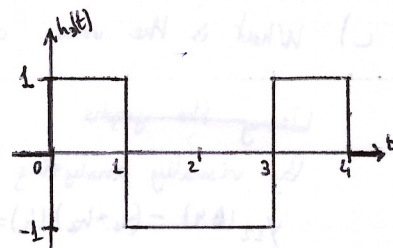
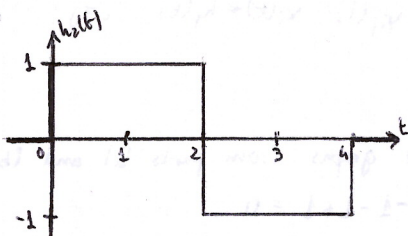
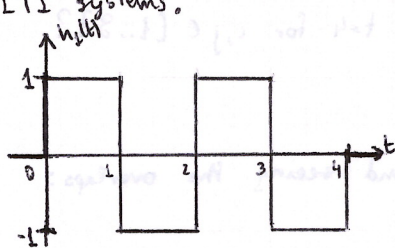


2.66. Let $h_1(t)$, $h_2(t)$, and $h_3(t)$ be as sketched, be the impulse responses of three LTI systems.

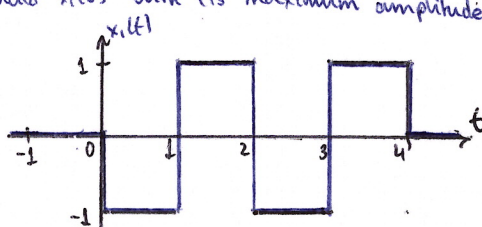
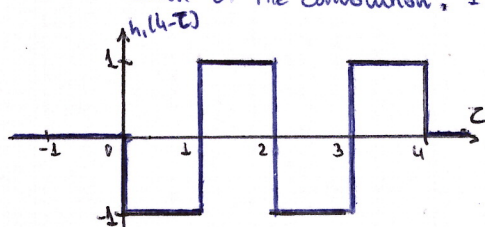


a) Determine and sketch a choice for $x_1(t)$, a continuous-time signal such that

- i) $x_1(t)$ is real
- ii) $x_1(t) = 0 \quad \forall t < 0$
- iii) $|x_1(t)| \leq 1 \quad \forall t \geq 0$
- iv) $y_1(t) = x_1(t) * h_1(t)$ is as large as possible at $t=4$.

I assume the condition is actually $y_1(t) = x_1(t) * h_1(t)$ maximum at $t=4$.

Maximum at $t=4$ means the overlap between $x_1(t)$ and $h_1(4-t)$ is maximum, so it's a perfect overlap in shape. This conclusion was derived from the graph-manipulation visualization of the convolution. I will build $x_1(t)$ with its maximum amplitude and perfect overlap.



b) Repeat part (a) for $x_2(t)$ and $x_3(t)$.

Same process mutatis mutandis.

