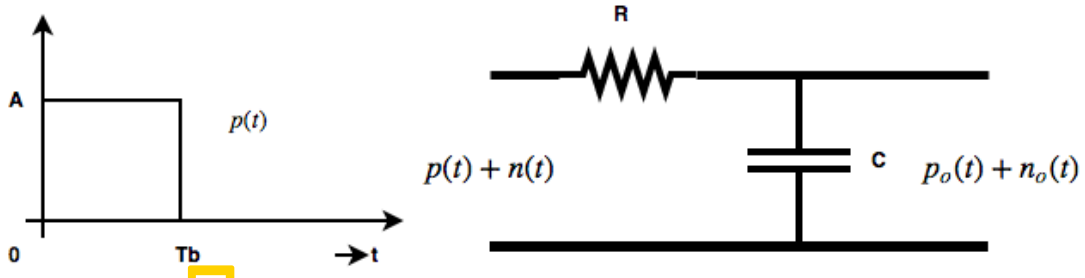
DA-IICT
CT303
LAB 8

1. An alternative to matched filter is a suboptimal filter where we use a simple RC low pass filter and adjust parameters R and C to maximize the SNR (ρ^2). Consider following filter to approximate the matched filter. Consider the input $P(t)$ is a rectangular pulse with width T_b and height A, noise input is white Gaussian with PSD=$\frac{\mathcal{N}}{2}$. The filter is:



Show that:

1. the minimum BER is obtained when $\frac{1}{RC} = \frac{1.26}{T_b}$ where T_b is the bit interval.
2. the minimum BER is obtained when we sample output is sampled at $t = T_b$.

Use following values: $A = 0.01$, $T_b = 10^{-6}$, $T_s = 10^{-9}$, $\mathcal{N} = 10^{-9}$, $\sigma^2_{n_0} = \frac{\mathcal{N}}{4RC}$.