

Topic 5:
Transmission Lines

Academic Year 2013 - 2014

P1.- Consider the circuit shown in Figure 1 where the generator V_S produces the signal in Figure 2. Generator has an inner resistive load $R_S = Z_0$. Assume propagation delay = T . Calculate and show the wave forms of $V_1(t)$, $I_1(t)$, $V_2(t)$ and $I_2(t)$ for:

- $R_L = \infty$
- $R_L = 3Z_0$
- $R_L = Z_0$

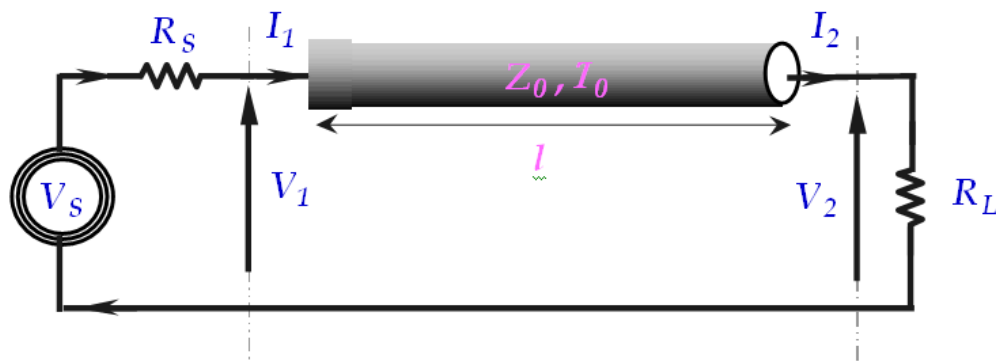


Figure 1.

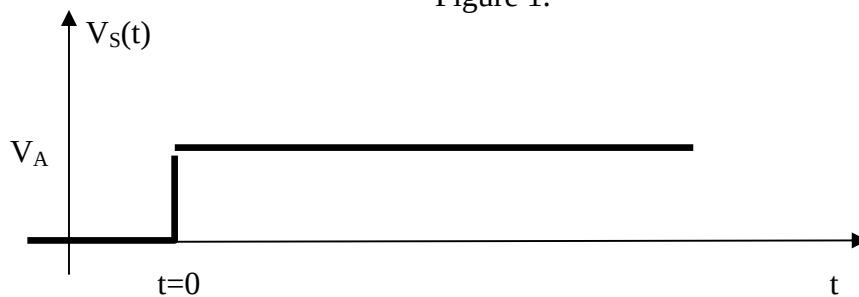


Figure 2

P2.- The planning of a local loop intended only for analog voice transmission uses the following design value: 6dB of limit attenuation at 800Hz. Using the Table 1 of electrical characteristics of transmission lines, obtain:

- Maximum length of the local loop with 0.405mm width wire, unloaded and loaded.
- Repeat for 0.51mm width.
- What type of wire should be used to a loop of 10km? (Cheaper solution).
- In the case of 0.405mm with no load, the maximum length that ensures 6dB attenuation for ADSL high frequency (1100kHz).

Width (mm)	Load	C (nF/km)	R (Ω /km)	α (dB/km a 0.8 KHz)
0.32	no	40	433	2.03
0.405	no	40	270	1.61
0.405	H-66	40	273	1.25
0.405	H-88	40	274	1.09
0.51	no	50	170	1.42
0.51	H-66	50	173	0.88
0.51	H-88	50	174	0.77
0.64	no	52	107	1.01
0.64	H-66	52	110	0.60
0.64	H-88	52	111	0.48
0.91	no	52	54	0.71
0.91	H-66	52	57	0.25
0.91	H-88	52	58	0.22

Table 1.