ECE250: Signals & Systems

Assignment 2: Report

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Assumptions:

1. The signal $u(t)$ is the unit-step signal, defined below:

$$u(t) = \begin{cases} 1 & \text{if } t \geq 0 \\ 0 & \text{if } t < 0 \end{cases} \tag{1}$$

2. Since we cannot deal with *continuous*-time signals in Python, I have assumed a very small time interval $dt = 0.01$ to plot the signals and perform the convolution.

Notes:

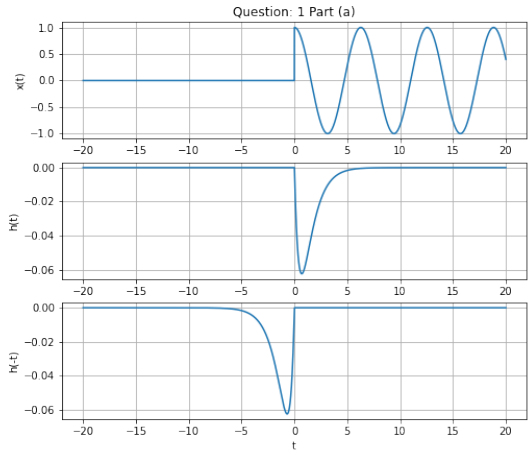
1. **Question: 1** asks us to plot the signals $x(t),\ h(t)$, and $y(t)$ for $t \in [0, 20]$. However, I have plotted the signals $x(t),\ h(t)$, and $h(-t)$ for $t \in [-20, 20]$ for visualization as well.

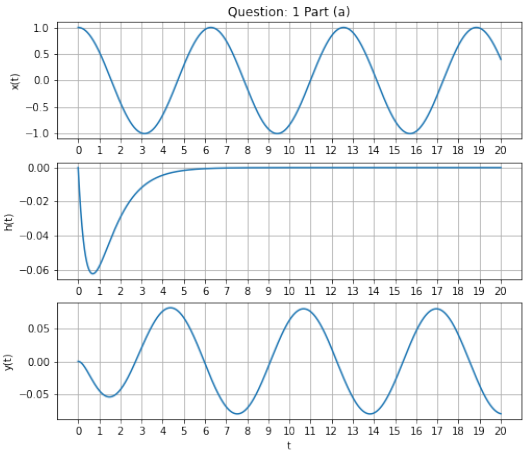
Question: 1

(a) Given the following signals $x(t)$ and $h(t)$:

$$x(t) = \cos(t)u(t) \tag{2}$$

$$h(t) = \frac{1}{4}\left(e^{-2t} - e^{-t}\right)u(t) \tag{3}$$



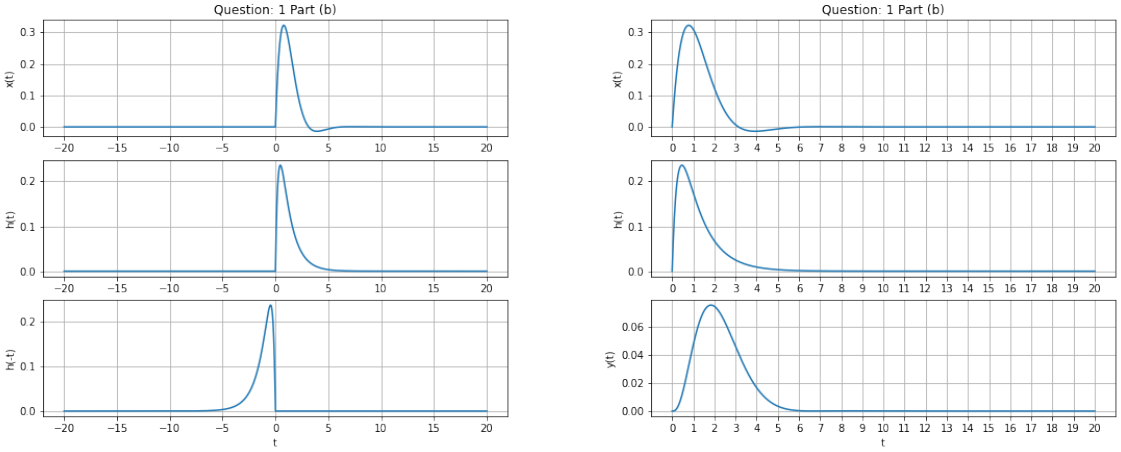


Subplots for **Question: 1 (a)**

(b) Given the following signals $x(t)$ and $h(t)$:

$$x(t) = e^{-t} \sin(t) u(t) \tag{4}$$

$$h(t) = \frac{1}{2} \left(e^{-t} - e^{-4t} \right) u(t) \tag{5}$$



Subplots for **Question: 1 (b)**