

ELEC 255 tutorial. Practice 2.

Continuous-Time Linear Time-Invariant Systems

STUDENT #: _____ MARKS: _____/15

Problem: [5 marks/part]

Using the graphical method, compute the convolution of the following two signals:

$$x(t) = \begin{cases} t + 2, & -1 \leq t \leq 2, \\ 0, & \text{elsewhere.} \end{cases}$$

and $h(t) = 2\cos(t)[u(t + \frac{\pi}{2}) - u(t - \frac{\pi}{2})]$.

(a) Plot $x(\tau)$, $h(\tau)$ and $h(t - \tau)$ versus τ . ***Be very careful to plot these graphs correctly. If you make a mistake here, all of your subsequent work will be completely wrong, and you will lose a very substantial number of marks as a result.***

(b) For each of the cases (i.e., intervals of t) to be considered in the computation of the convolution result $y(t)$, carefully sketch and fully label the graph that includes both $x(\tau)$ and $h(t - \tau)$ plotted versus τ .

(c) Use the graphs from part(b) to determine the convolution result $y(t)$. **You may state your final answer in terms of integrals.**