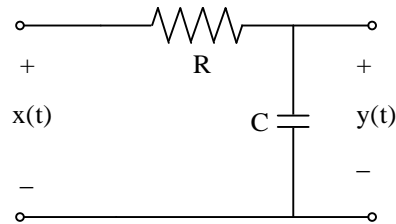1. (3.8-3) find the power of the output voltage y(t) of the RC network shown below with RC=2π, if the input voltage PSD $S_x(f)$ is given by

   (a) K;

   (b) $\Pi(\pi f)$;

   (c) $\delta(f+1) + \delta(f-1)$.

   In each case calculate the power of the input signal x(t).

2. Find the impulse response $h(t)$ of the ideal LPF with cutoff frequency f_c. The frequency response of an ideal LPF with cutoff frequency f_c is given by

   $$H(f) = \begin{cases} e^{-j2\pi f t_d} & |f| \leq f_c \\ 0 & otherwise \end{cases}$$

3. Find the Hilbert transform of $x(t)$ ($f_0 > 0$):

   (a) $x(t) = \cos 2\pi f_0 t$

   (b) $x(t) = \sin 2\pi f_0 t$

   (c) $x(t) = e^{j2\pi f_0 t}$