

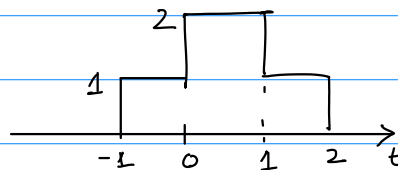
## Review assignment 1

1) Let  $u(t)$  be the unit step signal, i.e.,

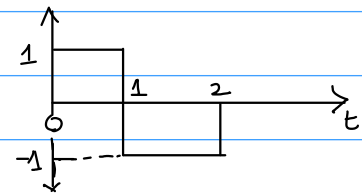
$$u(t) = \begin{cases} 1, & t \geq 0 \\ 0, & t < 0 \end{cases}$$

express the following signals using linear, time shifted combinations of the unit step signal.

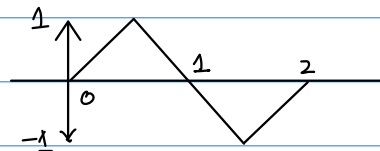
a)



b)



2) Suppose  $p(t)$  is the signal



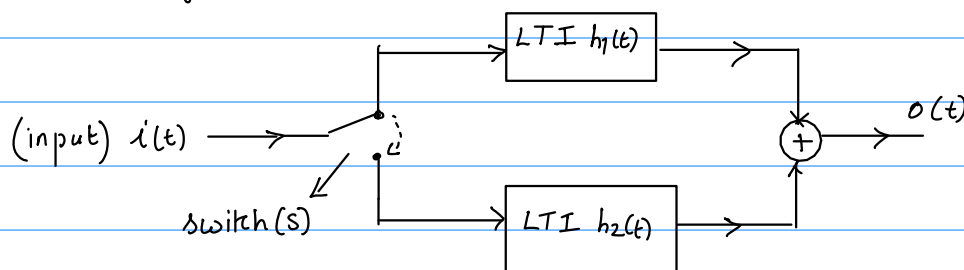
define  $\tilde{p}(t) = \sum_{k=-\infty}^{\infty} p(t - 2k)$ .

a) Is the signal  $\tilde{p}(t)$  periodic? Justify

b) Find out the energy of  $p(t)$  and  $\tilde{p}(t)$ .

c) Find out the power of  $p(t)$  and  $\tilde{p}(t)$ .

3) Consider a system which is represented using the following block diagram



The input  $i(t)$  is transformed into the output  $o(t)$  using the above system.

The switch (S) connects  $i(t)$  to the upper path for  $t < 100$ . At  $t = 100$ , the switch instantaneously connects  $i(t)$  to the lower path. The two blocks in the upper and lower paths are LTI systems with impulse responses being  $h_1(t)$  and  $h_2(t)$  respectively.

Express the output  $o(t)$  in terms of  $i(t)$  and the impulse responses.

Questions from the textbook - Comm. Systems - Upamanyu Madhow.

- Problems 2.1 and 2.2.
- Examples 2.3.1 and 2.3.2