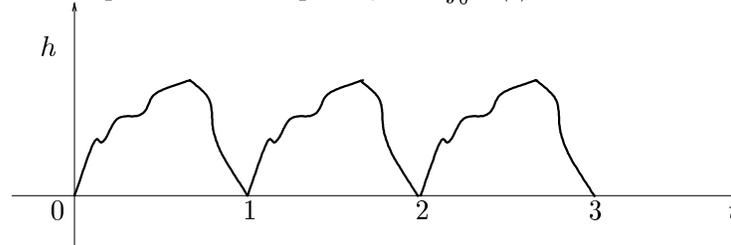1. We consider a linear, time invariant system with impulse response $h(t)$ depicted in the figure. The function is made of three identical curves in the intervals $[0, 1]$, $[1, 2]$, $[2, 3]$, and is zero outside that range. It is non-negative, and $\int_0^1 h(t)dt = 1$.

   Sketch the response of the system to the input $x(t) = u(t) - u(t - 1)$.
   Your sketch cannot be exact since you don't know $h(t)$ exactly, but it must be consistent with the information given above.

2. Given the function $f(t) = e^{-t}u(t)$, where $u(t)$ is the step function, find the convolutions:

   (a) $u * f$;
   (b) $f * f$;
   (c) $u * u$.

3. Consider the cascade of linear, time-invariant systems $\mathcal{S}_1$ and $\mathcal{S}_2$.
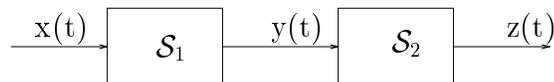
   We know:

   - The impulse response function $h_1(t) = u(t) - u(t - 2)$.
   - The response of system $\mathcal{S}_2$ to the ramp input $y(t) = tu(t)$ is the function $z(t)$ below.
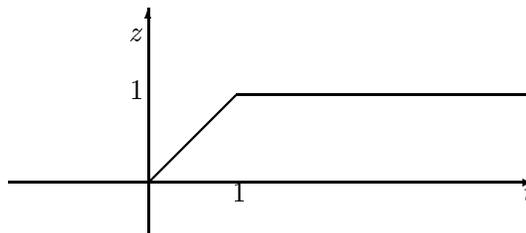
   Find and sketch the impulse response of the cascade.