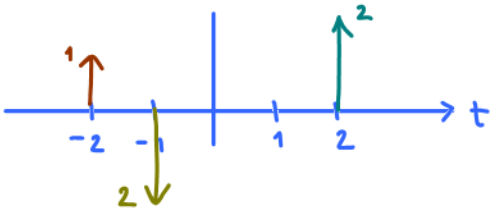
ECS 332: In-Class Exercise # 1

Instructions

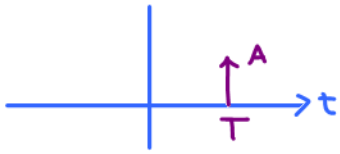
1. Separate into groups of no more than three persons.
2. **Write down all the steps** that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.
3. **Do not panic.**

Date: **22** / **08** / 2018			
Name	ID (last 3 digits)		
Prapun	**5**	**5**	**5**

1) Plot $2\delta(t-2)+\delta(t+2)-2\delta(t+1)$.



This is the plot of $A\delta(t-T)$.



2) Evaluate the following integrals:

a) $\int_2^4 \delta(t)dt = \int_2^4 1\,\delta(t-0)\,dt = 0$

$g(t)\equiv 1$; $c=0\notin[2,4]$

b) $\int_2^4 \delta(t-3)dt = \int_2^4 1\,\delta(t-3)\,dt = g(3) = 1$

$g(t)\equiv 1$; $c=3\in(2,4)$

Recall: General sifting property:

$$\int_A g(t)\,\delta(t-c)\,dt = \begin{cases} g(c), & c\in A, \\ 0, & c\notin A. \end{cases}$$

c) $\int_2^4 (t^2-1)\delta(t-3)dt = g(3) = 3^2-1 = 9-1 = 8$

$g(t)$; $c=3\in(2,4)$

d) $\int_2^4 (t^2-1)\delta(t)dt = 0$

$g(t)$; $c=0\notin[2,4]$

e) $\int_0^\infty 2\delta(t-2)+\delta(t+2)-2\delta(t+1)dt = \int_0^\infty 2\delta(t-2)\,dt + \int_0^\infty 1\,\delta(t+2)\,dt - \int_0^\infty 2\delta(t+1)\,dt$

$2\in(0,\infty)$; $-2\notin[0,\infty)$; $-1\notin[0,\infty)$

$= 2 + 0 - 0$

$= 2$

f) (optional) $\int_{-\infty}^{\infty} \delta(t^2-3t+2)dt = 2$

Come discuss with Dr. Prapun if you think you have found a way to solve this.

A good start is to find the roots of t^2-3t+2.

↳ $t=1,2$.

However, this is not enough. The answer will also depend on the slope of t^2-3t+2 at $t=1,2$ as well.